# An Archaeological survey in the Severn Vale, Gloucestershire:
# A Highlight Report for the National Mapping Programme

Stephen Crowther and Amanda Dickson

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Gloucestershire COUNTY COUNCIL

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# A Highlight Report for the National Mapping Programme

## Historic England; NHPCP project no. 6585

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2016



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Front cover: View looking 0east from the Cotswold over the Severn Vale, with the River Severn in the background and former Second World War military hospital (now a prison) at Tortworth in the foreground – NMR 26758/015 27-OCT-2010 © Historic England

# SUMMARY

This report describes the results of a survey to identify, map and record archaeological remains visible on aerial photographs and lidar remote sensing images in the Severn Vale, encompassing areas in Gloucestershire and South Gloucestershire, with a small area within Bristol. The report provides a synthesis of the archaeology recorded in order to inform heritage protection in the project area.

The project was undertaken by Gloucestershire County Council Archaeology Service as part of the Historic England National Mapping Programme. This report covers an area of 737 square kilometres divided into three phases, extending from just north of Cheltenham southwards down the Severn Vale to the northern suburbs of Bristol. The project began in August 2013, and mapping and recording ended in January 2016.

The aerial survey was undertaken in an area where strategic development land allocations are concentrated, and where there had been no previous projects using National Mapping Programme (NMP) standards. As projects using NMP methods are a productive source of new archaeological information in rural landscapes, the results from the Severn Vale NMP project will allow areas under threat from development to benefit from an enhanced and more accurate historic environment record.

The project identified and mapped an archaeological landscape with components ranging in date from the Neolithic to the 20th century. 729 new site records were created in the National Record of the Historic Environment for England (NRHE), an increase of 28.2% in the project area. A further 524 records were updated with new information. In total 38.2% of the current monument record was produced or improved by this project, an average of 1.7 monument records per square kilometre. This information was supplied to the Gloucestershire, South Gloucestershire and Bristol Historic Environment Records to directly inform strategic heritage protection. NRHE records are accessible online via the Pastscape website.

The two major archaeological themes which emerged from the project results were earthworks relating to medieval and post-medieval agriculture and evidence for Second World War installations. Scheduled Monuments were also rapidly assessed using aerial

photographs, and lidar where available, to review interpretation, location, and potential management issues.

# ACKNOWLEDGEMENTS

The Severn Vale NMP project was carried out by Amanda Dickson and Stephen Crowther of Gloucestershire County Council Archaeology Service (GCCAS) and was funded by Historic England's Heritage Protection Commissions (HPC). Helen Keeley was the HPC Project Assurance Officer. Helen Winton of Historic England (Aerial Investigation and Mapping team) acted as the NMP Quality Assurance Officer and Toby Catchpole of GCCAS was Project Manager.

Special thanks go to Historic England Archive Services team, in particular Luke Griffin who provided the main aerial photographic sources and Chantelle Smith, from the Corporate GIS team who provided Ordnance Survey data. Special thanks also to Tim Grubb of Gloucestershire County Council who provided Historic Environment Record data, and assistance throughout.

Many thanks also go the Historic England Aerial Investigation and Mapping team for their expertise and advice, for quality assurance and for supplying the APGB and lidar data. APGB images were supplied to Historic England by Next Perspectives through the Pan-Government Agreement. Lidar data was supplied to Historic England by the Environment Agency and all images are ©Environment Agency copyright 2015. All rights reserved.

Many thanks also to Sue Adams, who provided her research on Gaunt's Earthcott and mapped Bury Hillfort for the team, which was incorporated into the final project mapping. Grateful thanks go to Barclay Barrell who kindly gave permission to use his photographs.

Thanks to Alun Martin, Photographic Librarian, for providing aerial photograph loans from the Cambridge University Collection of Aerial Photography. Digital copies of RAF airfield plans were supplied by kind permission of the Trustees of the Royal Air Force Museum.

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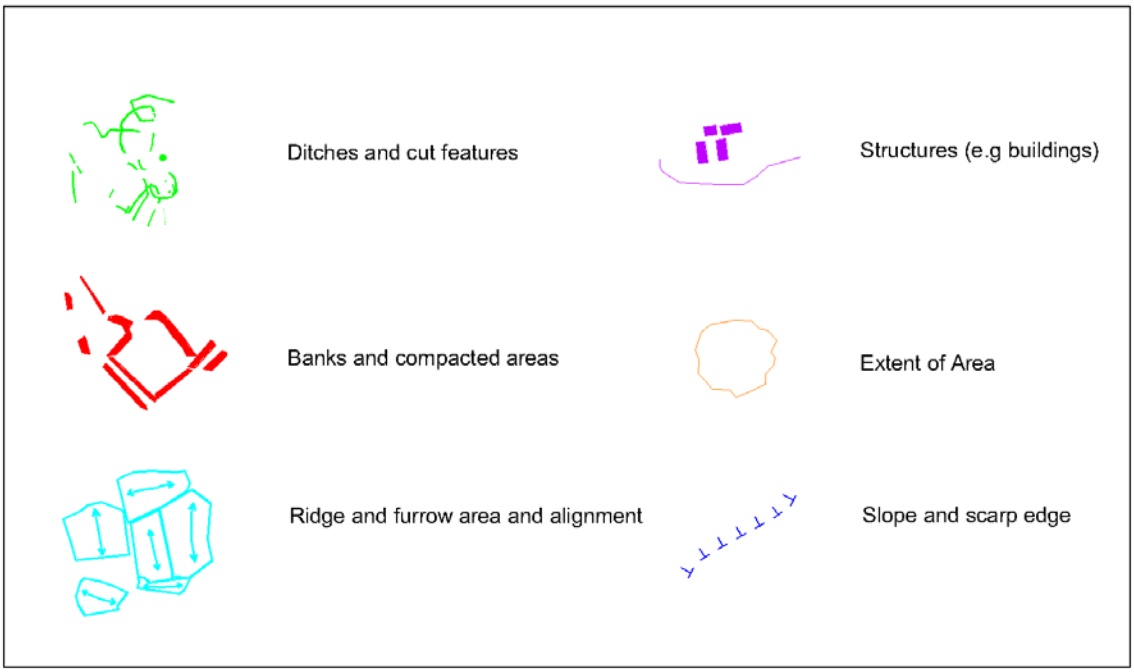
# ABBREVIATIONS

| | |
|---|---|
| ALSF | Aggregates Levy Sustainability Fund |
| AMIE | Archives and Monuments Information, England (part of the NRHE) |
| CUCAP | Cambridge University Collection of Aerial Photography |
| HEA | Historic England Archives |
| GCCAS | Gloucestershire County Council Archaeology Service |
| GCHER | Gloucestershire County Historic Environment Record |
| HAR | Heritage at Risk |
| HER | Historic Environment Record |
| Lidar | LIght Detection and Ranging (airborne laser scanning) |
| MOD | Ministry of Defence |
| NHLE | National Heritage List for England |
| NHPP | National Heritage Protection Plan |
| HPC | Heritage Protection Commissions |
| HPCT | Heritage Protection Commissions Team |
| NMP | National Mapping Programme |
| NRHE | National Record of the Historic Environment (formerly NMR) |
| OS | Ordnance Survey |
| APGB | Aerial Photography for Great Britain |
| RAF | Royal Air Force |
| RCZAS | Rapid Coastal Zone Assessment Survey |
| UDS | Unified Designation System (formerly ‘scheduling’) |

# MAPPING CONVENTIONS

These mapping conventions are used in illustrations throughout this report unless otherwise stated.



# 1 INTRODUCTION

## 1.1 Background

This highlight report describes the main results from all phases of a three-part archaeological aerial survey project covering the Severn Vale, in the historic county of Gloucestershire (Fig 1). A significant proportion of Gloucestershire has been covered by previous NMP projects in response to other priorities and this project filled in the gap between seven other previous NMP projects.

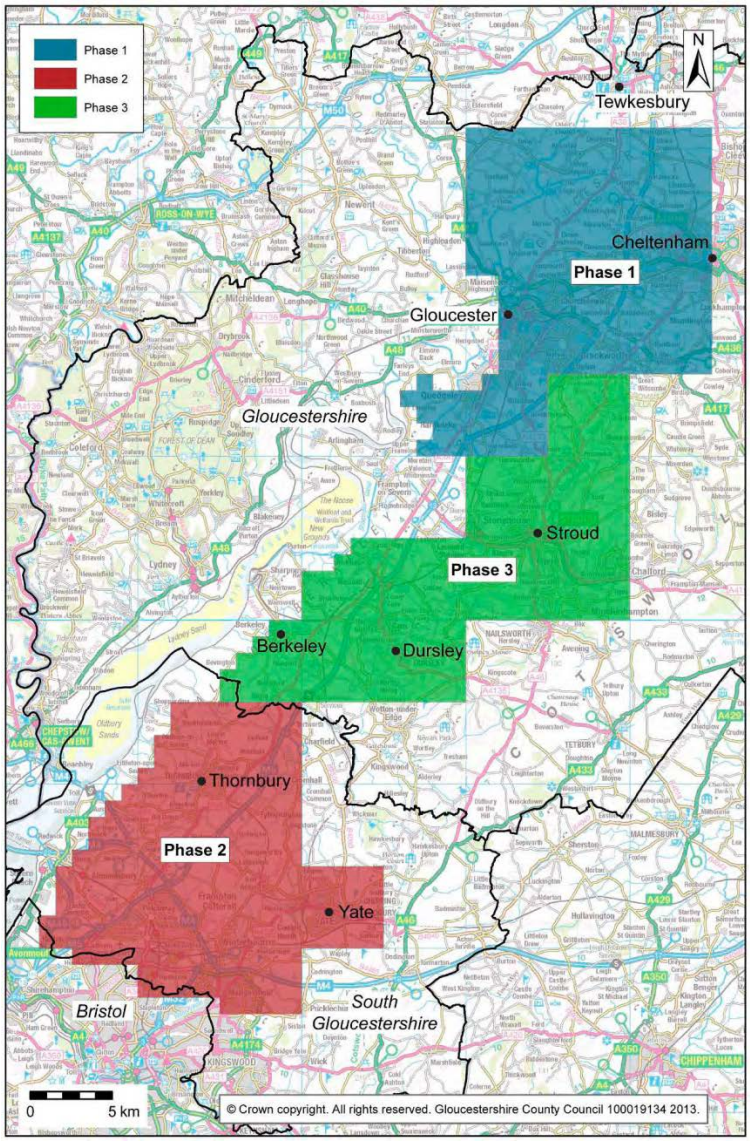



**Figure 1. The three phases of the Severn Vale NMP project. Phase 2 also covered part of South Gloucestershire and a small area of Bristol. (Catchpole & Dickson 2013).**

Adjoining NMP projects included the Frampton on Severn Aggregates Levy Sustainability Fund (ALSF) (Dickson 2006), the Severn Estuary Rapid Coastal Zone Assessment Survey (RCZAS) (Dickson and Crowther 2008), the Leadon Valley ALSF (Priest *et al.* 2009), and The Cotswold Hills NMP (Janik *et al.* 2011), all completed by the GCCAS NMP team. The Carrant Valley Landscape (Bishop 2009), North Gloucestershire Cotswolds (Stoertz 2012) and Forest of Dean (Small *et al.* 2006), were completed by Historic England's Aerial Investigation & Mapping team (Fig 2).

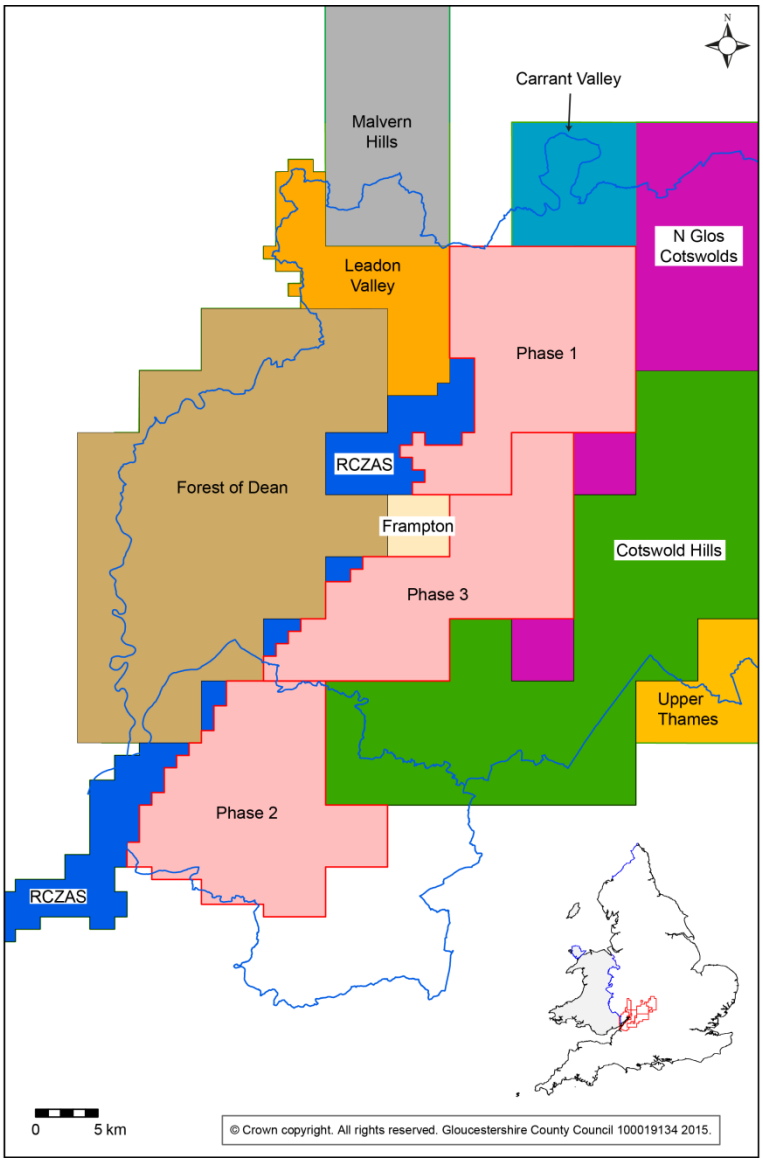



**Figure 2.The three phases of the Severn Vale NMP project and contiguous NMP projects (after Catchpole & Dickson 2013).**

As the Severn Vale project area filled in the remaining gaps in NMP coverage, Gloucestershire is now completely covered by archaeological aerial surveys. This project

ensures that this additional archaeological information is available for the whole County and can inform any current or future strategic development allocations within Gloucestershire (Catchpole and Dickson 2013: 14-19). As NMP is one of the most productive sources of new archaeological information, the Severn Vale NMP survey will allow for an enhanced and more accurate historic environment record.

The project was undertaken by Gloucestershire County Council Archaeology Service (GCCAS) to Historic England National Mapping Programme (NMP) standards and began in August 2013; mapping and recording was completed in January 2016.

The project was funded through the Heritage Protection Commissions Programme (HPC) of Historic England and contributed directly to the National Heritage Protection Plan Measure 3: 3A4 Identification of Terrestrial Assets via non-intrusive Survey (English Heritage 2011a and 2001b) and the Strategic Framework for Historic Environment Activities and Programmes in English Heritage Research Programme A1: What's Out There? Defining, characterising and analysing the historic environment, Sub-Programme: National Mapping Programme: recording and mapping archaeological landscapes using aerial photographs (SHAPE 32111.110) (English Heritage 2008:57).

The Severn Vale NMP project has contributed to the historic environment sector's framework for strategic priorities for England from 2015 to 2020, as set out in Heritage 2020 (The Heritage Alliance 2014). Discovery, understanding, and identification of the historic environment remain key strategic priorities. New discoveries identified by the NMP project will enhance understanding of local, regional and national heritage, adding value to the knowledge economy and will provide a better appreciation of the risks to the historic environment, facilitating better conservation management and decision-making.

The project has fed directly into Heritage 2020's priority theme 3.9: Developing a more strategic approach to risks and opportunities. It has contributed to Heritage 2020's priority theme 3.10: Addressing undiscovered and under-appreciated heritage (The Heritage Alliance 2014). The NMP dataset has provided accurate, up-to-date baseline archaeological aerial survey data that will be important for understanding the significance of the archaeological resource and so better inform strategic planning decisions and mitigate the impact of risk factors.

Constructive conservation and sustainable management are also identified as strategic priorities in the Heritage 2020 framework. The Severn Vale NMP project has assisted the work of designation teams as identified in Heritage 2020's priority theme 4.15: Preventing and tackling heritage at risk) by producing evidence-based recommendations for further assessment, leading to potential designation of new heritage assets (The Heritage Alliance 2014). The project has provided information on current mapping accuracy of Scheduled Monuments and provided evidence on recent condition changes. This data will support policy advice on the location of major development as part of strategic planning.

The proposed NMP project has engaged with Heritage 2020's priority theme 4.16: Contributing positively to the growth agenda by providing enhanced baseline historic environment data to inform guidance for strategic planning and sustainable growth policy (*ibid* 2014). Heritage 2020's priority theme 4.17: Supporting landscape-scale management (*ibid* 2014) has also been addressed by the project, its holistic dataset providing landscape-scale appreciation of heritage assets, informing conservation policy to mitigate the impact of future and evolving land management and environmental strategies.

The project has also met the aims of the Historic England Action Plan (2015-2018) (Historic England 2015) by addressing Corporate Objective 2:2 [Identify, record and define the significance of heritage that is poorly understood, under-represented or most at risk]: Corporate Objective 3:4 [Target dedicated resources to support Heritage Action Zones in those places where growth offers the biggest opportunities and challenges for heritage]: and Corporate Objective 4:3 [Work with others to assess and deliver the heritage skills required by local authorities, owners and others].

The Severn Vale NMP project has addressed a number of priorities identified by the NMP Strategy (Horne 2009): to encourage NMP projects in those areas most likely to see major new house building and infrastructure schemes; to provide baseline data for strategic planning decisions and to place the results of developer-funded work in context; and to encourage NMP projects in those areas where arable farming is most intense.

## 1.2 Aims & Objectives

Projects using Historic England's National Mapping Programme standards aim to enhance the understanding of past human settlement by providing primary information and synthesis for all archaeological sites and landscapes visible on aerial photographs or other airborne remote sensed data. This comprehensive synthesis of the archaeological information available on aerial photography is intended to assist research, planning, and protection of the historic environment (Horne 2009). Each project responds to specific threats or research questions.

The specific aim of the Severn Vale NMP project was to enhance the evidence base for the historic environment and thereby to assist with strategic planning and development management in Gloucestershire and South Gloucestershire (Catchpole & Dickson 2013). The results will also improve advice given to Natural England; landowners and consultants regarding agri-environment scheme applications and renewals. This is achieved through enhancing both HERs and the NRHE with NMP standard data, including monument records and a geo-referenced digital transcription indicating the form and extent of all archaeological features mapped.

The project also aimed to identify the potential significance of archaeological sites and landscapes to inform local or national designation. The project included a rapid review of Scheduled Monuments, using aerial photographs and lidar, to assess interpretation, the accuracy of extent and location of the schedule description, and to highlight potential management issues.

## 1.3 Methods

The NMP standard is to map and record all archaeological features visible on aerial photographs whether they are buried features revealed as cropmarks, soilmarks, parchmarks or features visible at the surface such as earthworks and structures. This includes sites with dates ranging from the Neolithic, through to near the present, including 20th century military features.

The project systematically examined all available aerial photographs, mostly from the Historic England Archive (HEA). The archive includes vertical photographs taken for non-archaeological purposes and specialist oblique aerial photographs that focus on archaeological and architectural sites and landscapes. Other sources included aerial photographs from the Cambridge University Collection of Aerial Photography (CUCAP) and Gloucestershire County Council Archaeological Service. Aerial Photography for Great Britain (APGB) are georeferenced and orthorectified vertical aerial photographs in 1 square kilometre digital TIFF format tiles which were supplied by Next Perspectives™. Lidar (Light detection and ranging) images derived from Environment Agency airborne laser scanning data were used where available. Online resources such as Google Earth (http://earth.google.com/) provided relatively recent georeferenced vertical aerial photographs.

Relevant aerial photographs were transformed (made suitable for digital mapping) using specialist orthrectification software (Aerial 5.29 and Aerial 5.36), using control from the Ordnance Survey 1:2,500 scale mapping and digital terrain model. This provided an accuracy of less than two metres error to the 1:2,500 scale map for the orthrectified photographs. The Ordnance Survey advises that their 1:2,500 scale map data has an accuracy of ±0.4 metres for rural towns and ±1.1 metres in all other rural areas. The archaeological features transcribed for the Severn Vale NMP project, therefore, will on average be accurate to within two to three metres of true ground position. Archaeological features were traced from the georeferenced and orthorectified photographs in AutoCAD Map 3D 2012 using standard NMP drawing conventions (See Appendix 3 for more details).

New discoveries and amendments to known sites were recorded in the National Record for the Historic Environment (NRHE). The digital drawing files are available from the Historic

England Archive and Gloucestershire County Council HER (GCHER). The monument records are available on the Historic England PastScape website (http://www.pastscape.org.uk/) and from GCHER through Heritage Gateway (http://www.heritagegateway.org.uk/).

## 1.4 PROJECT AREA

### 1.4.1 Background

The Severn Vale NMP project area covered 737km², encompassing areas identified as being under potential development pressure. The western edge of the Severn Vale NMP project area was defined by the eastern border of the completed Severn Estuary RCZAS NMP polygon. For the remainder of the project area, entire OS quarter sheets were used in defining the project polygon, except on the northern fringes of Bristol where 1km squares were used to avoid covering large historic built-up areas.

The project area was divided into three phases of roughly equal area for project management purposes (Fig 1). Phase 1 encompassed 250km², Phase 2 was 248 km² and Phase 3 was 239km². The boundary between Phases 2 and 3 was chosen near the county boundary so that communications and data exchanges were mainly with one HER per phase. Phase 1 comprised the northern part of the project area including parts of Gloucester, the west part of Cheltenham and extended south down the Severn Vale as far south as Haresfield. Included within this phase was a discrete area of 0.997km² in OS quartersheet SO82NW, which lay within Eldersfield Parish in Worcestershire. The remainder of the phase lay within Gloucestershire. Phase 2 comprised all the OS quartersheets that lay wholly or mostly in South Gloucestershire, including the towns of Thornbury, Yate and Bradley Stoke, the Cribbs Causeway and Patchway commercial and industrial developments and Filton Airport. About 5.5km² of the project area lay within Bristol in OS quartersheet numbers ST58SW, ST58SE, ST57NE and ST67NW. Phase 3 comprised the remaining central part of the project area, which included the Vale of Berkeley, Stroud, Stonehouse, Minchinhampton and Dursley.

### 1.4.2 Topography

The topography of the whole Severn Vale NMP project is broadly similar in its disposition: to the west of the project area is fertile low-lying land adjacent to the River Severn, which rises slowly eastwards to the steep-sided valleys and footslopes of the Cotswold Hills, culminating on the project's eastern border at or upon the Cotswold Hills escarpment (Fig 3). However, the topography within each phase varies.

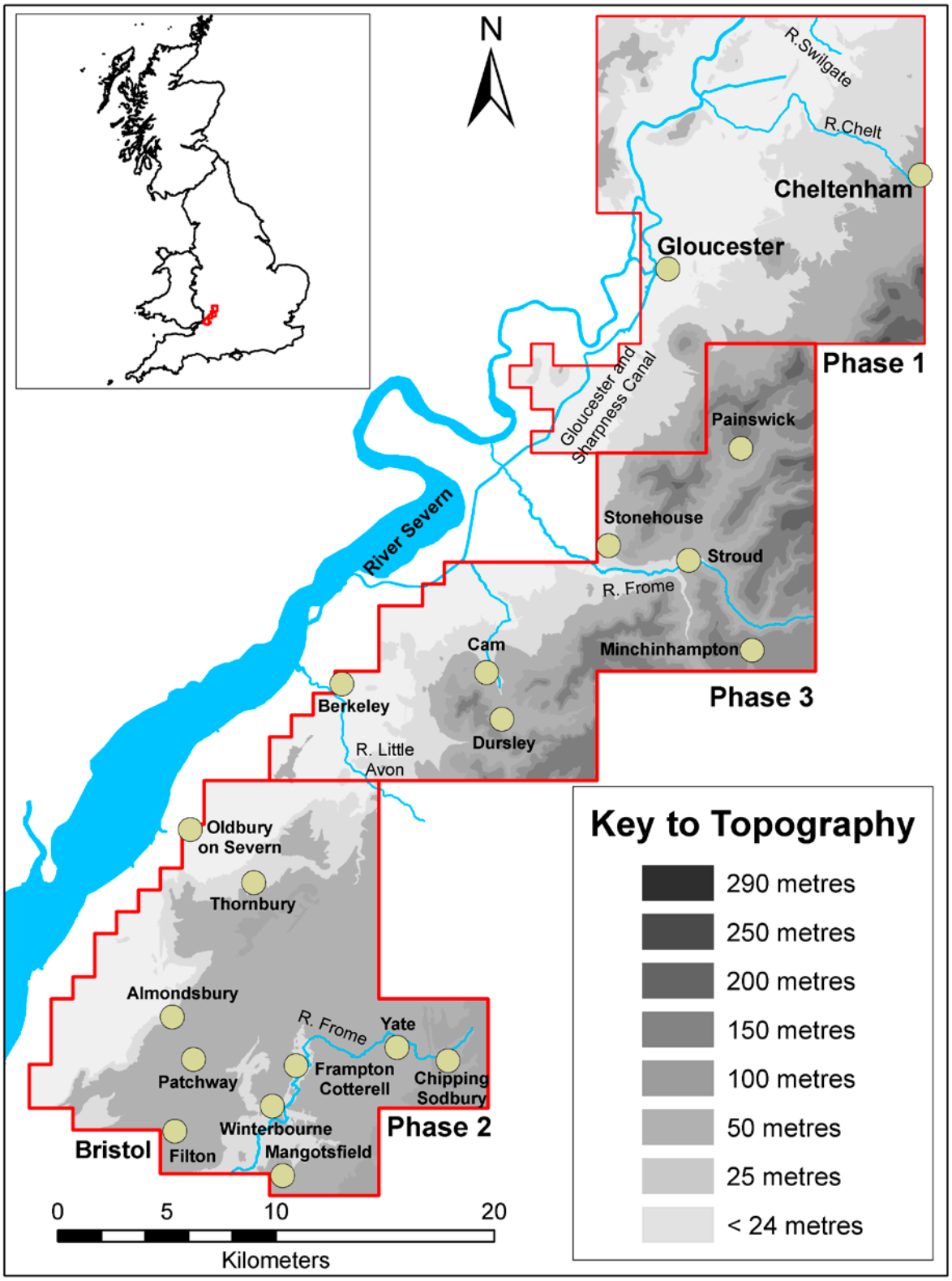



**Figure 3.** The topography of the Severn Vale NMP project area. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.

The Phase 1 area comprises the low lying Severn Vale, with much of the area rising no more than 25 metres above Ordnance Datum. The tidal River Severn flows southwards

through the western parts of the project area, widening into the estuary to the south. The River Chelt flows westwards from the Cotswold escarpment through Cheltenham and feeds into the River Severn at the foot of Norton Hill. In the central south part of the Phase 1 area, Robinswood Hill and Churchdown Hill are two outliers of the Cotswold Hills and rise to 198 metres and 155 metres OD respectively. To the east of the project area, the slopes of the Cotswold escarpment rise to 296 metres OD at the highest point near Birdlip.

The Phase 2 area is located at the southern end of the Severn Vale, the land rising to the east in ridges and terraces that extend eastwards towards the Cotswold Hills escarpment just outside the eastern border of the area. Much of the area does not rise over 100 metres OD, much of Bristol's extensive northern suburbs and outlying settlements being located between 50 and 100 metres OD.

The low lying fertile Vale of Berkeley dominates the southwest of the Phase 3 project area, rising not much more that 25 metres OD with the exception of Whitcliff Deer Park which rises to 55 metres OD. The low lying topography gives way to rising fingers of land separated by steep-sided valleys that dominate much of the eastern half and northern part of the area, reaching over 250 metres OD and presaging the Cotswold Hill escarpment.

### 1.4.3 Geology

The following geological information is taken from 1: 625,000 scale British Geological Survey (BGS) digital mapping available at http://maps.bgs.ac.uk/geologyviewer and information produced by South Gloucestershire Council (SGC 2007). Basic soil typology information has been accessed from Cranfield University's National Soil Resources Institute (*NSRI)* Soilscapes website ( http://www.landis.org.uk/soilscapes).

## Solid geology

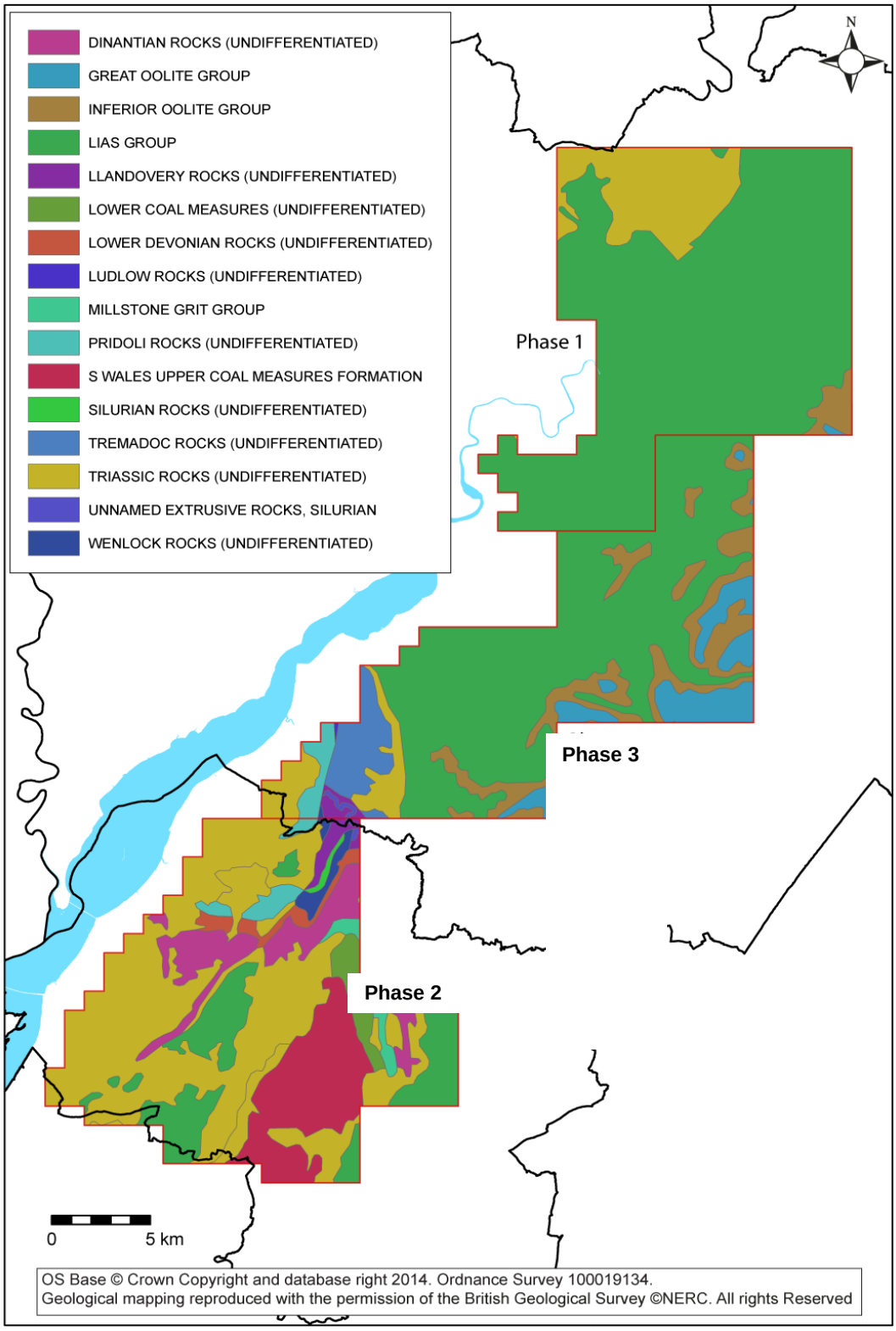



**Figure 4. Solid geology of the Severn Vale NMP project area (from BGS mapping) (Dickson and Catchpole 2013).**

The solid geology of the Phase 1 project area is composed of mainly Triassic and Jurassic Lias Group (Blue Lias and Charmouth Mudstone), with late Triassic rocks of the Mercia Mudstone formation (Keuper Marl) outcropping in the northwest and limestones of the inferior Oolite Formation at the Cotswold Scarp to the southeast (Fig 4) (Dickson and Catchpole 2013).

A major fault line runs across Phase 2 area southwards from near Berkeley to Stone, where it divides. Massive fracturing has been caused in a broad swathe either side of the fault between Berkeley and Stone, from where it runs south towards Coalpit Heath. The earliest rocks are Ordovician, which outcrop east of the fault mainly in Hamfallow and Alkington parishes, but a complex sequence of Silurian and Devonian rocks also outcrop in the general area. These relatively soft rocks form areas of low relief (SGC 2005).

Much of the Phase 2 area sits on the North Bristol Coalfield syncline, comprising folded Carboniferous rocks. Lower Carboniferous limestones outcrop in a band stretching south-west across the area from roughly Tytherington to Almondsbury, where the later rocks have been eroded away, and on the other side of the syncline, running north-south near Yate. The limestones were overlaid by further bands of Carboniferous rock before the formation of the syncline, including the Cromhall Sandstone and the Coal Measures, which form the bedrock in a broad band running north-eastwards from Mangotsfield. The Coal Measures generally form lower lying vales between ridges of harder limestone and sandstone (SGC 2005). Despite the name the majority of the rocks in the Coal Measures are sandstones (including Pennant Sandstone), but numerous coal mines were present in the area. There are over 70 records of collieries and coal mine related features recorded on the South Gloucestershire HER within the project area. Once the syncline had been eroded to an almost level plain it was overlain by sedimentary rocks of Triassic date (Mercia Mudstones and Lias Group), as seen further north. These form the bedrock in the western and north-western parts of Phase 2, from Frampton Cotterell westwards except where the harder underlying Carboniferous limestone forms ridges and hills, and from Falfield westwards at the north end of the phase area. In the south-eastern corners of the project area the Blue Lias and Jurassic Charmouth Mudstone sequence again forms the bedrock.

Most of the solid geology within Phase 3 is relatively simple, though the western part is slightly more complex. The larger proportion of the eastern side lies on limestone of the

inferior Oolite Formation at the Cotswold Scarp. In the south-eastern corner, the Phase 3 area extends onto the Cotswold plateau in Bisley and Minchinhampton parishes, where the surface rocks are of the overlying Great Oolite Group. The Frome valley cuts through these revealing the earlier underlying rocks through Brimscombe and Chalford (SGC 2005).

**Drift geology**

There are significant drift deposits in the Phase 1 area. The area bordering the banks of the River Severn overlies alluvial deposits, which also extend east beyond the river around Leigh, Norton and Gloucester (Fig 5). Cheltenham sand and gravel deposits extend eastwards from Gloucester and are extensive in the eastern part of the project area (Dickson and Catchpole 2013).

The drift geology may have served to affect the identification of archaeology by the aerial survey. River alluvium may obscure sub-surface archaeological features from the air (Wilson 2000). The areas of Cheltenham Sands also have a low density of buried remains recorded as cropmarks, possibly due to the variable depth of overlying soils (Mullin 2008). The landslip areas at the base of the Cotswold escarpment form a small part of the project area, but are also not particularly conducive to cropmark formation (Dickson and Catchpole 2013).

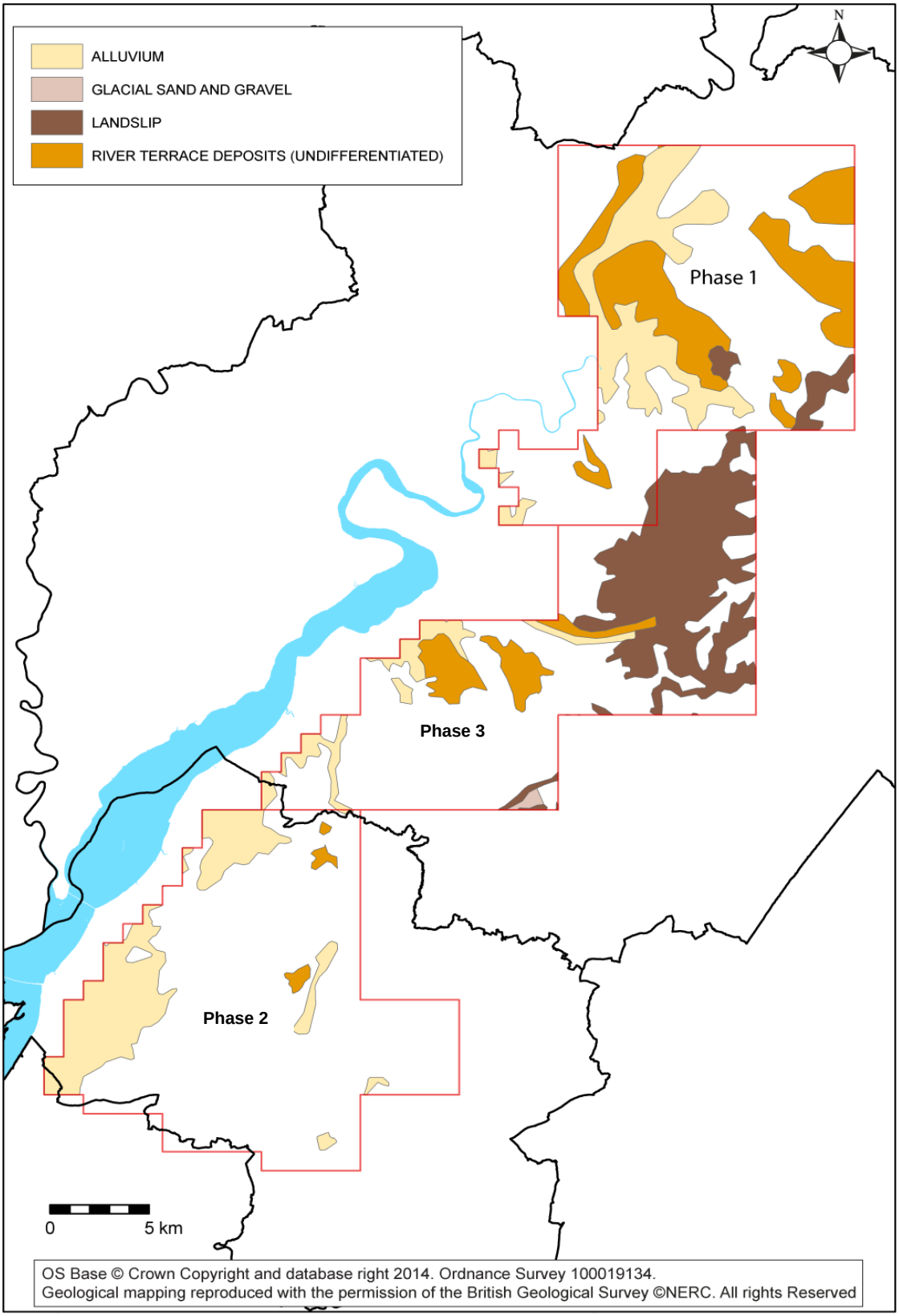



**Figure 5. Drift geology of the Severn Vale NMP project area. (from BGS mapping) Cheltenham sands and gravels are included in the River Terrace Deposits. (Dickson and Catchpole 2013).**

Tidal flat deposits are present in two broad swathes, one north of Oldbury and Thornbury inland to Rockhampton; and the second over most of the area located to the west of the M5 and south of the M48 motorways. Alluvium is also associated with the Ladden Brook, between Iron Acton and Tytherington, where there is an area of river terrace. There is another small terrace south of Falfield.

Limited tidal flat deposits are present where the project area is near to the River Severn in Ham and Stone and Berkeley parishes, where river alluvium is also associated with the Little Avon River. There is another river alluvium area near Slimbridge and a narrow band along the River Frome. At Frocester and Slimbridge there are further deposits of Cheltenham Sand and Gravel. Small gravel terraces are found associated with the River Frome and around Frampton on Severn and Arlingham, which are the most southerly terraces in the Severn Vale. Much of the eastern part of the Phase 3 area contains landslip deposits derived from the nearby Cotswold scarp.

**Soils**

Soils are dominated by lime-rich loamy and clayey soils, with impeded drainage. The alluvial areas near the River Severn have loamy and clayey floodplain soils with naturally high groundwater, whereas the areas that generally equate to Cheltenham sand and gravel have more free draining lime-rich loamy soils. In the south east of the phase 1 area, at the base of the Cotswold escarpment, slowly permeable and seasonally wet slightly acid but base-rich loamy and clayey soils make way for shallow lime-rich soils over limestone on the Cotswold Hills.

The soils reflect the underlying geology. Broadly overlying tidal flat deposits are naturally wet, loamy and clayey soils of coastal flats. Slightly acid, loams and clays with impeded drainage overlie the Triassic rock in the west and in a band through Winterbourne and Tytherington. Overlying Carboniferous limestone are freely draining, slightly acid but base-rich soils. From roughly Filton Abbey Wood to Alvington, slowly permeable, seasonally wet, basic loams and clays are associated with Carboniferous that is overlaid with Triassic rocks. Slightly acid loamy soils encircle the coal measures. Slowly permeable, seasonally wet, acid loams and clays are located around Coalpit Heath and Mangotsfield and also around Engine Common and Bagstone. Along the complex area near the fault line in the north-eastern part of the phase area are found mostly slightly acid, loams and clays with impeded drainage.

Shallow lime-rich soils over limestone are on the higher ground, with slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils in the Cotswold river valleys. Slightly acid loamy and clayey soils with impeded drainage dominate in this area of the scarp; and lime-rich loamy and clayey soils with impeded drainage are localised on areas of landslip. Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils and slightly acid loamy and clayey soils with impeded drainage are found in the Severn Vale with loamy and clayey floodplain soils with naturally high groundwater on alluvium and tidal flats.

### 1.4.4 Landscape character

The Severn Vale forms a major transport corridor; the M5 motorway and the main Bristol to Birmingham railway line bisect the project area NNE-SSW. The landscape comprises the low lying Severn Vale, with much of the northern part of the area being very agricultural. To the south, urban areas dominate the landscape, with the northern suburbs of Bristol, Bristol Filton Airport, the M4, M32, M48 and M49 motorways, and the Almondsbury M5/M4 motorways interchange (Fig 6).

The landscape of the Phase 1 area is a mixture of rural and urban. Low lying flood meadows adjacent to the River Severn merge into to the largely flat clay fields of the vale. The expanding urban areas of Gloucester and Cheltenham dominate the central southern and eastern parts of the area. The industrial and commercial retail area on the outskirts of Gloucester include the former Gloster Aircraft Company's factory airfield east of Gloucester city at Brockworth and the extant and expanding Gloucestershire Airport (formerly RAF Staverton and Staverton Airport) between the city and Cheltenham town.

The landscape character of the Phase 2 is split: the southern third of the area is dominated by the northern residential and industrial and commercial outskirts of Bristol city, expanding northeast to almost conurbate with Yate and Chipping Sodbury. The large retail and commercial complex of Cribbs Causeway at Filton has encroached towards Bristol Filton Airport and another large retail complex at Aztec West, Patchway. Major road and railway transport links to London, to Wales, the north and to the southwest all intersect in the southern half of the area, the former at the M4/M5/M48 Almondsbury Interchange and the

latter at the diamond of loops formed by the Patchway/Filton/Filton West/Stoke Gifford junctions. The remaining two-thirds of the Phase 3 area to the north is distinctly agricultural, containing only small nucleated villages and the town of Thornbury, the remaining land a rural fieldscape with wooded gentle hills, cut through by the M5 motorway.

The east of the Phase 3 area comprises steeply wooded and sinuous valleys of the Cotswold Hill scarp, five of which converge at Stroud (Chalford or 'Golden' Valley, Ruscombe Valley, Nailsworth Valley, Slad Valley and Painswick Valley). These valleys constrain the main settlements of Stroud, Woodchester, Brimscombe, Chalford and Nailsworth, as well as roads and railway lines. Other villages such as Dursley, Cam and North Nibley are located on the lower slopes of the Cotswold escarpment. Other villages are sited atop the Cotswold Hills escarpment such as Edge, Cranham, Painswick, Nympsfield, Minchinhampton, Eastcombe and Bussage. Large areas of historic commonland are associated with these settlements, particularly the extensive Minchinhampton Common, Rodborough Common, Selsley Common, Cranham Common and Edge Common, upon which are significant important prehistoric and medieval archaeological monuments remain as extant earthworks. The expanding town of Stonehouse is located to the west of Stroud on the River Frome. To the west of the Phase 3 area, the historic small town of Berkeley and its 11$^{th}$ century castle sits adjacent to the River Severn on a small 25 metres OD rise, surrounded by earthworks from the former medieval and post-medieval field systems and drainage systems.

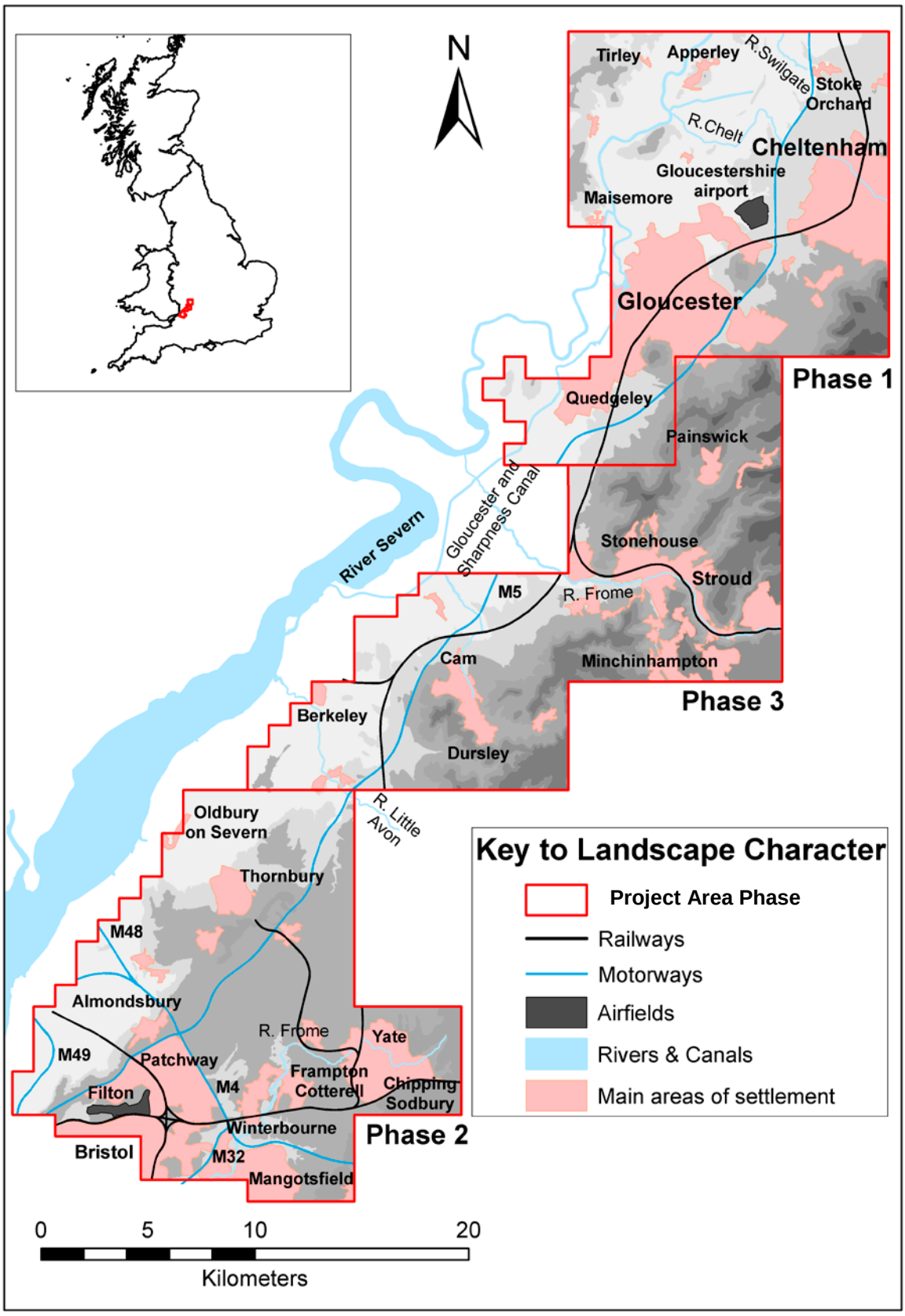



**Figure 6. The landscape character of the Severn Vale NMP project area. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

NMP mapping indicates that the low-lying rural landscape has until very recently been dominated by medieval and/or post-medieval agricultural earthworks. These arable earthworks survived when the landscape was enclosed for pasture between the 14th and 19th centuries (Wilson 2000), and their continued existence may mask sub-surface archaeology and impede cropmark formation, as observed in south-east Warwickshire (Priest and Dickson 2013). The steep slopes of the Cotswold escarpment at the eastern edge of the project's survey area were less used but some cultivation earthworks were recorded. Earthworks relating to prehistoric settlement and funerary or ceremonial activity are visible on the promontories and crests of the Cotswold escarpment.

# 2. FACTORS AFFECTING THE AERIAL SURVEY

## 2.1 Introduction

The survival and visibility of archaeological sites is affected by geology, soils and land use. The mapping and interpretation of such features from aerial photographs can be limited by a wide range of factors including extent of photographic cover; the scale of the photographs; an unfavourable time of day or year for optimal visibility; or climatic conditions such as haze (Wilson 2000: 47)

The survival of archaeological remains depends in part on land use; a largely pastoral agricultural regime does little harm to extant earthworks or sub-surface remains, whereas long term ploughing for arable cultivation can remove traces of past activity. In the project area, the dominant post-medieval land use was pastoral, so that medieval ridge and furrow cultivation survival was extensive along with some examples of shrunken settlements. Conversely, the survival of ridge and furrow earthworks, despite a recent expansion in arable ploughing, has likely reduced the visibility of buried remains as cropmarks in the project area. There were some archaeological features visible as cropmarks, where the ridge and furrow was plough levelled during the post-war period.

## 2.2 Factors affecting the detail visible on aerial photographs and remote sensing data

### 2.2.1 Vertical sorties

Vertical aerial photographs were taken, usually for non-archaeological purposes, throughout the 20th century, but mainly from the 1940s onwards. They were not necessarily taken during the optimal climatic conditions, time of year, or time of day for the best visibility of archaeological features; however they do offer extensive landscape-wide coverage at a range of scales and have the advantage of being taken to be viewed in stereo, giving a unique 3D image of an archaeological site or sense of topography within a landscape.

The majority of RAF vertical sorties and Ordnance Survey sorties cover the whole of England and were taken to aid new mapping to inform post-war planning and reconstruction. They are therefore a useful tool in studying changes within the landscape over the last 50+ years, including expansion of villages and towns, new and updated infrastructure and changes in agricultural regimes. The optimal scale range seems to be 1:15,000 scale or larger which accounts for the most of the HEA collection, but even small-scale prints can be an important source where changes, if not great details, are recorded (Winton & Horne 2010). For example, aerial photographs may show the original context of Second World War military remains which now exist in only a fragmentary state. Additionally, they may record details of military buildings, structures, earthworks, or even cropmarks which have been subsequently ploughed level, removed, or built over. This is important in an area such as the Severn Vale project, with a high incidence of Second World War military airfields, defences, camps and other military installations.

Google Earth, APGB aerial photographs and the 1940s RAF vertical photographs provided the most complete coverage of the project area. Runs of Ordnance Survey vertical photographs were less consistently available, partly due to the fact that the OS only photographed areas where updates to their mapping were required. The RAF coverage was the most important source for mapping the medieval ridge and furrow prior to changes in agricultural land use from the 1950s onwards, as the medieval landscape was largely levelled by the 1970s. Later (post-1960s) Ordnance Survey and recent APGB aerial photographs were useful for the identification of cropmarks, even though the surveys were not archaeologically focused.

### 2.2.2 Oblique aerial photographs

Oblique aerial photographs, usually taken for a specific purpose, often provide large-scale targeted coverage of a particular archaeological site or other feature of interest and can therefore offer a good level of detail. They are also mainly (though not always) specifically taken at a good time of year for the visibility of cropmarks, or at the best time of day to reveal the presence of subtle earthworks (Wilson 2000: 30-40). However, the targeted approach has, in the past, tended to concentrate on areas where cropmarks could be expected to occur, resulting in poorer coverage in areas where ground conditions were less suited to cropmark formation. More recent archaeological reconnaissance has sought to redress the balance.

Analysis of the oblique coverage in the project design identified that there were concentrations of photographs particularly over well-known sites, such as the earthworks at Minchinhampton Common (Catchpole & Dickson 2013: 46). There were 61 obliques which were taken in 1976 and 1986/7 over the project area, which were mostly concentrated within Phase 3 of the project area. These dates are famous drought years when many sites were first recorded as cropmarks. Though most of the prehistoric features identified as cropmarks in the project were recorded from oblique photographs taken in 1983 and from more recent aerial photographs, they were still concentrated within Phase3.

Targeted oblique aerial photographic surveys tend to be taken from light aircraft and are often limited by airspace restrictions, particularly those that have been in place over a long period of time such as at Filton and Staverton. Restrictions due to safety have also limited flying activity, for example over part of Slimbridge (WWT Sanctuary) during September to April, when large numbers of migrating birds overwinter in this part of Gloucestershire. As such there are fewer specialist oblique photographs available for these areas.

### 2.2.3 Lidar imagery

Lidar has proved useful for the identification of low earthworks in other NMP projects, especially where no vertical aerial photographs with suitable lighting are available (H. Winton pers. comm.). It also has the advantage of being georeferenced and not requiring rectification so is quick and easy to use.

Environment Agency lidar tiles available from Historic England did not cover the whole project area so some archaeological features, especially low earthworks, may have been missed as a result of the limited coverage. This may have been mitigated by the relatively small percentage of the project area under woodland and the good vertical coverage.

Cranham lidar data provided by GCHER was extremely useful in filling in blanks in EA lidar coverage and resulted in the addition of numerous new archaeological earthwork features to the NRHE record.

## 2.3 Surviving earthworks

### 2.3.1 Regional context for ridge and furrow cultivation

Throughout Gloucestershire, the evidence recorded during NMP projects from recent aerial photographs and lidar suggests that most of the ridge and furrow is ploughed level or nearly level. Some open fields were destroyed during urban expansion, for example around Gloucester and Cheltenham. The South East Warwickshire and Cotswold Hill NMP project (Priest and Dickson 2013: 57) found that 73% of ridge and furrow visible as earthworks in the 1940s has since been levelled. A similar low level of earthwork survival is evident in the Severn Vale (Fig 7). Pockets of ridge and furrow do survive as earthworks and could be considered for local heritage protection especially where they are part of a pattern of settlement, land division and other agricultural earthworks. This is an important consideration given the relatively poor survival of good examples of medieval open fields identified in the region.

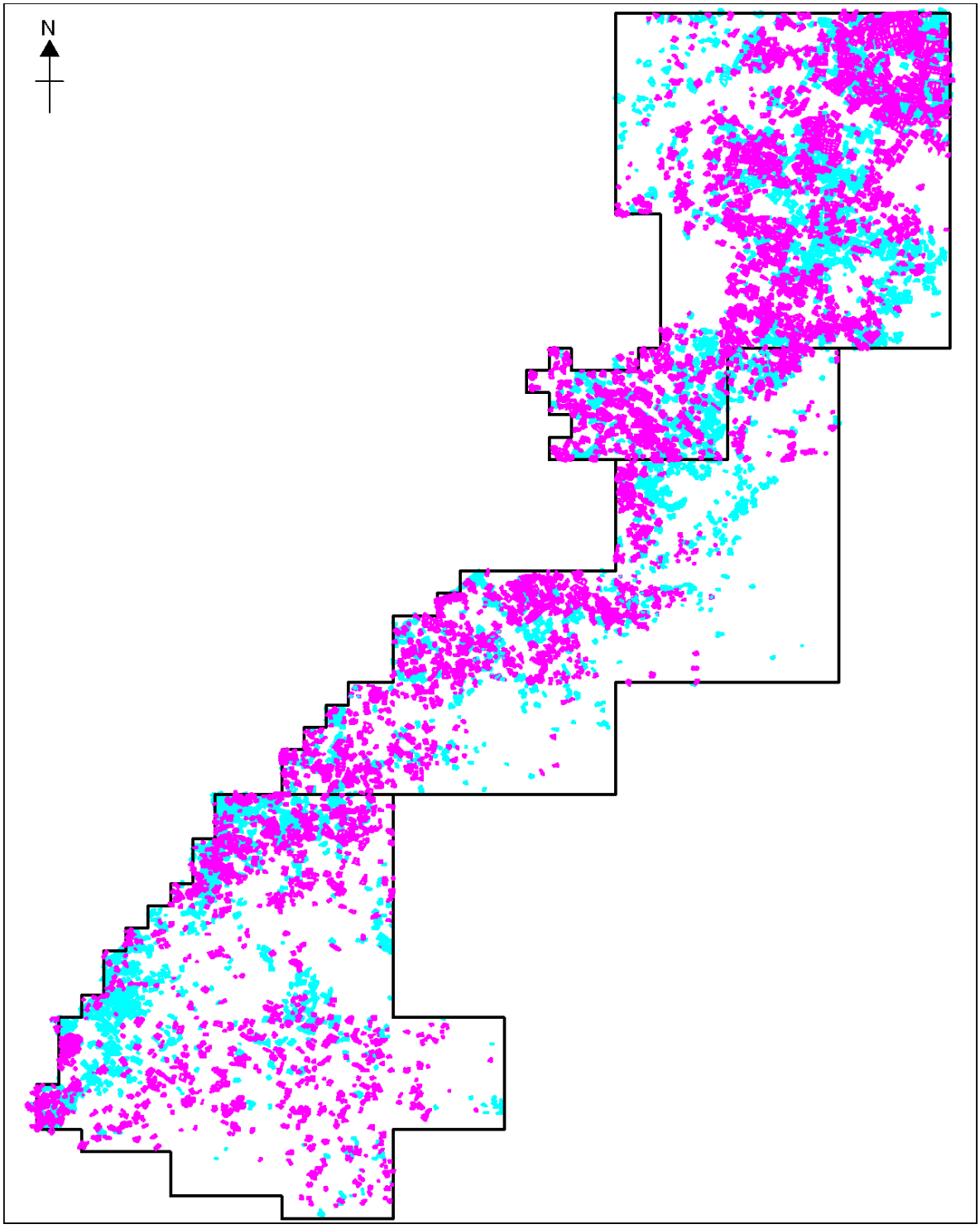



**Figure 7. Earthwork survival in the project area. Surviving ridge and furrow earthworks are shown in light blue and levelled earthworks and cropmarks in pink. Much of the ridge and furrow visible as cropmarks were plough-levelled in the post-war period. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

It is possible that the levels of earthwork survival are slightly better than suggested by the archaeological mapping. For example, the Turning the Plough Update Assessment (Catchpole and Priest 2012) used specially taken oblique aerial photographs to assess the

survival of previously identified open field systems in the Midlands (Hall 2001). That project concluded that aerial photographs taken in the right conditions, specifically to record ridge and furrow, indicated that earthwork survival was usually better and often more extensive than previously thought (Catchpole and Priest 2012). It is suggested that a regional survey for Gloucestershire, similar to the original Turning the Plough study, may identify the most significant 'township' field systems and their survival. The NMP mapping would provide a framework for this kind of study and information on the 'lost' elements of the medieval open fields.

### 2.3.2 Unmasking the ridge and furrow cultivation

A smaller than expected number of buried later prehistoric and/or Roman archaeological features was revealed as cropmarks within the project area. This is in contrast to the large number of sites dating to these periods recorded in the NRHE and GCHER. The adjacent Cotswold Hills NMP project found that sites dating to the Iron Age to Roman periods were numerous and widespread across the southern Cotswold Hills. (Janik *et al.* 2011: 54). In contrast known sites in the Severn Vale NMP project were mainly identified from excavation and geophysical survey during archaeological mitigation in advance of development. The reasons for the lack of evidence for pre-medieval sites on aerial photographs in the Severn Vale project area are likely to be complex, but some generalisations can be made.

Overall, most archaeological records in the project area relate to the medieval to modern periods and the NMP survey results reflect this pattern. The medieval and post-medieval agricultural land use of the survey area obviously has a huge effect on the visibility of archaeological remains on aerial photographs. Almost blanket coverage of medieval and/or post medieval ridge and furrow has been recorded from the aerial photographs. Much of this was still extant in the late 1940s and remained so until early 1970s. This has served to mask earlier buried archaeology.

At Bridge Farm, Frocester, a multiphase Iron Age to Roman settlement site [NRHE: 1113199], with the last phase being a Roman Villa, was excavated in the 1960s, 1970s and 1980s. The site is not visible as cropmarks on any available aerial photographs and it was thought this may be due to the nature of the soil (Price 2000: 4). It is located on slightly acid loamy and clayey soils with slightly impeded drainage. However, half a mile to the north of

the site at Frocester, on the same soils, is a possible prehistoric site [NRHE: 1598303], comprising ditched enclosures visible as cropmarks.

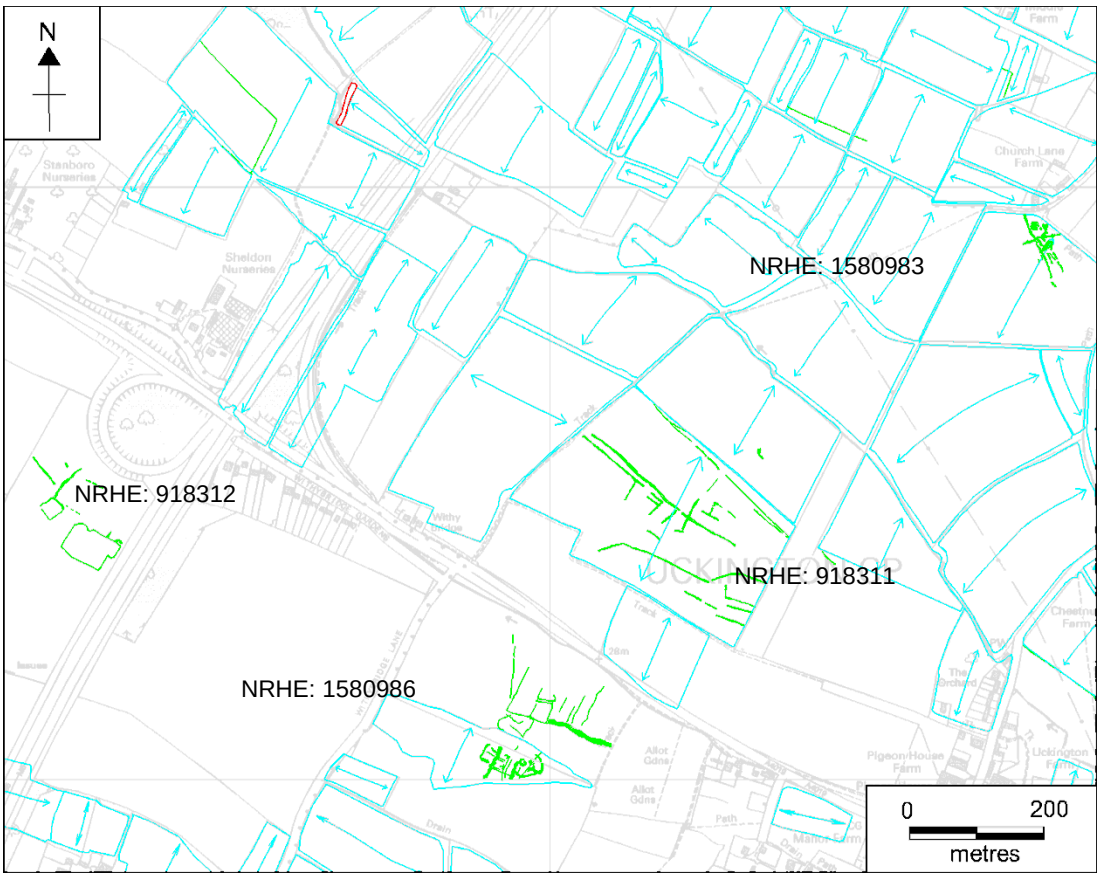



**Figure 8. Pre-medieval archaeological features mapped as cropmarks (green), and the overlying ridge and furrow (blue) at Uckington. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

Other examples of possible Prehistoric buried archaeology from Uckington [NRHE: 918311, 1580983 and 1580986] (Fig 8) and Longford [NRHE: 917711] demonstrate that the soils can be conducive to cropmark formation after the overlying ridge and furrow earthworks have been plough levelled. The archaeological features, two of which are new to the NRHE record, were only recorded on more recent aerial photographs taken after 1970.

Although the majority of ridge and furrow mapped within the project area has now been plough-levelled, there are still fewer than expected cropmarks in the project area. This is probably because the conversion to arable is relatively recent in places and that there has been less opportunity than in other areas to prospect for cropmarks in optimum conditions. However, the potential is clearly demonstrated that future aerial reconnaissance will still be

valuable in the Severn Vale and should be targeted at those areas where the ridge and furrow is shown to be levelled.

As previously mentioned other factors affect the production of cropmarks. Mullin (2008: 71 and 52) states that alluviation in the Severn Vale can form a barrier to cropmark formation. It is likely that deep soils are hampering the formation of cropmarks in some areas, such as on the lower lying parts of the Severn Vale. This is demonstrated at an Iron Age settlement site at Hallen Marsh, Avonmouth (excavated during the M5 link road), where the depth of overlying soil in addition to ridge and furrow earthworks hampered aerial prospection. The middle to late Iron Age deposits were found 1 metre below the ground surface and it was concluded that the site would only have been found by trenching (Barnes 1993a and 1993b). Other similar examples in the project area are at Hardwicke (Sausins 2014), Leckhampton (RPS 2010) and Shurdington (Meara 2008), where the absence of evidence on aerial photographs does not equate to a lack of buried archaeological deposits.

# 3 AERIAL SURVEY RESULTS

## 3.1 Brief highlights of Severn Vale NMP mapping

### 3.1.1 Neolithic to Bronze Age

Evidence for the Neolithic and Bronze Age periods was largely concentrated in the Cotswold Hills, on the escarpment and plateau. In South Gloucestershire only one possible Bronze Age round barrow [NRHE: 201506] was identified, at Alveston. The survey overall did not identify any new characteristically Neolithic features but did identify seven possible new Bronze Age barrows (Fig 9).

There were twelve archaeological monuments visible from the Neolithic period, the majority unsurprisingly for this region, were long barrows. Cotswold-Severn long barrows form one of the main distinct regional groups nationally (Darvill 2004). The condition of the long barrows varied considerably, from largely well preserved barrows such as Uley Long Barrow [NRHE: 113217] to mutilated examples such as Crippets Long Barrow [NRHE: 117459]. A couple are still recorded as possible long barrows, due to no known archaeological excavations or

dateable finds. These are Whitfield's Tump [NRHE: 115004] at Minchinhampton and an example at Nympsfield, north of Woodchester Park [NRHE: 113208].

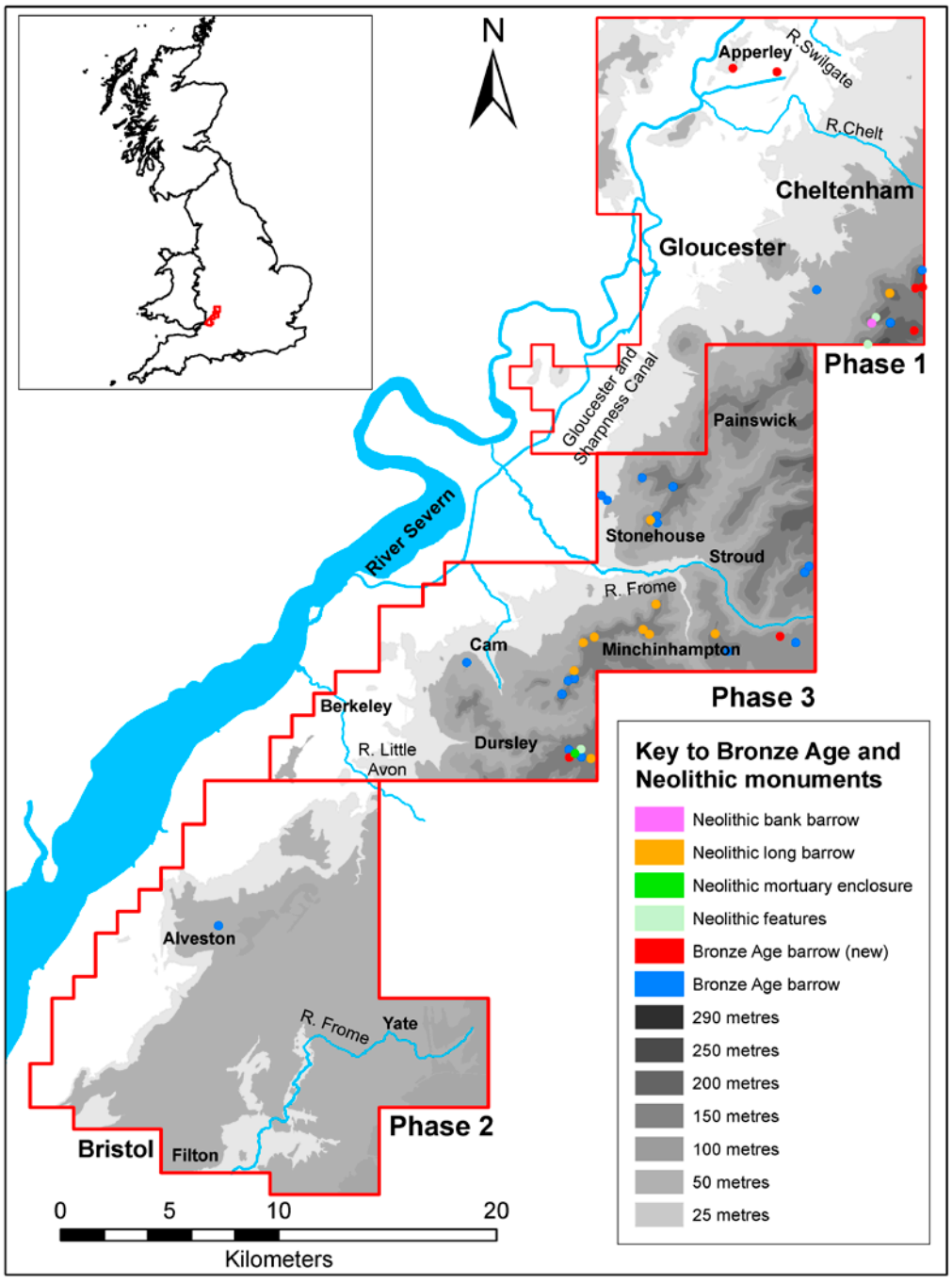



**Figure 9. Distribution map of the Neolithic and Bronze Age monuments recorded by the Severn Vale NMP project. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

Crickley Hill [NRHE: 117450] is a complex and multi-phase site located at the summit of the Cotswold scarp. The Neolithic elements include possible bank barrow and the 'inner' or

west bank. The latter was part of a causewayed enclosure, though dating is a result of years of excavation on the hill rather than these features being diagnostically Neolithic in appearance. Likewise Peak Camp, Birdlip [NRHE: 117437] is also multiphase, though these phases are all within the Neolithic Period. The two curving and concentric banks were visible as slight earthworks on lidar imagery and have been compared to the Neolithic enclosures on nearby Crickley Hill. (Whittle *et al.* 2011: 454-457)

Perhaps the most intriguing Neolithic feature is the possible cursus or mortuary enclosure, recorded on Symonds Hall Hill, Wotton-under-Edge [NRHE:91699] (Fig XX). If this was a cursus monument it would be the first recorded on the Cotswold uplands (Darvill 2006: 33). The enclosure is defined by a ditch on three sides with rounded corners and is about 25 metres wide and about 72 metres in length; though the north-western end is open-ended and appears to be cut by the road, so it is likely that the enclosure was originally longer. The enclosure is superimposed by a Bronze Age bowl barrow [NRHE: 205217] which perhaps suggests that it forms part of a wider ritual landscape on Symonds Hall Hill. Other elements of this include a Long Barrow [NRHE: 205213], and nearby possibly Bronze Age ring ditches [NRHE 916689 and 1597535].

Most of the visible features dating to the Bronze Age were round barrows, 28 of which were mapped and recorded as part of the aerial survey. Seven of these were new to the NRHE record, including two mounds near Deerhurst [NRHE: 1581504 and 1581471] (Fig 9), first recorded in 1972 (Rahtz *et al.* 1997) and would merit further investigation. A barrow [NRHE: 117427] and its surrounding square banked enclosure located on Leckhampton Hill is more difficult to date despite excavations in 1925, it may be of Iron Age origin or the enclosure may be post-medieval (NRHE record information). There were also eight ring ditches visible as cropmarks only and these may have a different date or function.

### 3.1.2 Iron Age to Roman

Particular types of archaeological features such as rectilinear enclosures or field boundaries, can extend in date across the Iron Age and Roman periods, and may even have their origins in the Bronze Age. Therefore the survey results from the Iron Age and Roman periods are included together in this report.

Iron Age and Roman archaeological features were visible across the project area. These periods are dominated by features which are defensive and domestic in character, as opposed the ritual and funerary monuments of the Neolithic and Bronze Ages. They included large earthwork complexes of Iron Age hillforts and hilltop enclosures, such as Crickley Hill and Uley Bury. Other sites visible as earthworks included two probable co-axial field systems recorded near Minchinhampton, one of them new to the national record [NRHE: 1601001] and a possible short section of the Roman road (RR541a) between Berkeley and Bitton at Engine Common [NRHE: 1593154].

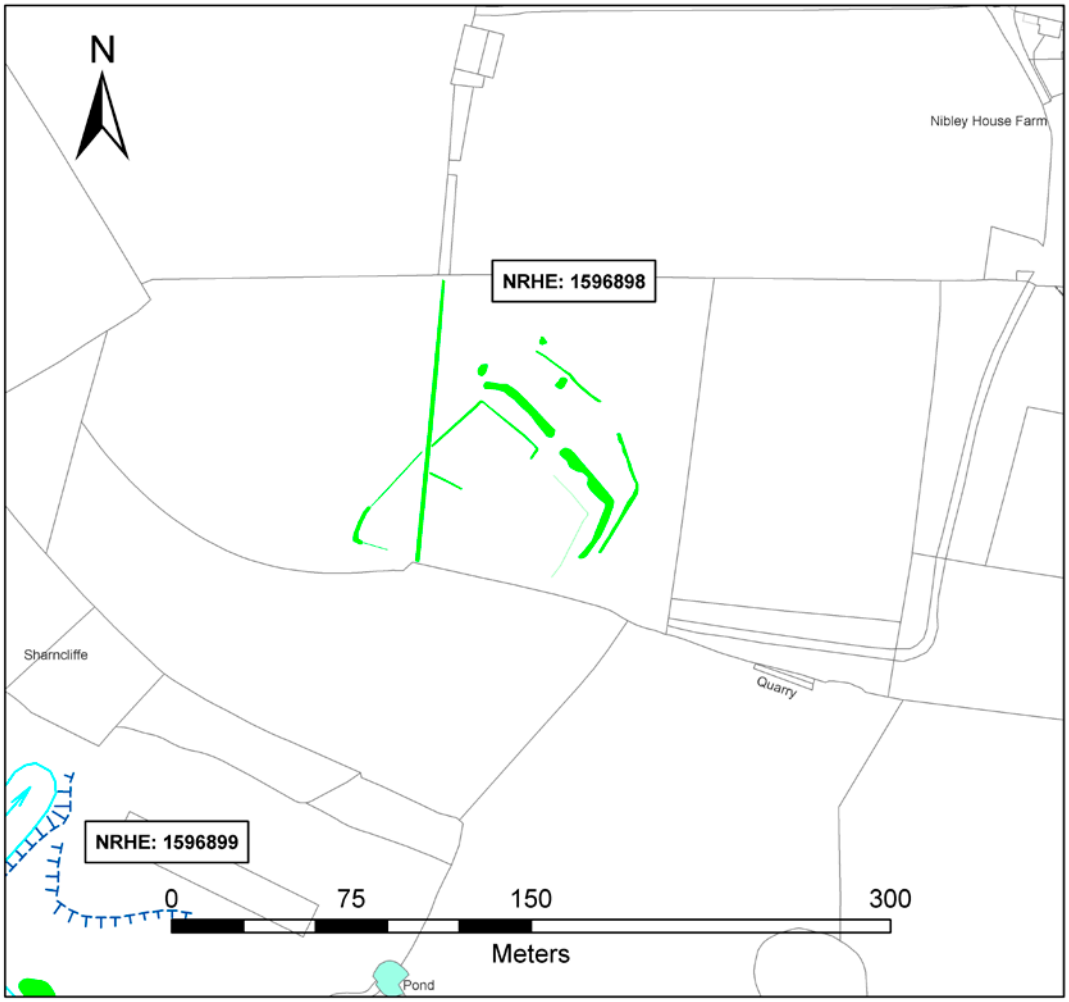



**Figure 10. The newly recorded Iron Age and/or Roman double-ditched enclosure at North Nibley [NRHE: 1596898]. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

Seven possible Iron Age to Roman rectilinear settlement enclosures were visible as cropmarks, three of which were new to the NRHE database, such as the double ditched enclosure at North Nibley [NRHE: 1596898] (Fig 10). The partial outline of the remains of a

Roman villa near Cromhall [NRHE: 201442] was also recorded but the site was already known from previous excavations. Perhaps the most impressive results relating to this period were the buried remains of a substantial prehistoric settlement recorded within the ramparts of Uley Bury [NRHE: 205226], one of the most remarkable hillforts in the Severn Vale project area (Fig 11)

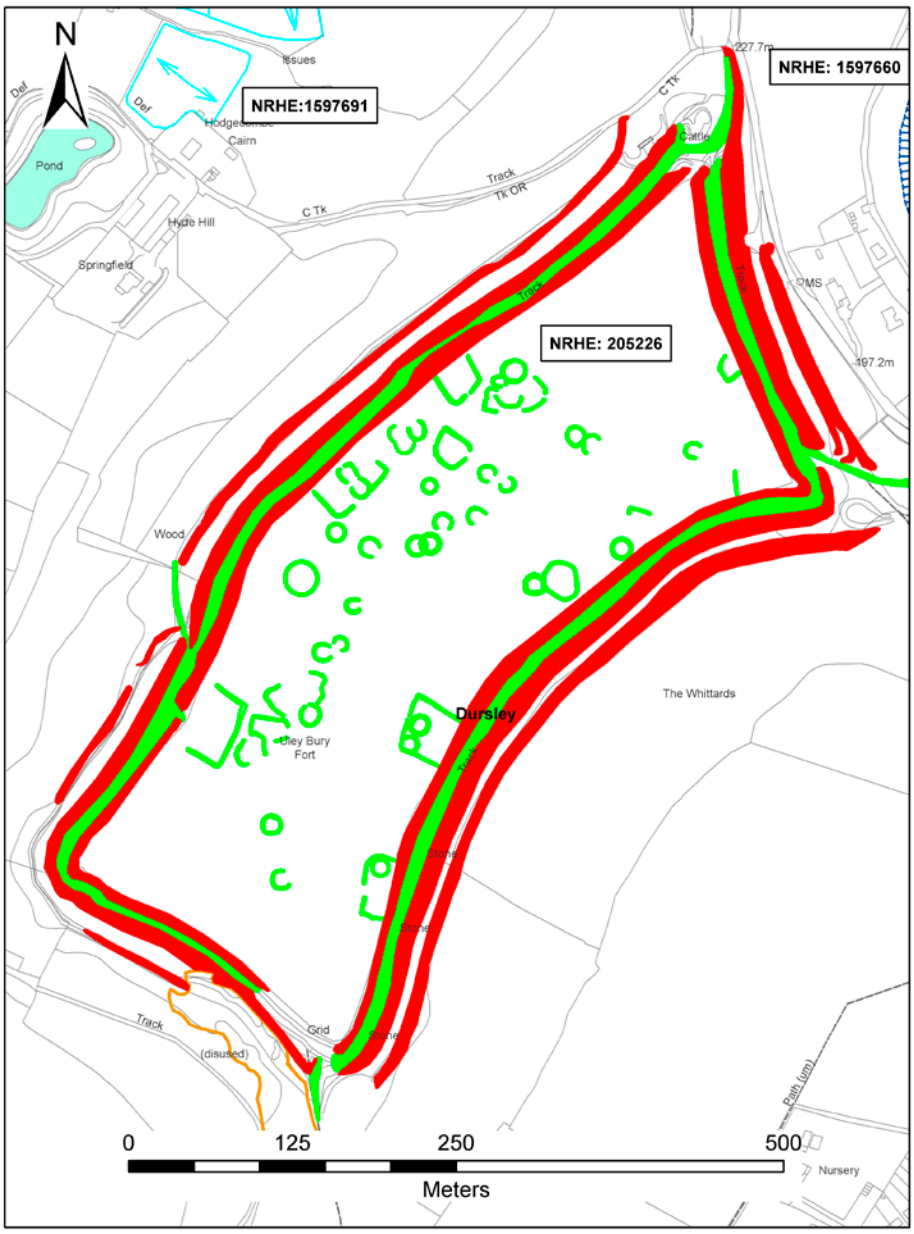



**Figure 11. The Iron Age hillfort at Uley Bury, with the settlement mapped. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

Moore (2006a) states that the Cotswold Hills and the Severn Valley formed an intensively settled landscape with extensive social networks during the Iron Age. During the Roman

period this is no different and it was therefore expected that more buried archaeology would be visible as cropmarks than turned out to be the case, based on the existing distribution of known prehistoric and Roman sites across the project area. In contrast the Cotswold Hills NMP project found that sites dating to the Iron Age to Roman periods were some of the most numerous and widespread across the southern Cotswold Hills. (Janik *et al.* 2011: 54).

It is thought that the dominance of the extensive ridge and furrow cultivation earthworks is likely to be the main factor inhibiting cropmark production, but other factors such as the variable geology and soils across the project area may also be causal factors [See discussion on nature of evidence]. The archaeological features mapped as cropmarks were largely visible on aerial photographs taken after the 1980s and some features were visible on recent images taken between 2005 and 2007. This suggests that any new aerial prospection in favourable conditions for cropmark formation is likely to yield new archaeological features, as the ridge and furrow continues to be plough levelled.

### 3.1.3 Medieval to post-medieval

As is usual in aerial photographic evidence, there is a hiatus in the record that covers the early medieval period. This is due to a relative lack of distinctive site types from this period and the difficulty in confidently attributing an early medieval date to sites such as enclosures.

Medieval and post-medieval ridge and furrow covered most of the project area, particularly the central region, which is discussed further below (Section 3.2.2). The evidence for the medieval period was also characterised by settlement remains visible on the outskirts of many villages, such as at Stoke Orchard (NRHE: 1580997). These features were often seen on the earlier photographs and in many cases the remains have been affected by subsequent development as villages have re-expanded. Only one deserted settlement was recorded, at Boddington (NRHE: 872082), where the now levelled earthworks were situated west of Boddington Manor.

Another type of settlement evidence was for moated sites. For example, a moat just outside Elmstone Hardwicke village (NRHE: 117668), recorded on aerial photographs in 1955 (Fig 12). Changes to agricultural practices during the latter half of the 20$^{th}$ century had a major

effect on such sites and many have had their earthwork banks levelled and ditches filled in, as can be seen on aerial photographs of the same site taken in 1988.

**Figure 12. Church Farm, Elmstone Hardwicke village. The left image shows the moat as an earthwork in 1955 (RAF/58/1705 F21 0042 01-APR-1955); the right image shows the plough-levelled remains of the moat in 1988 (OS/88104 V 016 16-MAY-1988 © Historic England RAF Photography/Crown copyright. Ordnance Survey.**

Other features dating to this period include a possible medieval deer park boundary, visible as an earthwork west of Leckhampton Court (NRHE: 1587020) (Fig 13). The park was not identified by the Cotswold AONB and Wye Valley AONB Historic Landscape Characterisation project (Hoyle 2006) and neither was it noted by Moore-Scott (Moore-Scott 2000) in his study entitled 'Leckhampton's Fields'. The only evidence found to support the deer park interpretation is a field name 'Lower Park' marked on the Tithe map of 1835 (available at Gloucestershire Archives) on the south side of the deer park. It is also similar in form and nature to other deer parks that suggest it may an early example (English Heritage 2011c). The park boundary is still visible as earthworks on recent lidar images and further investigation would be beneficial to ascertain the significance of this enclosure or deer park.

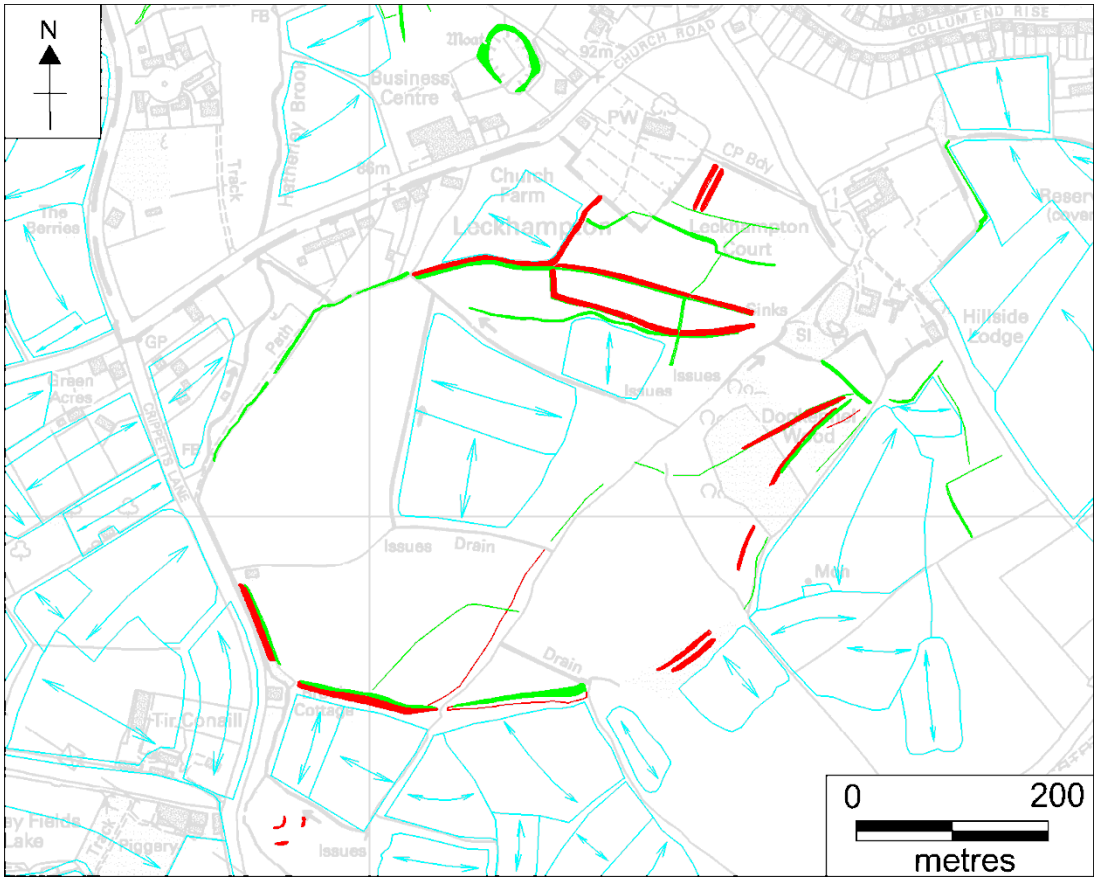



**Figure 13. The probable medieval deer park boundary at Leckhampton Court, defined by banks (in red) and ditches(in green). OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

Along the river valleys of the Severn and the Chelt extensive drainage systems were also visible and mapped. Some are likely to represent managed water meadows but most relate to drainage, as these rivers are liable to flooding and nearby land is often low lying and seasonally wet. These drainage ditches are difficult to date but most date from the medieval to post-medieval periods, though some may be re-cut or re-used into the present day. At Ashleworth Ham (NRHE: 1579702), now a nature reserve, the complex of parallel narrow linear drainage ditches and the double-ditched and curving ditches may suggest different phases and perhaps the use of natural watercourses as drains before inclosure.

### 3.1.4 The 20th century

After medieval to post-medieval agricultural features, Second World War structures and installations were the predominant archaeological type in the Severn Vale project area (Section 3.3). However, other interesting 20th century features were recorded by the project.

Information was added to the NRHE record (NRHE: 1466748) for the First World War Slimbridge armament depot, also known as His Majesty's Magazine No 23, recording the sinuous fragmented earthworks of the railway embankments connecting the storage buildings to the Midland Railway line in the South and the Gloucester & Sharpness Canal in the north. The railway embankments have since been levelled, but the project also recorded the remains of the rectangular concrete platform for what was once Standard Magazine Number 75, which remains extant.

One noteworthy 20th century feature recorded is the 1930s-1960s era government training facility at Eastwood Park, near Falfield (NRHE: 1589122) (Fig 14). Located in the grounds of medieval Eastwood Park with its 19th century mansion house, the Home Office bought the Park and opened the Civilian Anti-Gas School in 1936. During the Second World War the centre became known as the Ministry of Home Security Air Raid Precautions School, with the focus of training activity being focused in the parkland. Numerous air raid precaution training structures were constructed; one feature being a linear trench accessed by numerous steps.

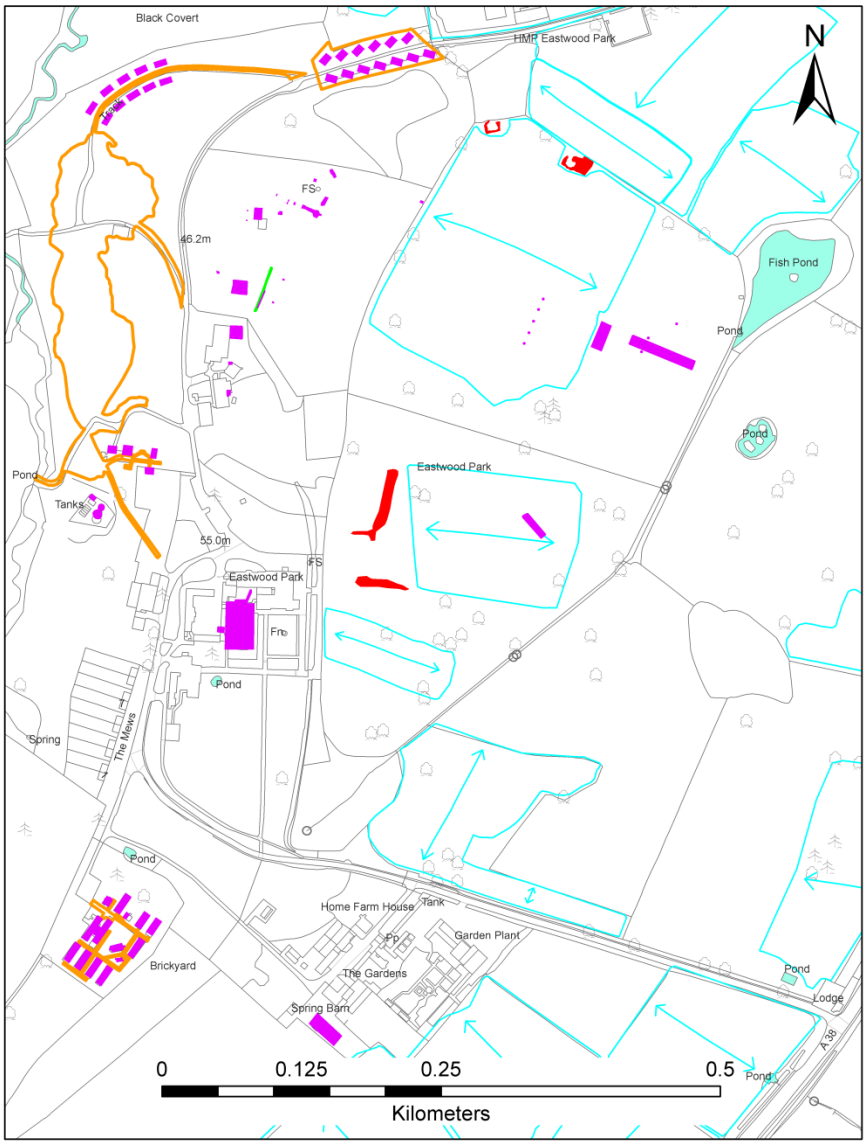



**Figure 14. The mid-20th century government training facility at Eastwood Park. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2015.**

At the onset of the Cold War, the Home Office reopened the park as a Civil Defence School, running training courses to deal with the aftermath of a nuclear strike until it closed in 1968. As part of this training, a training area called The Range was constructed to replicate a village street with houses on either side in various states of destruction that might be caused by a nuclear blast. Near Home Farm, a shed acted as a civil defence garage to house army-type fire engines, from where they would respond en masse during exercises (Fig 15).

**Figure 15. Civil Defence Training replica village known as The Range at Eastwood Park. Reproduced with the kind permission of B. Barrell.**

Eventually the training area also included a full-size crashed steam train and a crash-landed Gloster Meteor fighter jet (Fig 16). Large-scale, realistic first aid, and search and rescue exercises were conducted in the training area using volunteers, some of whom were amputees, to represent massed casualties trapped in the rubble strewn houses of the village, as well as detonating large pyrotechnics that simulated a nuclear strike, creating a mushroom cloud to provide the civil defence wardens and other emergency service crews as much realism as possible. The training area had an additional 23 houses built to test radiation effects on civilian populations (Barrell 2014, Thornbury Roots 2014).


**Figure 16. Eastwood Park. 1950s. The crashed Gloster Meteor jet is just visible behind the trees in top centre. Reproduced with the kind permission of B. Barrell.**

Although the buildings from the old Second World War camp have been demolished, the concrete building platforms and other air raid precaution training structures are still visible in recent aerial photography. However, the linear trench appears to have been levelled and none of the Cold-War era houses from The Range are visible, having also been demolished, though part of the village 'road' remains.

## 3.2 MEDIEVAL AND POST-MEDIEVAL AGRICULTURE

### 3.2.1 Lynchets

The Historic England thesaurus of Monument Types (Historic England, 2016) defines a strip lynchet as 'A terraced field usually found on hillsides. Comprising a flat strip of land, called the tread, and a steep, scarped lynchet or edge, called the riser'. It defines a cultivation terrace as 'An area of land, usually on a slope, which has been built up to provide a flat surface for the cultivation of crops'. The Severn Vale project area contains frequent examples of these; ranging from single possible cultivation terraces, to extensive systems of strip lynchets. As would be expected, their distribution and occurrence mirrors the topographical map (see Figure 3), and as such there is a particularly dense concentration of

lynchets along the Cotswold Escarpment south of Cheltenham to north of Yate (Whittington 1960)

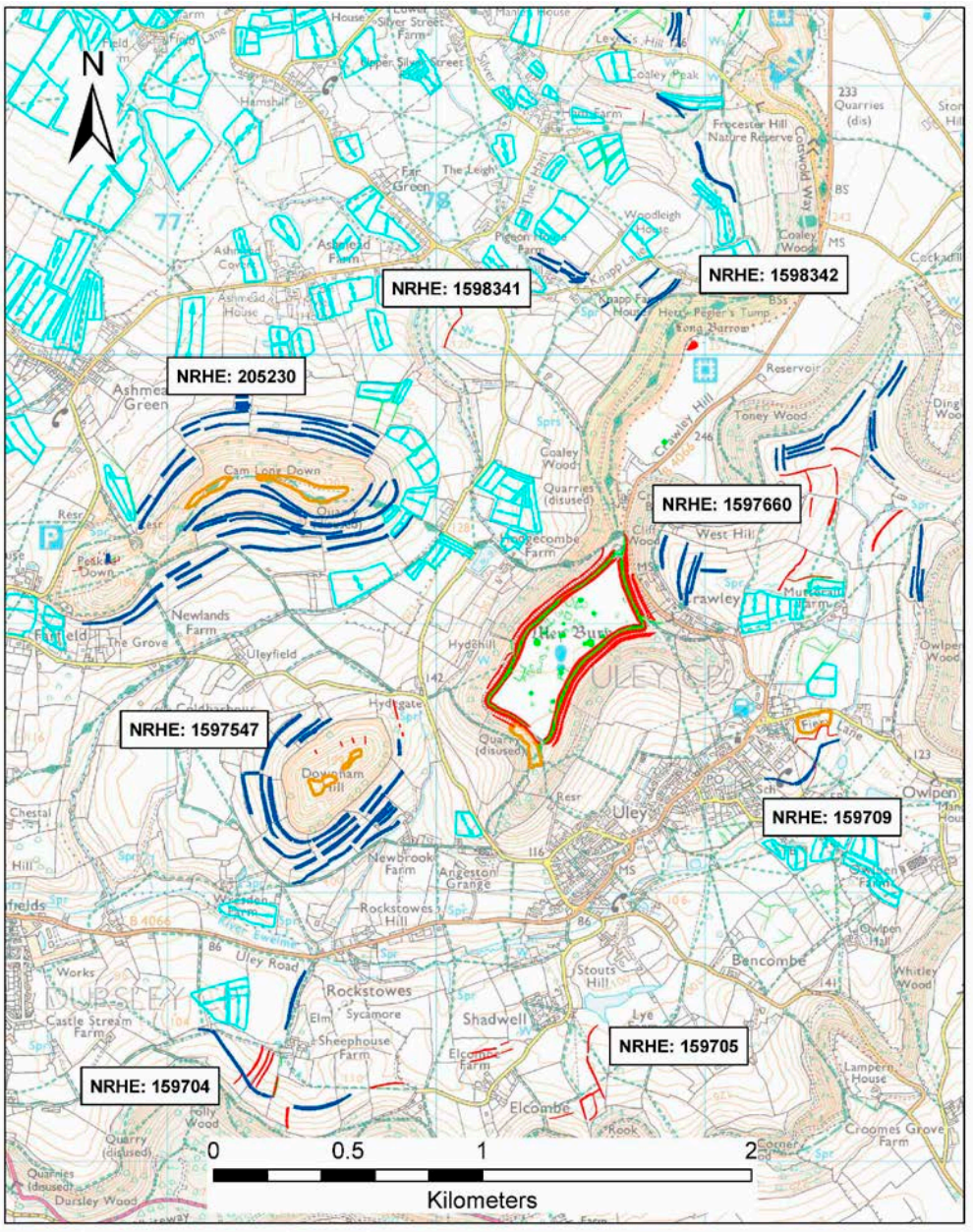



**Figure 17. Cultivation terraces, lynchets and strip lynchets around Uley. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

The slopes around Dursley are heavily lyncheted (Fig 17). This is likely to reflect the intensive exploitation of the landscape from the 12th and 13th centuries onwards, as it is thought that such steeply sloping hillsides are unlikely to have been ploughed without a lack of available level farmland elsewhere. This medieval demand for land is demonstrated by the subdivision of yardlands in the area (as seen at Berkeley), as well as the introduction of

a more intensive four-field system of rotation (Dyer 1987: 176-178). The agrarian crisis of the 14th century and the subsequent shift to an increase in upland pasture on the Cotswold Hills (Dyer 1987: 176-178), meant that the demand for available ploughland decreased, and these steeply sloping fields gradually fell out of arable cultivation; thereby preserving their earthworks through disuse. At periods in the later 20th century the return to a predominately arable regime has had a detrimental effect on the survival of some archaeological earthworks in the area. However, the hillside location of these lynchets has largely protected them from the modern plough as advances in agricultural technology and efficiency mean that it is now unnecessary to cultivate every last available square metre of land for arable purposes (Pilbeam 2006: 49).

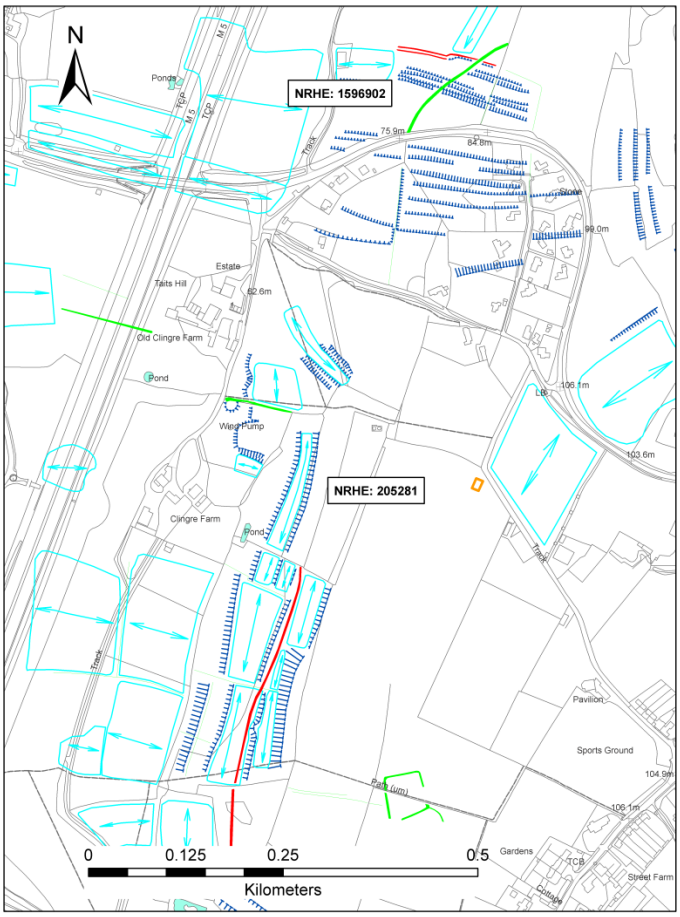



**Figure 18. Cultivation terraces, lynchets and strip lynchets around Stinchcombe. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

A particularly coherent area of strip lynchets and cultivation terraces can be seen on aerial photographs as earthworks to the north of the village of Stinchcombe (NRHE: 205281 and 1596902) (Fig 18).

The series of parallel lynchets visible to the north on Oldhill [NRHE: 1596902] are closely spaced apart whereas those at Clingre Farm [NRHE: 205281] are slightly wider and show evidence of ridge and furrow cultivation between them. Whether this difference in form denotes different dates for the earthworks, or a different type of cultivation is unclear. Some of the lynchets identified and mapped as part of the Cotswold Hills NMP (Janik *et al.* 2011) aerial survey were stated as having possible origins pre-dating the medieval period. The examples given were at Eastleach Martin [NRHE: 329682] and north-west of Kemble [NRHE: 212748], which were associated with early field systems. Those lynchets were thought to be later prehistoric or Roman in date due to their form (Pilbeam 2006: 49). This could also be true of the lynchets mapped and recorded by this project at Stancombe Park [NRHE: 205270, 765371 and 765354], which are also potentially the remains of a possible prehistoric field system as they are adjacent to banks [NRHE 1596888] that may represent a 'Celtic' field system (Fig 19).

The availability of recent aerial photographs taken in good conditions and lidar imagery allowed more lynchets to be mapped than if we had to rely solely on the historical aerial photographs. It was mentioned in the Cotswold Hills NMP project (Janik *et al.* 2011: 74) that some lynchets may have been missed due to a lack of recent aerial photographs and lidar imagery, so there may be more to identify within the region.

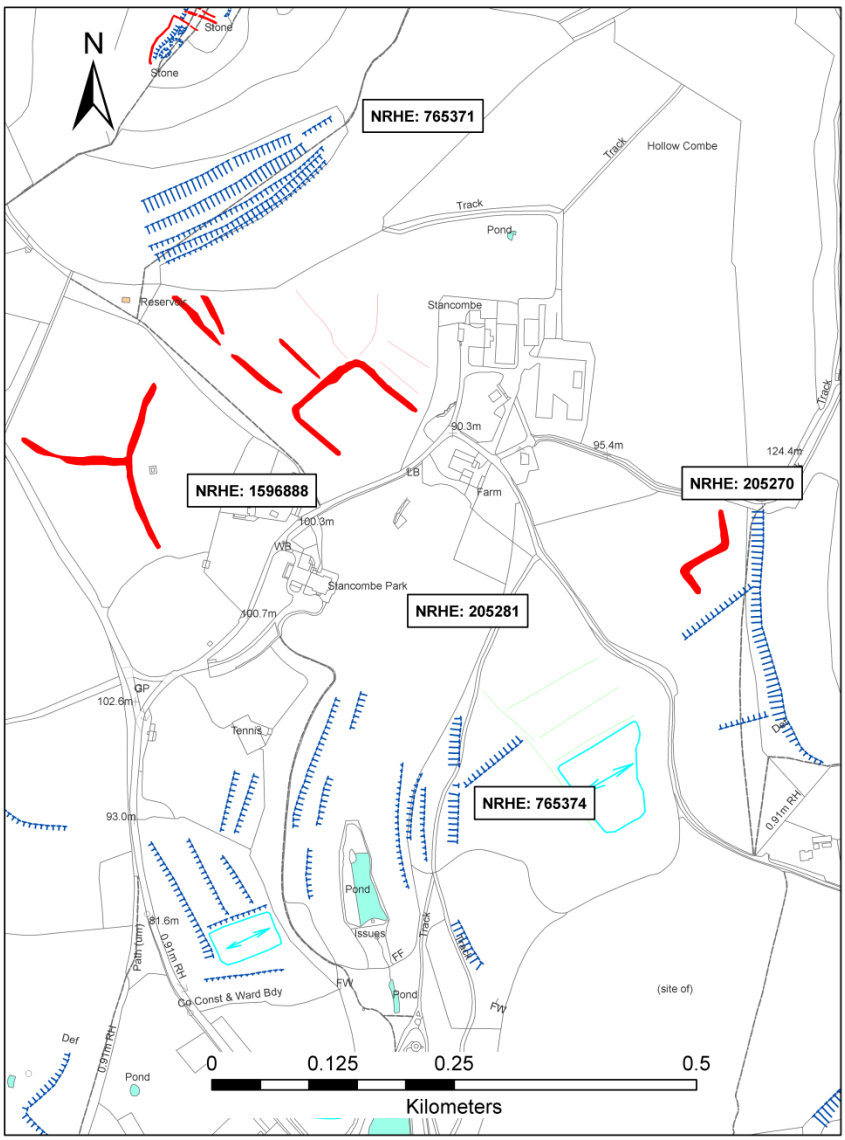



**Figure 19. Cultivation terraces, lynchets and strip lynchets around Stancombe Park. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

### 3.2.2 Ridge and Furrow

Evidence of medieval and/or post-medieval ridge and furrow cultivation extends throughout the survey area and was seen as earthworks and cropmarks. Most of the ridge and furrow was mapped from aerial photographs taken in the 1940s and 1955. However, the earthworks on the upland areas south of Shurdington were more readily identifiable on recent aerial photographs, which demonstrate the importance of having a range of sources.

Ridge and furrow cultivation earthworks are the result of many years of ploughing as part of a system of medieval open fields, which often continued in use into the post-medieval

period. These earthworks developed and changed over time and are difficult to date precisely (Taylor & Muir 83: 201; Beresford & St Joseph 1979: 27-28; Cantor 1982: 47). In some cases, such as to the north of Staverton (NRHE: 1581656), earlier plough headlands can be seen under later ridge and furrow on lidar images taken in 2012. This indicates that there were different phases of the open field layout. Beresford (1984: 121) explains this rather well: “Ridge and furrow is like a high-tide mark. It shows where the plough has once been; but it does not say when; it will cover up the marks of many earlier (or later) tides”.

The extensive evidence of ridge and furrow is characteristic of the English Midlands and is similar to the pattern found in the South East Warwickshire and Cotswold Hills NMP project, where almost continuous ridge and furrow was mapped and recorded over hundreds of square kilometres (Priest and Dickson 2013) A similar pattern of almost contiguous cultivation was also mapped in the Severn Vale project area (Fig 7) and shows clear continuity with the pattern of ridge and furrow cultivation recorded in the adjacent NMP aerial surveys.

The estuarine alluvial lands, particularly between Avonmouth and Berkeley clearly show that they were under intensive arable cultivation during the medieval period. This contrasts sharply with the Cotswold escarpment and the upland plateau to the east of the project area. Whereas the medieval arable cultivation has been studied on the margins of the Severn Estuary in South Gloucestershire by Allen (1992), less is known about the pattern seen further east between the estuary and the Cotswold Escarpment.

Obvious ‘gaps’ in the ridge and furrow are mainly associated with the large conurbations of Gloucester, Cheltenham, Bristol and the low-lying flood meadows along the River Severn and its tributaries and are easily explained, but the reasons for the absence of ridge and furrow in other areas aren’t so clear.

In the Cotswold Hills NMP project report, Janik *et al.* (2011) discussed the distribution of arable cultivation, regarding areas where an absence of ridge and furrow cultivation was noted. It was suggested that the upland plateau was returned to intensive agriculture earlier than the clay vales. It was thought that many earthworks were plough levelled before the earliest available aerial photographs were taken in the 1940s. This was demonstrated using the example of the protected landscape at Lodge Park, where well preserved ridge and

furrow may reflect the earlier situation in the surrounding area (Janik *et al.* 2011: 78). The earthworks in the uplands may also have originally been less pronounced. Soils are shallower and lighter over the plateau and Hall (1982: 22, 28) states that not only were the ridges more steep on clay soils to afford better drainage, but that any furlong boundary banks on light soils tend to be easily dispersed by modern ploughing; where there was not a sufficient depth of soil, extensive furlong boundary networks were not formed to begin with.

The visible evidence for ridge and furrow also dwindles on the western side of the River Severn in the northern part of the survey area and this also correlates with data from adjacent NMP projects. It is probably due to a lack of open fields within Corse Chase, which was closely connected to Malvern Chase in the 12th century, as both were contiguous hunting forests subject to 'forest law' (Toomey 1997). This large area extended beyond the parish of Corse and included those parishes lying between the rivers Severn and Leadon. By the 1490s some areas must have become more open as the Chase became known as Corse Lawn (as it is today), suggesting that the glades and clearings that broke the woodland were just as extensive as the woodland areas. Clearing of trees continued until 1779 and Corse Chase became a wide-open common used for pasturing sheep (Elrington 1968: 271-281). Some cultivatable land, however, had been made there by earlier assarts of woodland and later encroachments into the Chase (licensed and unlicensed). Historic records state that Tirley, a parish next to the River Severn, held arable land here in up to nine small open fields until the early 17th century (Elrington, 1968: 95-105), so it is possible that some blocks of ridge and furrow mapped may date from around this time.

In central South Gloucestershire the parishes of Tytherington, Rangeworthy and Alveston also show a lack of any ridge and furrow earthworks or cropmarks. The pattern in this and adjoining areas is much more scattered than along the eastern margins of the River Severn. Much of this area was the location of Kingswood Forest (Moore 1982: Map 1) until 1228, when Henry III granted a charter for its disafforestation in 1228. Kingswood Forest was a large area of land, not necessarily entirely wooded, reserved for royal hunting and administered by special officials (Moore 1982: 6). Until 1228 it was an offence to clear and enclose land without authorization within the bounds of the forest. Before disafforestation, one of the main areas of woodland was centred on Alveston, an area which shows a lack of ridge and furrow cultivation and suggests that, like Corse Chase, most arable cultivation was not undertaken until much later in the medieval period and then only as the woodland was cleared.

On the 1830 OS map, the eastern half of the phase 2 area was marked by large open commons, such as at Sodbury and Yate, and areas of heath and moor, such as Itchington Moor and Cromhall Heath. As at Corse Chase, these large tracts of common land were used as pasture not arable land and most likely are a result of woodland clearance from the original Kingswood Forest. Again some cultivatable land was made from earlier assarts or from authorised clearance for which there is evidence in the documentary record at Alveston (Moore 1982: 10). Also, comparative work on place-name evidence suggests places where cleared land contrasted with the still wooded land within Kingswood Forest and are noted by the *field* element. These are concentrated to the north and south of the Forest boundary, such as at Falfield and Charfield (Moore 1982: 11). At Falfield there is certainly a higher concentration of visible cultivation. Clearly further detailed research is required to fully understand the distribution of medieval to post-medieval ridge and furrow in the south of the project area, but that distribution, along with the other medieval to post-medieval features mapped and recorded, could provide a greater understanding of the post-1228 history of the Kingswood Forest lands. It will also provide further archaeological evidence for recent research such as that carried out already at Gaunt's Earthcott (Adams 2016) a medieval manor, and its surrounding land.

In other more localised areas, the lack of ridge and furrow is likely to be simply that continual ploughing into the modern period has levelled any remaining earthworks. An example of this was seen in the parish of Deerhurst where common fields showed no evidence for ridge and furrow. The large open field known as Redfield by 1565 covered a large part of the centre of the parish and included most of the arable land (Elrington, 1968: 34-49). In 1815 the open fields of arable land were still located in Redfield and the smaller adjacent Walton Hill field and continued in arable use to the present day. As a result, continuous ploughing has removed the earlier ridge and furrow earthworks. The surrounding fields, however, went out of arable use in the post-medieval period, the land having been enclosed, so the ridge and furrow cultivation within those enclosures survived as earthworks until the post war period when the land then reverted to arable.

The extent of medieval and post-medieval agriculture in Gloucestershire, Oxfordshire and southern Warwickshire, on the lower lying land north of the Cotswold Hills, is apparent when one views larger areas of landscape rather than small areas in isolation. By combining the adjoining NMP project datasets evidence for the medieval agricultural regime can be viewed as a whole (Fig 20). Visually appreciating the cultivation over wide areas of the landscape

beyond modern imposed boundaries is an invaluable tool for any future research, whether as part of a more detailed analysis to ascertain the chronologies of the field systems using a multidisciplinary approach, or to contribute to further settlement studies in the region tied in with the historical documentary evidence.

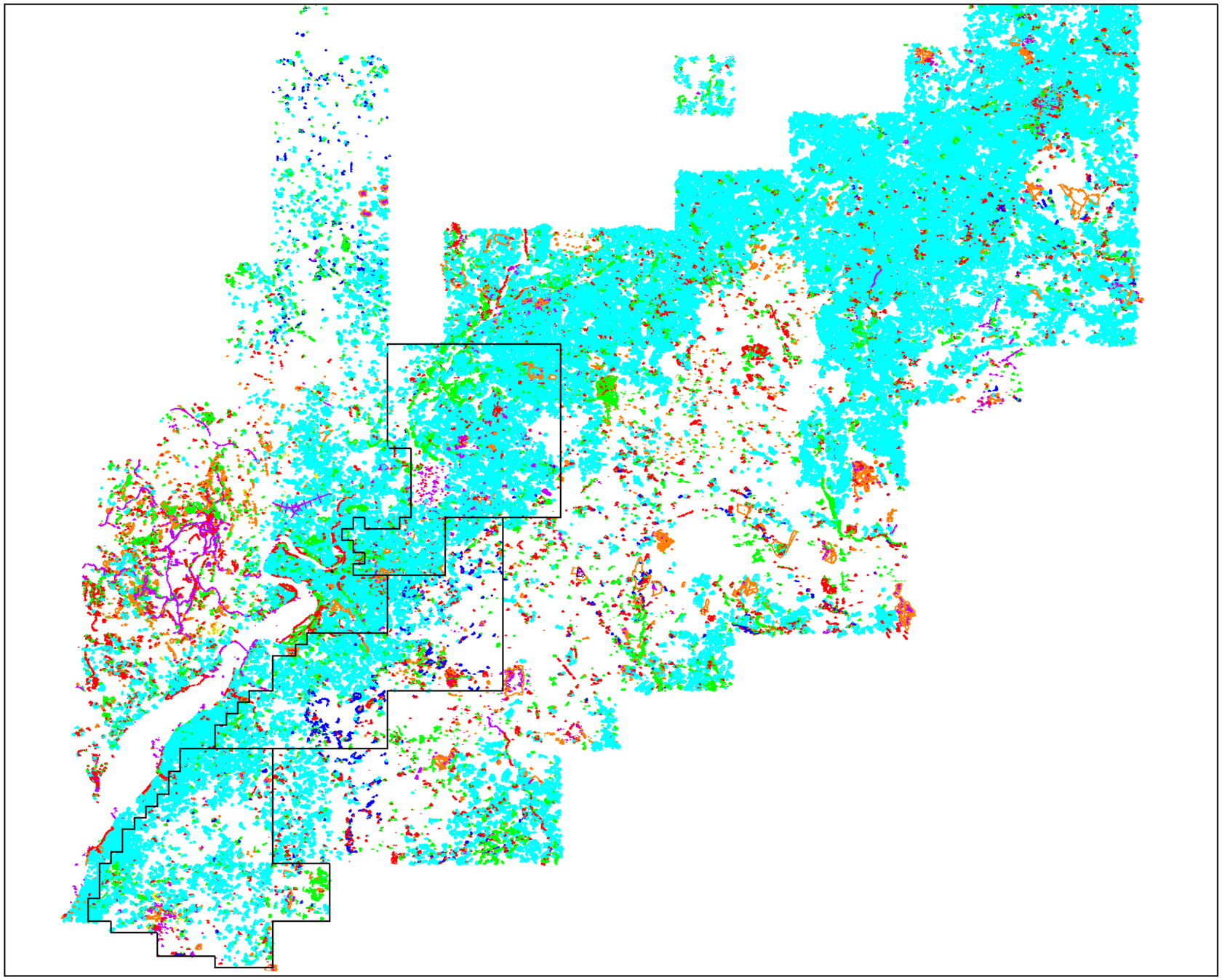


**Figure 20. Archaeological features mapped from aerial photographs during NMP projects in Gloucestershire This shows the great extent of ridge and furrow which is coloured in light blue. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

## 3.3 THE SECOND WORLD WAR

### 3.3.1 Introduction

The project identified a large number of previously unrecorded Second World War features. Although this had been anticipated (Catchpole and Dickson 2013, paras 7.4.8-9) the actual density of features recorded relating to airfields and military bases around Gloucester, Cheltenham and Bristol (both disused and extant) was higher than expected (Figs 21-23). A total of 289 new records of Second World War features were added to the NRHE database, equating to 39.6% of new NRHE entries created by the project. A further 89 existing NRHE records of wartime monuments were updated with additional information. Altogether, Second World War entries represent 30.2% of all NRHE records either newly created or updated by the Severn Vale NMP project (see Table 1). Some of the NRHE entries record single buildings or structures, but most represent groups of structures, buildings or earthworks: for example anti-aircraft defence sites, groups of earth-protected and freestanding air raid shelters, emergency water supply tanks, defence obstructions, military camps and airfields.

| Type of NRHE entry | Overall NRHE entries | Second World War related NRHE entries | % Second World War NRHE entries |
|---|---|---|---|
| New | 729 | 289 | 39.6 |
| Updated | 524 | 89 | 16.9 |
| **Total** | 1253 | 378 | 30.2 |

Table 1. Statistics for NRHE entries related to the Second World War.

Some of these military sites survived into the post-war period, but many others were only temporary events, such as digging defensive earthworks and siting mobile air defences. These project results highlight the importance of both the collection of wartime aerial photographs held at the Historic England archive and the value of experienced air photo interpreters to provide an accurate interpretation of short-lived Second World War features.

The NMP data is designed to be viewed against historic maps and modern Ordnance Survey (OS) mapping. Royal Air Force bases and airfields are usually well documented and their complexes of buildings and structures recorded in detail on accurate, scaled, de-restricted Air Ministry plans that can be freely obtained by request from the Royal Air Force Museum. In such cases, the relevant NRHE entry provides reference details for the OS map

or to the source of the publicly available material. At the larger former military bases, such as RAF Innsworth (NRHE: 1585409), RAF Staverton (NRHE: 1430177), RAF Quedgeley (NRHE: 1583179) and RAF Moreton Valence (NRHE: 1406485), the Severn Vale NMP project mapped only those military structures, buildings and earthworks such as buried air raid shelters that are not already recorded on publicly available plans or OS maps. However, major features such as airfield runways and perimeter tracks are still mapped to show the main features and extent of the military complex.

All three phases of the NMP project contained either newly created or updated NRHE records of Second World War features. The main concentration of these monuments, however, was located around the outskirts of Bristol and around the city of Gloucester. These cities were strategically important ports and manufacturing bases and each contained airfields associated with large aircraft manufacturing facilities: Filton in Bristol was the home to the Bristol Aeroplane Company and Rolls Royce factory complexes, producing and repairing RAF bomber and fighters of various types which used the large airfield there, along with an operational Royal Air Force station. Brockworth on the eastern suburbs of Gloucester was the location of the extensive Gloster Aircraft Company complex and its large factory airfield.

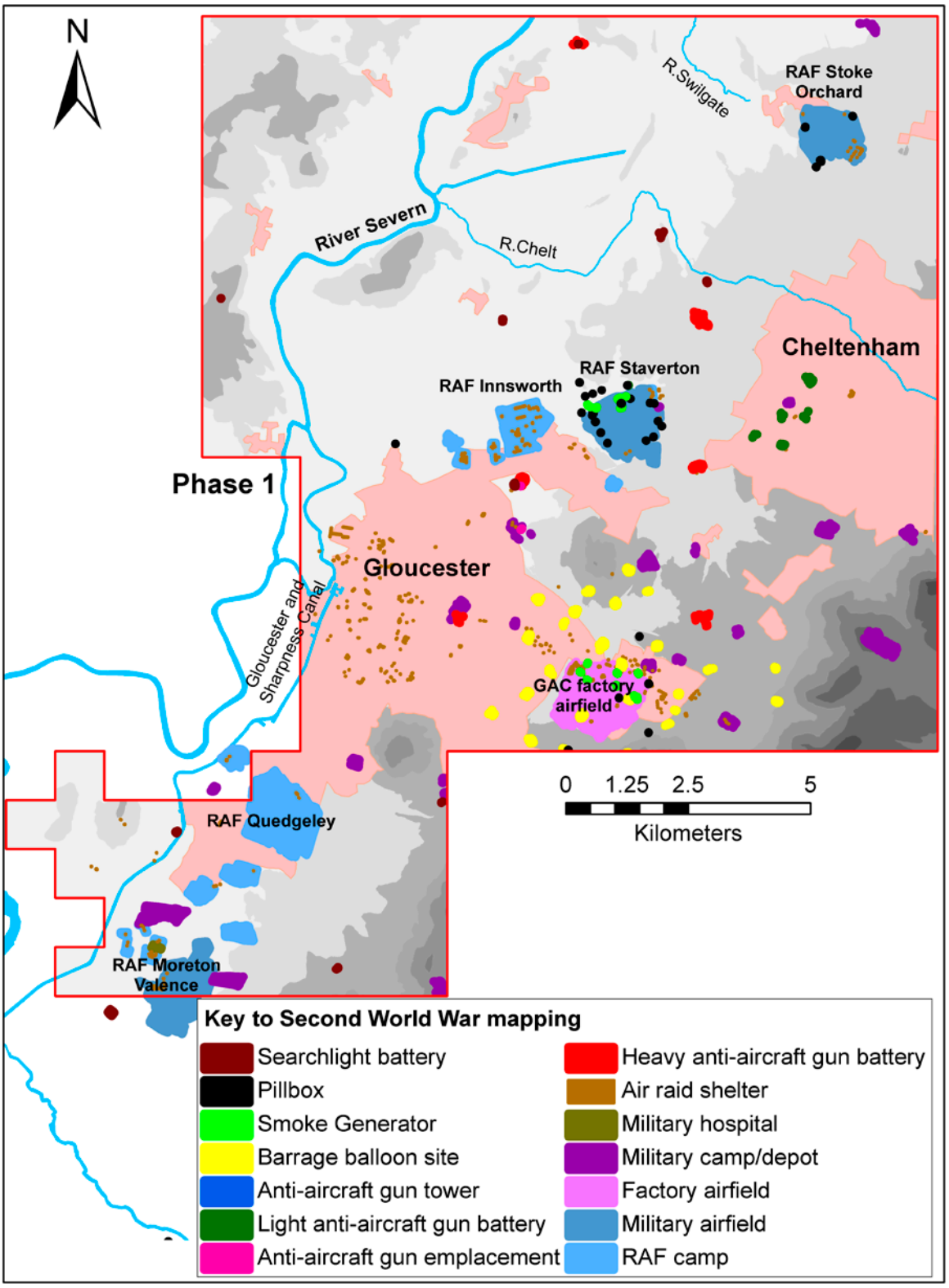



**Figure 21. The main types of Second World War features recorded in Phase 1 of the Severn Vale NMP project. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

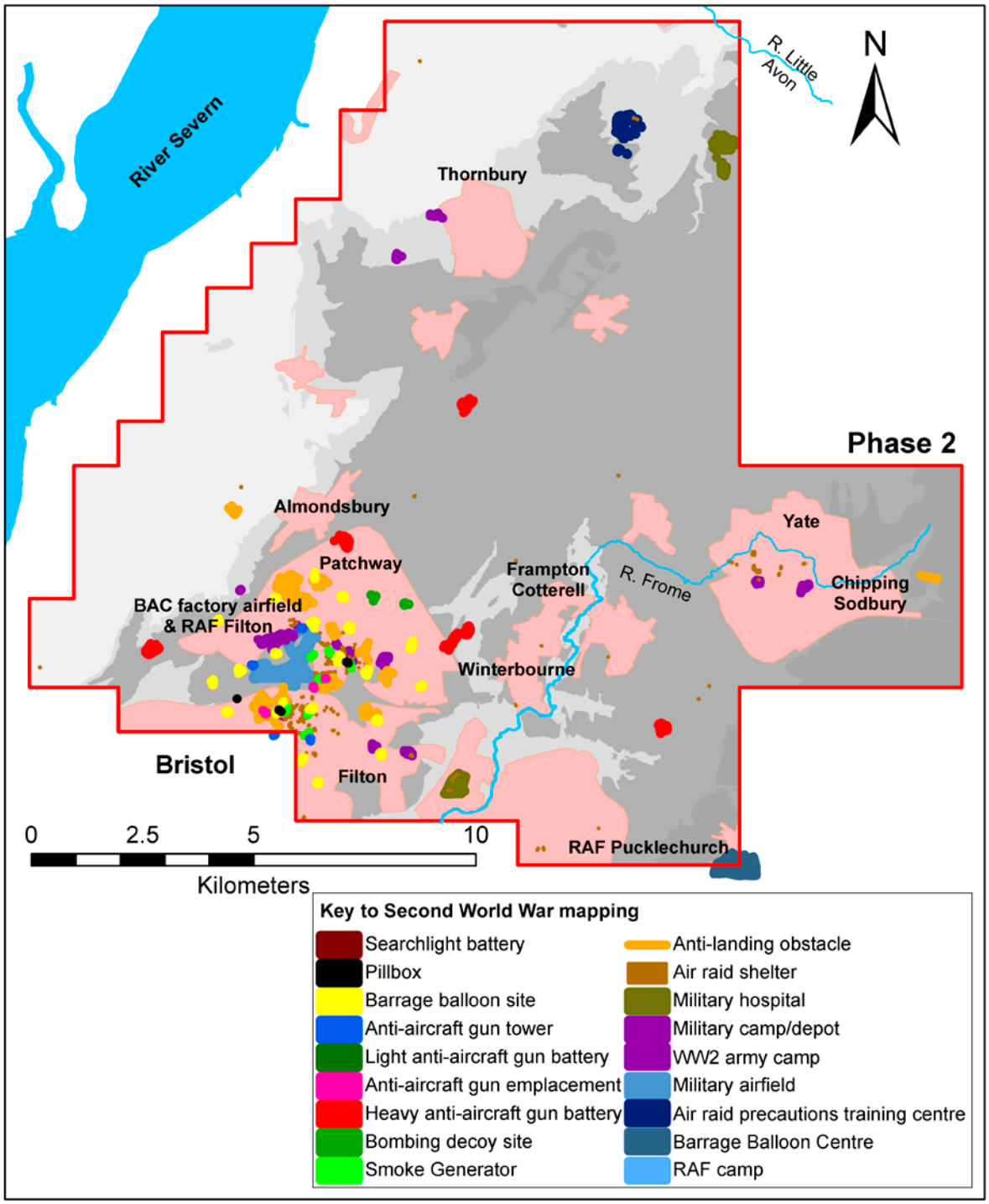



**Figure 22. The main types of Second World War features recorded in Phase 2 of the Severn Vale NMP project. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

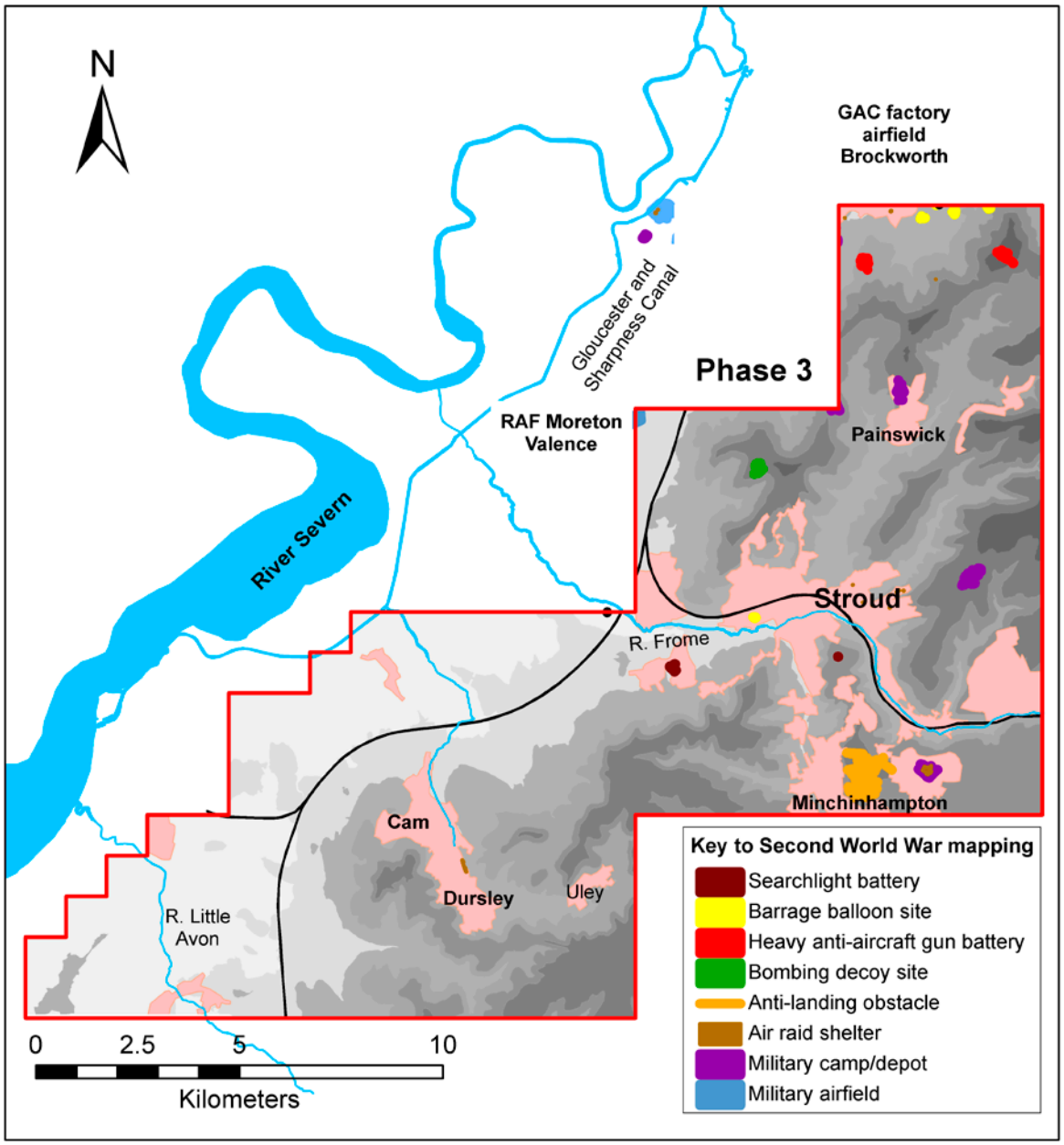



**Figure 23. The main types of Second World War features recorded in Phase 3 of the Severn Vale NMP project. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

### 3.3.2 Air raid shelters

The Severn Vale NMP project recorded a total of 1,177 air raid shelters, divided into three broad types: 784 earth-protected shelters, 361 free-standing above-surface concrete and/or brick shelters: and 32 open-topped 'maize'-type brick-built blast shelters (Fig 24).

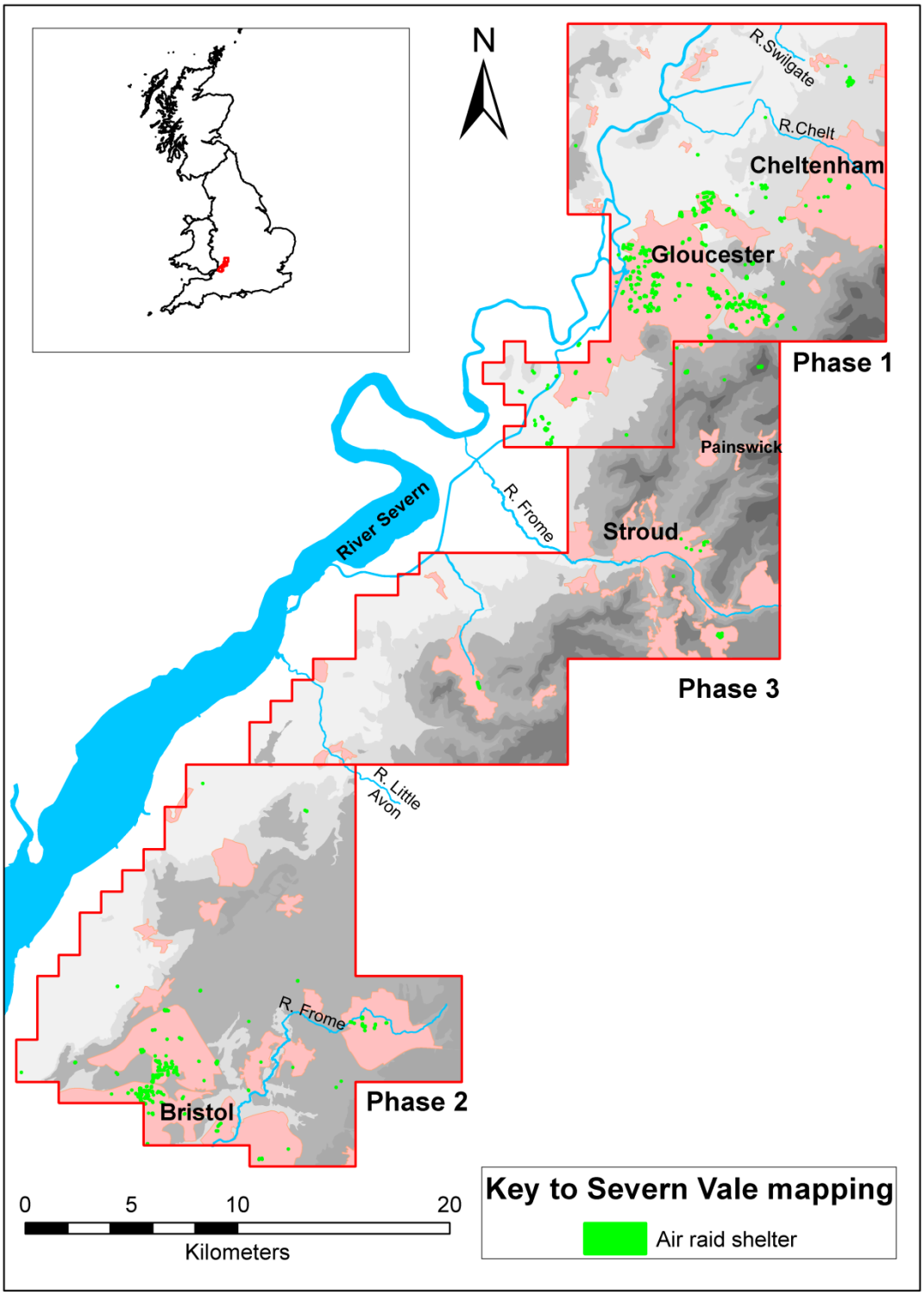



**Figure 24. Distribution of Second World War air raid shelters recorded during the Severn Vale NMP project. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

Air raid shelters were commonly situated at military installations and airfields, but were also recorded at civilian locations such as schools and industrial facilities. There were a

significant number of both free-standing and earth-protected air raid shelters within the perimeter of Bristol Aeroplane Company (BAC), Filton airfield and the adjacent Rolls Royce factory, provided for the civilian workforce (Fig 25).

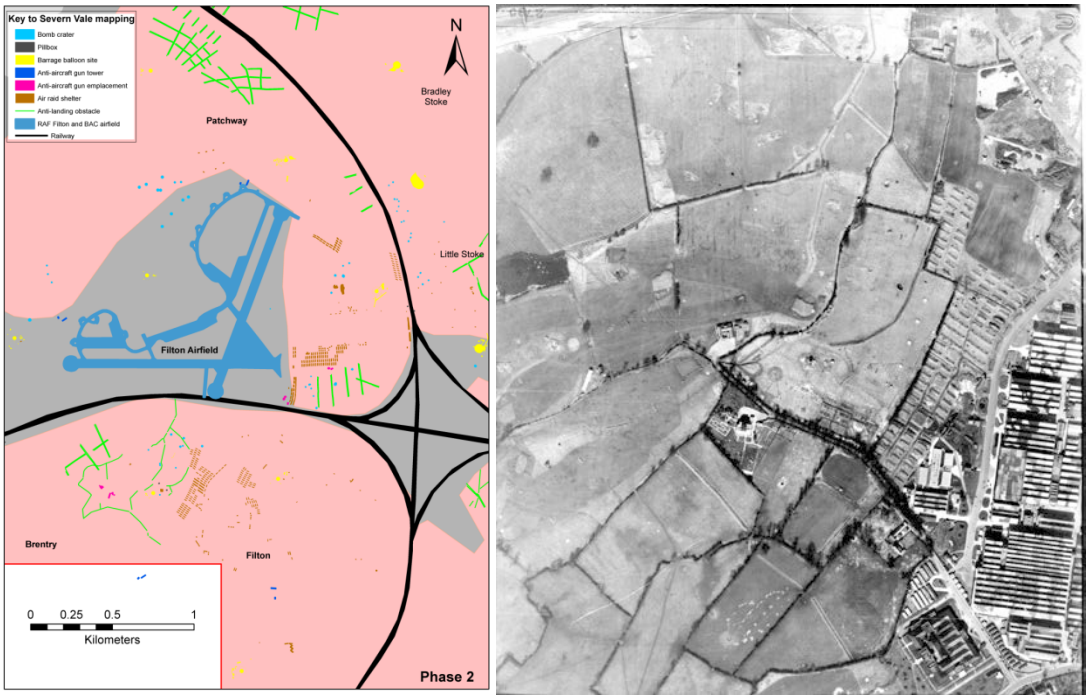



**Figure 25. Left: Distribution of Second World War air defences around Filton at Bristol. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016 Right: the air raid shelters in south Filton, RAF/106G/UK/1288 Vp1 5086 25-MAR-1946 Historic England RAF Photography.**

A daylight Luftwaffe air raid by 58 Heinkel bombers just before midday on Wednesday 25th September 1940 resulted in a direct hit on an earth-protected air raid shelter inside the aircraft works area, damaged a further five and other factory buildings, resulting in 132 death and 315 injuries (Penny 2015) (Fig 26). Of these deaths, 91 were aircraft workers. Air raid shelters were allocated to different departments and the one used by the Tool Room took a direct hit, killing at least 45 toolmakers, a serious loss of skilled personnel that took at least a year to replace (Clare, 2002/2014). The day following the raid, Hurricane fighter aircraft were moved to Filton for defensive protection (Forces War Records 2016)

**Figure 26. Ringed in red are air raid shelters destroyed and damaged in the 25th September 1940 air raid on Filton, one bomb killing 45 toolmakers within the Tool Room's designated air raid shelter. RAF/106G/UK/1288 Vp1 5086 25-MAR-1946 Historic England RAF Photography.**

Similarly, a large number (115) were sited within the Gloster Aircraft Company (GAC) factory and airfield site, to provide protection for the 14,000 strong workforce (Fig 27). All of the shelters at the GAC factory were demolished, though a few isolated examples remain *in situ* at other former military sites in the survey area, mainly in scrub land or secondary woodland around Innsworth (eg. NRHE: 1585413 and NRHE: 1585417).

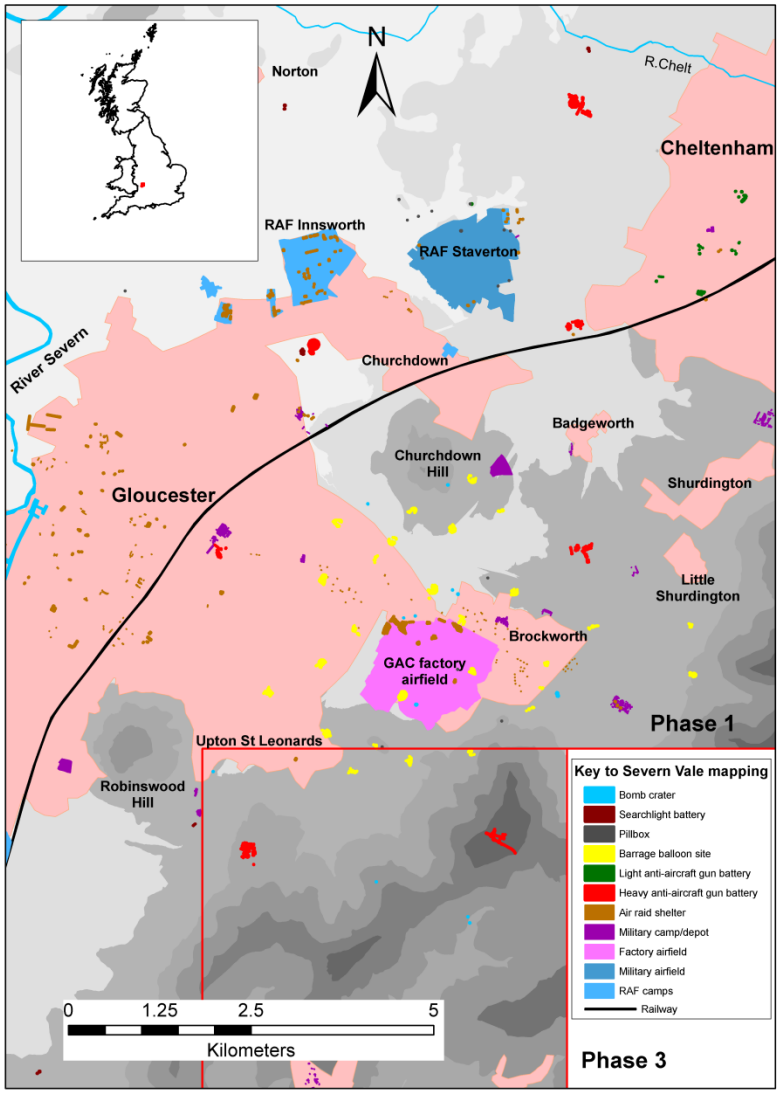



**Figure 27. Distribution map of Second World War features mapped around Gloucester and Cheltenham. The large number of air raid shelters reflects the importance of Gloucester as a strategic target. The absence of recorded air raid shelters in the Cheltenham area is likely due to the lack of wartime aerial photographs. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

The 32 air raid shelters that were brick-built, earth-bermed, 'open-maze' blast shelters (Reed 2013), are a type solely associated with Royal Air Force bases, in this instance at RAF Innsworth and RAF Moreton Valence. These blast shelter structures have now all been demolished due to the closure and re-use of these military sites.

It is notable that the project recorded no air raid protection sites within Cheltenham. There is, however, a strong likelihood that large numbers of air raid structures (of various types) were constructed in and around Cheltenham town during the war, especially given the

documented number of air raids that took place and the large military presence (of US forces particularly) in the vicinity. However, the earliest available aerial photographs for the NMP survey in the Cheltenham area were taken in 1946, by which time many air raid shelters had been demolished. Moreover, the 1946 photographs of Cheltenham were of too poor quality to confidently identify air raid shelters. In contrast, the availability of (mostly) good quality 1944 United States Army Air Force aerial photographs of the City of Gloucester and its suburbs enabled the temporary wartime buildings, structures and earthworks to be identified and recorded by the project. Therefore, the mapping shows much greater numbers of shelters in Gloucester that does not necessarily reflect the true distribution of such features.

As might be expected, there is a concentration of air raid shelters in the major urban centre of Gloucester, presumably also due to the proximity of strategically important railway goods marshalling yards and Gloucester docks. Of particular note, are the 234 free-standing communal civil air raid shelters constructed throughout the urban areas of Gloucester and also in the suburbs of Barnwood, Hucclecote and Brockworth. The distribution of numerous large communal shelters in these suburbs may be linked to the nearby Gloster Aircraft Company factory complex and airfield. These shelters were rectangular, measuring approximately 9 x 5 metres and constructed with brick walls and concrete slab roofs, usually being designed to hold up to 50 persons (Moshenska 2010). They are sited singly, in pairs or in groups on roadsides or in public spaces adjacent to heavily populated areas and sometimes at schools.

As most of these structures were constructed in or near to built-up areas, they were demolished to make way for post-war infrastructure improvements or residential housing expansion. However, the aerial survey has discovered that at least two communal air raid shelters have survived virtually unaltered to the present day. These two buildings had been constructed 11 metres apart on the edge of open fields to the rear of residential houses in Boverton Drive and Ermin Park, Brockworth, along with numerous other identical shelters situated in the streets and public spaces nearby (Figs 28 and 29).


**Figure 28. Of the 234 communal air raid shelters recorded around Gloucester, two appear to have survived to the present (NRHE: 1587234). US/7PH/GP/LOC234 5041 15-MAR-1944 Historic England USAAF Photography.**

The two free-standing air raid shelters were incorporated into the rear garden of a bungalow and used as (rather large) garden sheds (NRHE: 1587234) (Fig 30). The two air raid shelters retain their historic context close to the former site of the Gloster Aircraft Company (now Invista and Gloucester Business Park), the northern boundary of which is 300 metres to the south, at bottom left of the map in Fig 29. Hitherto unrecorded by other archaeological surveys such as The Defence of Britain project, the discovery of these two surviving buildings is potentially significant in terms of their rarity in the Gloucester area.

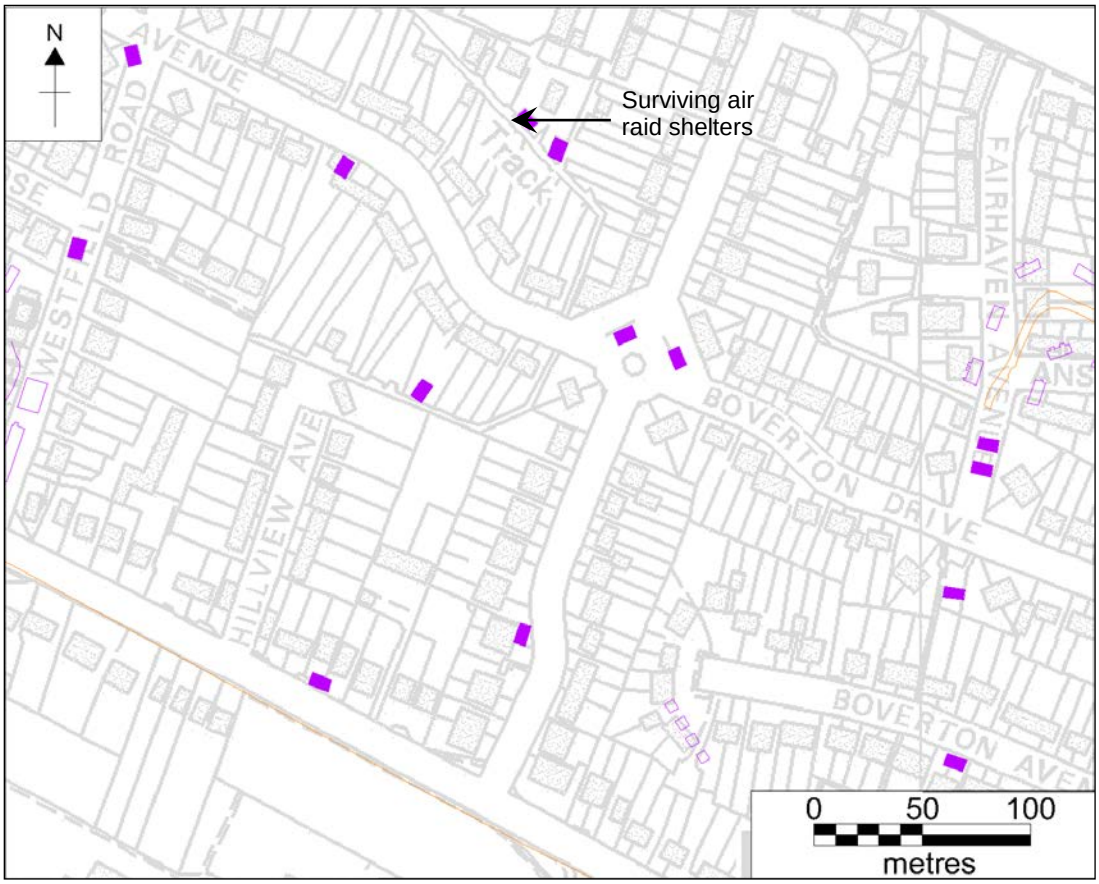



**Figure 29. Second World War communal civil air raid shelters located near houses around Brockworth in March 1944, with the two extant shelters indicated (NRHE: 1587234). OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

**Figure 30. Two free-standing air raid shelters in Brockworth, now garden sheds (NRHE: 1587234). © S. Crowther 2014. Photographed with the kind permission of and with thanks to the landowner.**

### 3.3.3 Barrage balloons

Forty eight new NRHE records for Second World War barrage balloon sites were created by the project. As shown in Figs 21-23, the barrage balloon sites are concentrated around the two major strategic wartime targets already referred to. Around the GAC factory airfield at Gloucester, 4 flights of (8) barrage balloons were operated by members of 912 (County of Warwick) Balloon Squadron, Auxiliary Air Force. By 1940, 4 flights had been reduced to 3 flights of 8 balloons to defend the GAC factory airfield (Nevington War Museum 2014, Penny 2006). From the outbreak of war, No. 935 (County of Glamorgan) Barrage Balloon Unit (Auxiliary Air Force) had been stationed at Filton, but its numbers increased from 16 to 24 balloons at the height of the Battle of Britain in summer 1940 (Forces War Records 2016)

A barrage balloon site is likely to have consisted of a barrage balloon (deployed in the air or 'bedded' on the ground) attached to a ground winch or winch lorry via a 'main anchorage', an outer circle of secondary anchors, spare Hydrogen cylinders, a large canvas cover for when the balloon was not in the air and had to be 'bedded', a Nissen type hut or other military building for crew accommodation, a privy, a crew shelter (probably brick-built with a concrete slab roof) and possibly a barbed wire or earthwork perimeter (Fig 31).

**Figure 31. A detailed aerial photograph of a barrage balloon site, with balloon tethered above its central mooring on the edge of Filton airfield, Bristol. US/31/GR/LOC26 V 0100 21-APR-1944 Historic England USAAF Photography.**

The hydrogen-filled barrage balloon, known as the LZ (Low Zone) Kite Balloon, was constructed of an aluminium coated cotton material and measured about 18.9 metres in length and 7.6 metres in diameter. It was tethered by steel cables via an eyebolt that was set in a large concrete 'main anchorage' point in the centre of the site, to petrol driven winches (either sited on the ground or affixed to RAF winch lorries). At a radius of 90 feet from the 'main anchorage', 24 secondary concrete blocks fitted with metal rings were set into the ground in a concentric circle, to anchor the balloon's mooring cables. The cables could be extended or retracted to specific heights (maximum altitude about 1,500 metres) via an altimeter, according to which height the balloon crew were given by plotters, to hamper the approach of enemy aircraft (Bacon 2006, Brannan 2005)

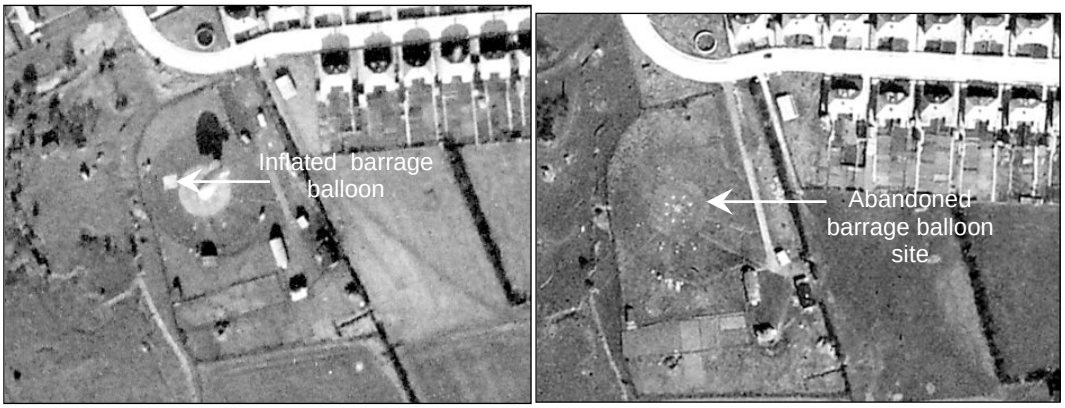



**Figure 32. Wartime aerial photographs are a key contemporary source for the location and deployment of the numerous new barrage balloon sites, such as this identified at Hucclecote, Gloucester. Left: NMR US/7PH/GP/LOC234 5040 15-MAR-1944 Historic England USAAF Photography. Right: NMR RAF/106G/UK/1354 5411 02-APR-1946 Historic England RAF Photography.**

Where available, the USAAF aerial photographs which are dated to 1944 provided clear evidence of barrage balloons sites, with many of the balloons *in situ* at that time, either bedded on the ground, or airborne (Fig 32). In many instances it was possible to identify the main anchorage and secondary anchorage points, as well as defences such as barbed wire and crew buildings. Many of the military buildings, concrete anchors and earthworks associated with the barrage balloons sites were still extant in 1946, though no features from any balloon sites were still extant by 2010, having been either demolished or covered by post-war residential housing.

NMP mapping from wartime dated aerial photographs can significantly enhance the archaeological record. For example, GCHER entry 17969 is the record of a field investigation report of a land parcel in Upton St. Leonards (Parry 1996) which states that, "*within the survey area two modern concrete bases (17969/2-3) had been constructed on the earthworks. Their origin is uncertain, but they presumably provided hardstanding for sheds or other such temporary structures*". The concrete 'shed' bases referred to appear to be, in fact, the building platforms for the Nissen type huts and other military buildings associated with the previously unrecorded Second World War barrage balloon site located there (NRHE: 1587139) (Fig 33).

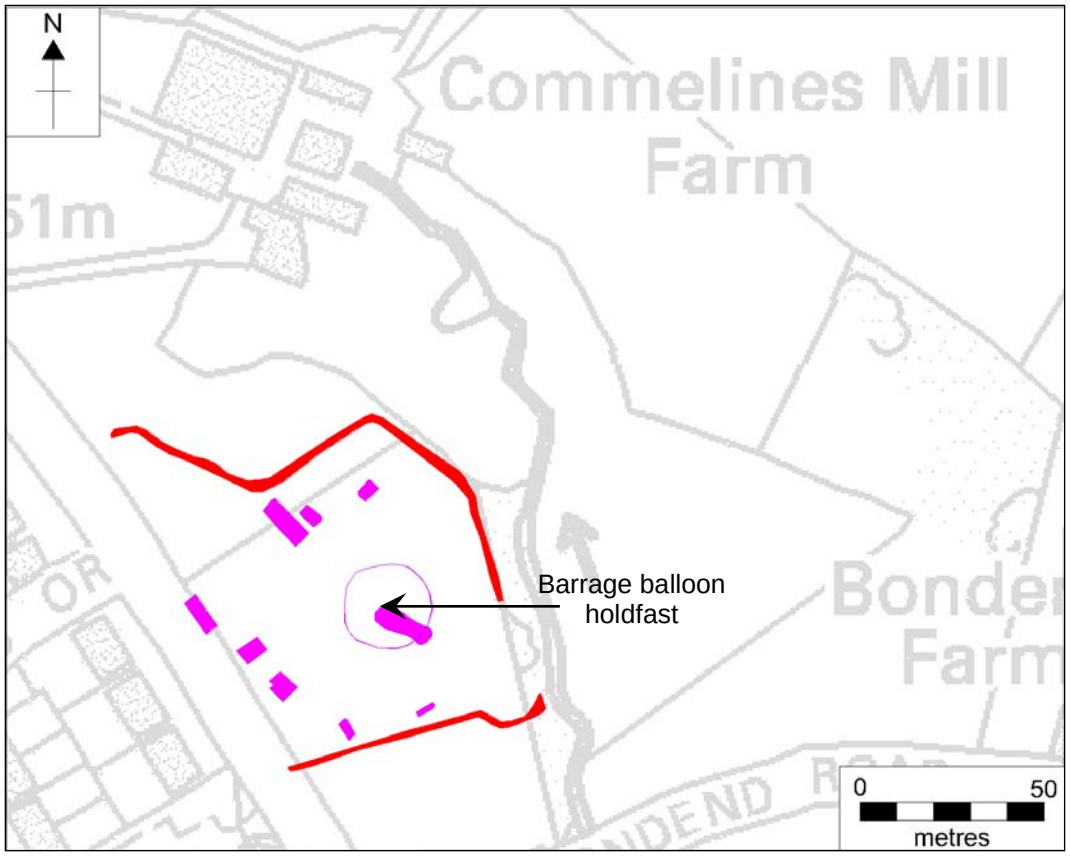



**Figure 33. Newly recorded Second World War barrage balloon located near houses at Upton St. Leonards from aerial photographs taken in March 1944 (NRHE: 1587139). OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

### 3.3.4 Pillboxes

The NMP project identified and mapped 39 pillboxes of various types. As might be expected, these structures are generally focused around military establishments and strategically important industrial sites. Figs 21-23 shows the distribution of these defensive structures clustering around the BAC factory airfield and RAF station at Filton, RAF Stoke Orchard, RAF Staverton (now Gloucestershire airport) and the GAC factory airfield at Brockworth, Gloucester.

Five large shallow V-shaped concrete and brick defensive structures, known as seagull trenches, were recorded defending the former RAF grass airfield at Stoke Orchard, at least one of which survives to the present day (Fig 34). The five structures are recorded variously pointing both inwards towards the airfield and outwards from it.

**Figure 34. The extant Second World War seagull trench on the perimeter of the former operational RAF airfield at Stoke Orchard (NRHE: 1587234). © S. Crowther 2016.**

Nine examples of the Air Ministry variant pillbox were recorded encircling the GAC factory airfield at Brockworth and also around the airfield at nearby Staverton, of which at least four examples survive to the present day at both airfield locations. These pillboxes were constructed with two angle forward-facing sides and an open square annexe to the rear for siting air defence anti-aircraft machine guns (Fig 35).

**Figure 35. The extant Air Ministry pattern pillboxes on the perimeter of former RAF Staverton (NRHE: 1249591) and overlooking the airfield (NRHE: 1422458). RAF/58/368 V 5199 27-FEB-1950 Historic England RAF Photography and © S. Crowther 2016.**

The remaining pillboxes recorded in the survey are a mix of types, only a few of which remain extant, such as the mostly buried type 22 pillbox overlooking the runway at former RAF Staverton, which for years was fitted with railings and used as a lookout for customers in garden of the airport's restaurant, The Aviator (Fig 36).

**Figure 36. The extant partially buried Second World War type FW3/22 pillbox overlooking the runway at Gloucestershire Airport, Staverton. The top of the sealed off entrance is visible to the rear (NRHE: 1246377). © S. Crowther 2016.**

The survey identified a previously unrecorded pillbox type FW3/26 at Longford, Gloucester (NRHE: 1583785). It has probably remained so because it has now almost completely sunk into the field on which it once stood. First identified from RAF aerial photographs taken in 1946, it is located on the banks of the Horsbere Brook. The site comprised a defensive perimeter, within which there were three possible tents and other structures. As the site was recorded from post-war aerial photographs, it is possible that some of the other structures may not relate to wartime activity (Fig 37). Only the pillbox survives, although it is now barely visible, having sunk into the grass-covered flood defence bank 3 metres from the brook (Fig 38).


**Figure 37. A previously unrecorded pillbox, type FW3/26 at Longford (NRHE: 1583785), with nearby tents and a fenced off perimeter. NMR RAF/106G/UK/1293 RV 6023 25-MAR-1946 Historic England RAF Photography**

**Figure 38. The sinking Longford pillbox type FW3/26 (NRHE: 1583785 ) in January 2014. © S. Crowther 2014.**

### 2.3.5 Military camps and airfields and their impact on modern landscape character

The results of the Severn Vale NMP mapping show how 20th century warfare has significantly changed some parts of the project area's historic landscape character into the present-day. Large areas of former farmland upon which Second World War installations and camps were constructed appear to have been permanently transformed from rural to industrial, country to peri-urban. As detailed in Appendix 1, extensive areas of concrete runways, roadways, hangars, workshops and numerous other military buildings that were constructed for military use were subsequently not returned to their former agricultural state once decommissioned by military authorities.

In addition to the main wartime RAF airfields at Stoke Orchard, Staverton, Moreton Valence and Filton, there were also large non-operational RAF bases at Quedgeley, Innsworth and Pucklechurch, the first two of which had numerous satellite camps providing accommodation and other services such as medical centres, technical sites, telecommunications and motor transport. RAF Quedgeley had been the site of No. 15 Shell Filling Factory during the First World War, employing thousands locally in munitions production. It was subsequently demolished and rebuilt as an RAF base in the build-up to the second World War, the base acting as a maintenance unit and stores during and following the war (Quedgeley Community Trust 2013).

Historic aerial photographs dated 1925 and 1939 show that both the GAC factory at Brockworth and RAF Staverton had grass airfields prior to the Second World War but, with the onset of hostilities, the runways were extended and upgraded to concrete and a large infrastructure of roads and military buildings constructed. Shadow factories for GAC were built during the war at Stoke Orchard and Bentham and four large workers' hostels were constructed to supply workforce accommodation for the GAC factory, Smith's Industries in Bishop's Cleeve and Dowty Equipment Ltd at Staverton, all producing essential war materials.

The smaller Second World War military camps, depots, hospitals, training centres, air bases, shadow factories and workers' hostels within the Severn Vale project area were constructed at that time, for the most part, in agricultural fields and woodlands, as recorded on Ordnance Survey maps dating to between 1904 and 1939. With the exception of RAF

Innsworth at Gloucester, which has now been taken over by the British army and renamed Imjin Barracks, all of the former military sites have been decommissioned. Many were closed following the end of the war, though some did not close until the late 20th century. In almost all instances, however, these sites have now been re-used for industry, commerce, technology or housing, or have simply been abandoned, but only a very few have been returned to their pre-war status as farmland and parkland. These are detailed at Appendix 1.

Examples include the former RAF Stoke Orchard's grass airfield (used for glider training pre-D-Day), which has reverted to arable land-use, but even there the remainder of the airbase that was the RAF technical site has retained an industrial character as landfill and commercial units. Smaller wartime RAF satellite camps used for accommodation, such as around Moreton Valence, Innsworth and Little Witcombe, remain as scrub pasture or are covered with naturally regenerated woodland on private and inaccessible land (Fig 39).

**Figure 39. Left: RAF Little Witcombe was constructed upon farmland (RAF/106G/UK/1354 V 7415 02-APR-1946 © NMR RAF Photography) and right: The private entrance to the abandoned former RAF Little Witcombe camp in 2014, now overgrown with secondary woodland. Copyright S Crowther 2014.**

### 2.3.6 Anti-aircraft defences

Significant anti-aircraft defences were mapped by the project, clustering particularly in Phase 1 around Gloucester city and the Gloster Aircraft Company's factory airfield at nearby Brockworth; and in the Phase 2 area around Bristol and encircling the Bristol Aeroplane Company's factory airfield at Filton. The active air defences in the Phase 3 area, such as the heavy anti-aircraft batteries at Belmont (NRHE:1472228) and Brotheridge

(NRHE:1472235) relate to the proximity of Gloucester and the GAC factory airfield a short distance to the north.

**Figure 40. 40mm Bofors gun anti-aircraft gun tower and adjacent crew accommodation hut (NRHE: 1591479), south of Filton airfield. RAF/106G/LA-45 Vp4 5300 30-OCT-1944 Historic England RAF Photography.**

One of the more unusual Second World War anti-aircraft defences that the project recorded were four anti-aircraft gun towers (NRHE: 1428419, 1591480, 1595390 and 1591479), three of which were new to the NRHE (Fig 40). The four towers accommodated a 40mm Bofors gun for the defence of Filton airfield. The towers were, in fact, two adjacent concrete towers with a small gap between them. One platform housed the Bofors gun with recessed ammunition stores in the corners; the other housed the sensitive predictor equipment, necessitating a gap between structures to dampen any vibrations from the gun. The towers were probably of modular concrete construction and the gun platform stood on braced legs, the form and height of which can be seen from the shadow cast by the structures in Fig 40. Unfortunately, the towers and adjacent shelter block were both demolished after the war and the three other anti-aircraft gun towers have also now been demolished.

# 4 AREAS OF REGIONAL AND LOCAL DEVELOPMENT PRESSURE

The low-lying lands east of the River Severn within the Severn Vale NMP project area contain the major population centres of Bristol, Gloucester and Cheltenham and major infrastructure routes, with the consequence that development pressure is concentrated around these areas. Planning decisions on the Cotswold Hills are carried out in the context of the Area of Outstanding Natural Beauty (AONB) status. Across the project area, strategic development land allocations are further defined by local policy, flood risks, infrastructure needs and other environmental designations, focusing new development to the outskirts of large urban areas, principle settlements and conurbations.

The Submission Version Joint Core Strategy (JCS) document, produced by north Gloucestershire planning authorities (Gloucester, Cheltenham and Tewkesbury), quantifies major development needs as part of long term strategic direction and identifies the need for an estimated 32,500-43,500 new homes in the JCS area (plan period 2011-2031). (JCS 2014).

The Severn Vale NMP project dataset has added value to the archaeological record, enhancing the understanding of past human activity to better inform debate and decision-making regarding development and proposed strategic allocation areas. The mapping evidence from the project records archaeological remains that range in date from the Neolithic to the Cold War. With the completion of the Severn Vale project, the Historic England National Mapping Programme has now provided NMP mapping for the whole County of Gloucestershire, setting out base-line information on the form and extent of the archaeology identified, which can now be employed to inform strategic planning decisions and further archaeological prospection. There is always scope for further discoveries from the air and it is likely, given experience elsewhere in the region, that other techniques, such as geophysical survey and excavation, will identify further archaeological features.

# 5 REVIEW OF SCHEDULED MONUMENTS

The National Heritage Protection Plan (NHPP) Activity 5A2: Upgrading and Modernising of Designation Base identified the need to update older scheduling records. There are 91 Scheduled Monuments for the whole of the Severn Vale project area of which 50 are Old County Number (OCN) Scheduled Monuments (Catchpole and Dickson 2013).

Of the Scheduled Monuments that were suitable for assessment from aerial photographs and lidar images, the Severn Vale NMP survey has provided a basic assessment of changes in agricultural or management regime and any damage that had occurred since the last Heritage at Risk visit. An assessment was also made of the accuracy of the current Scheduled Monument mapping. This assessment was completed using a pro-forma table. Details can be found in Appendix 2.

Structures, such as Churchyard Crosses and others monuments that were obscured by dense vegetation on available images, were assessed for the geographical location and accuracy of the scheduling information only.

# 6 REVIEW OF ARCHAEOLOGICAL SIGNIFICANCE

The English Heritage Monuments Protection Programme (MPP) in the 1990s covered only a small proportion of monument classes in Gloucestershire and South Gloucestershire. As a result of the limited nature of the MPP, there are a large number of well-preserved sites of potential national importance that have not been reviewed (J. Wills, pers. comm). There is therefore a need to examine designation within the Severn Vale, where most of the major development in the county is likely to take place over the next 10-20 years. Such a review would support the preparation of advice on policies and on the location of major development through the planning process. The information derived from the NMP project would be an important component of any strategic review of management of the archaeological resource in the Severn Vale.

During the NMP project, archaeological features, sites and monuments were briefly assessed in terms of potential national or local significance (DCMS 2010), taking into

account the Selection Guides, provided by Historic England via their website (English Heritage 2012 and 2013). It is suggested that the following monuments recorded during the Severn Vale NMP project survey should be assessed with a view to potential designation.

## 6.1 Air raid shelters

The two surviving Second World War civilian air raid shelters located within the rear garden off Elm Drive, Brockworth, as detailed in Section 3.3.2 were felt to be of significance.

## 6.2 Strip Lynchets and cultivation terraces

The numerous strip lynchets and cultivation terraces that have been recorded by the Severn Vale NMP survey along the edge of the Cotswolds escarpment, from Dursley to Brockworth appear to be an integral feature of the agricultural landscape on the footslopes and hills, and the features mapped by the Severn Vale NMP project are part of a larger, locally distinctive cultivation system along the Cotswold escarpment also recorded by the South Cotswolds NMP, such as the extensive system of lynchets to the south of Bibury (Janik *et al.* 2011).

Comparable cultivation terrace and strip lynchet systems have been Scheduled at Hawkesbury in Wiltshire (NRHE: 205075 / NHLE: 1010258). There, as here, it was recognised that strip lynchets, lynchets and cultivation terraces form a cohesive pattern of evidence for medieval and earlier agricultural activities. These features give an indication of the intense level of land use and farming practices at times of maximum arable expansion. (Fig 17).

## 6.3 Pillow mounds

At Hill Court House, Hill, an unusual group of possibly associated earthwork features may warrant further investigation (Fig 41). The most prominent earthwork (NRHE: 1597199) comprises 16 square mounds measuring roughly 7x7 metres in plan, laid out in 2 rows of 8, giving the appearance of a segmented chocolate bar. Each square mound/bank is surrounded by a linked ditch to create a feature that is 72 metres long and 17.5 metres

wide. This may be an unusual garden feature, but the function or aesthetic purpose for such an unusual park feature is unclear. The feature is presumably associated with several nearby linear and circular earthwork mounds.

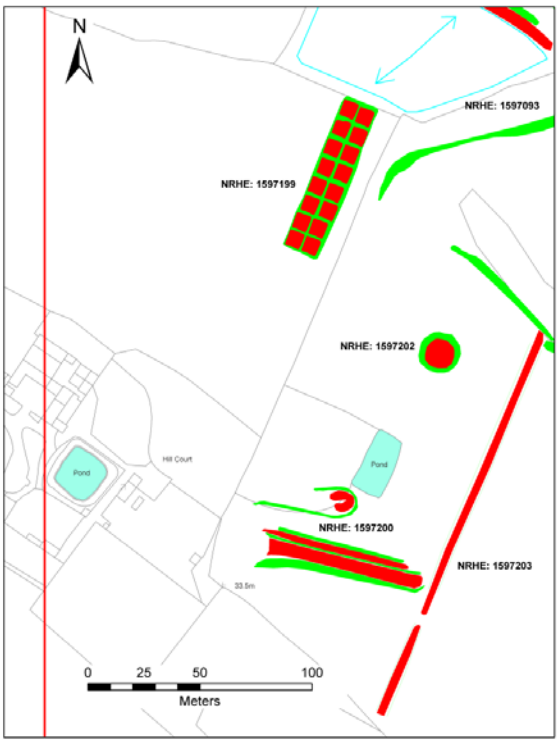



**Figure 41. Possible pillow mounds at Hill Court The unusual 'chocolate bar' feature may also be a pillow mound associated with industrial-scale rabbit rearing for the Bristol hat industry in the post-medieval period. OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

These features are clearly visible on aerial photographs taken from 1946 onwards. Another speculative interpretation for these earthworks is that they are pillow mounds for the industrial rearing/production of rabbits. This interpretation may be given some credibility due to the proximity of this feature to other probable pillow mounds in the house's grounds. It is also strengthened by the proximity of the Bristol hat-making industry, which used huge numbers of rabbit pelts in the production of felt hats from the early post-medieval period to the early 20th century. If further investigation confirmed the feature as a pillow mound, then there may an argument for designation of this and the other associated earthwork features due to its potentially unique form.

## 6.4 Symonds' Hall prehistoric mortuary enclosure and medieval settlement

At Symonds' Hall, the possible Neolithic mortuary enclosure (described at 3.1.1 above, NRHE: 916699, Fig 42) forms part of complex of prehistoric ritual monuments, which also includes a Long Barrow (NRHE: 205213), a bowl barrow (NHRE 205217), and nearby possible ring ditches (NRHE: 916689 and 1597535).

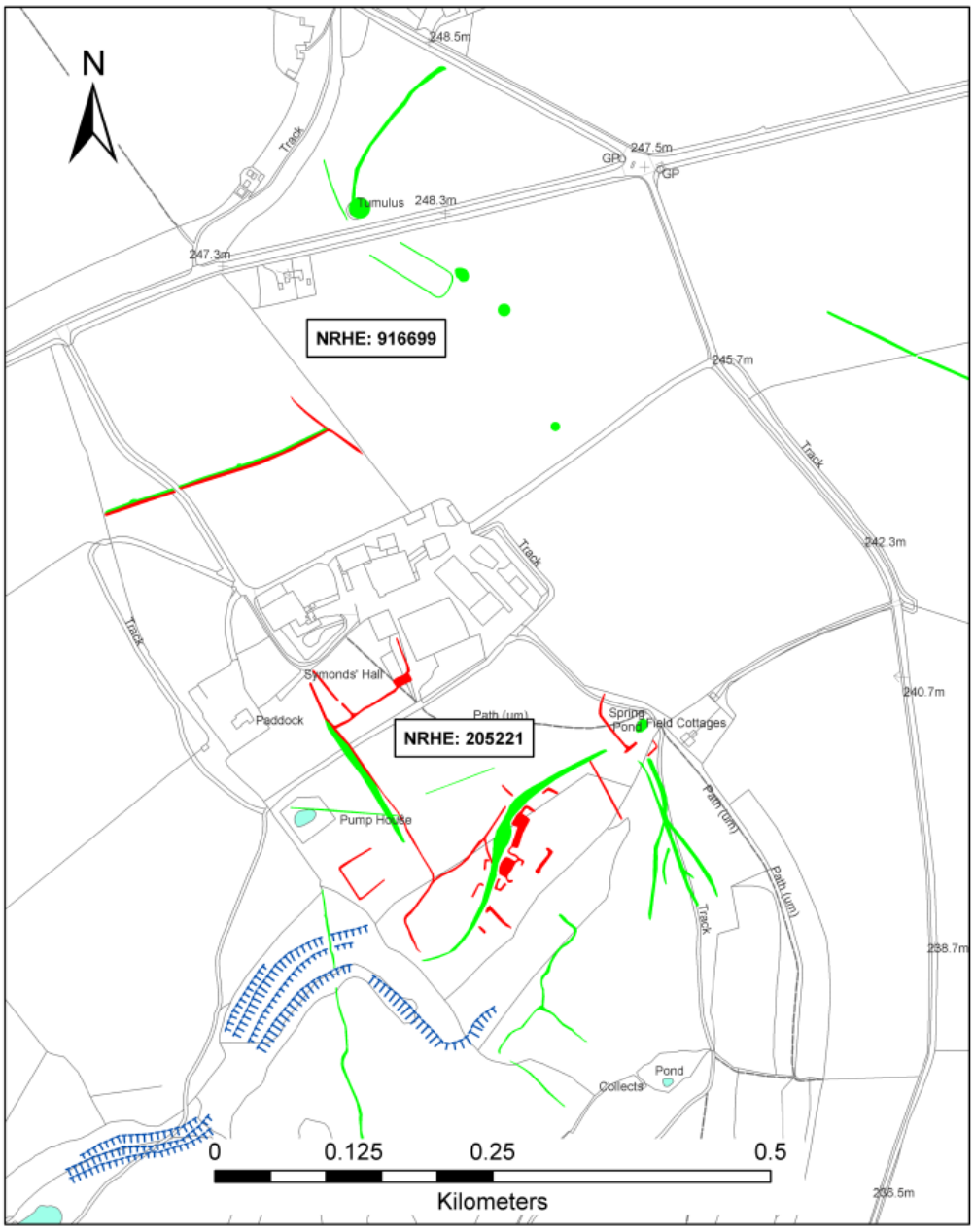



**Figure 42. Symonds' Hall possible mortuary enclosure (NRHE: 916699) and the deserted settlement of probable medieval date (NRHE: 205221). OS Map Base © Crown copyright. All rights reserved. Gloucestershire County Council 100019134 2016.**

The earthwork remains of a nearby medieval deserted settlement (NRHE: 205221) were also mapped (Figs 42-43). A main street extends northeast to southwest. Although not clearly defined, building outlines are visible on the eastern side of the street, though less so on the western side. A series of interconnecting trackways extend down the combe east of the settlements. These settlement earthworks remained extant until 2006, when much of the settlement was ploughed, which may be levelling earthworks and could be causing damage to the subsurface archaeology. Due the recent changes to the earthworks an assessment of the condition of the surviving archaeology would be beneficial.

**Figure 43. Symonds' Hall medieval settlement earthworks (NRHE: 205221). RAF/CPE/UK/2098 RS 4394 28-MAY-1947 Historic England RAF Photography.**

# 7 CONCLUSION

The main results of the Severn Vale NMP project comprise contributions to understanding of medieval and post-medieval agricultural remains, as well as the importance of the military and industrial roles played by Gloucestershire and Bristol during the Second World War. The project mapped and recorded widespread evidence of ridge and furrow earthworks. Using data from previously completed NMP projects, this almost contiguous agricultural regime is now shown to have extended almost unbroken from the Midlands through Oxfordshire and southern Warwickshire, into northern Gloucestershire and down the Severn Vale to the northern fringes of Bristol.

Many of the Second World War sites within the Severn Vale project area were previously unrecorded and in a number of cases there is potential for further investigation of these sites. For example, the discovery of two intact air raid shelters at Brockworth offers an opportunity to investigate and record these potentially locally important structures. Where contemporary Second World War aerial photographs were available, it was notable that a significant number of military sites, structures and camps, as well as civil defences, were recorded, especially and unsurprisingly in proximity to the larger urban areas. There is a numerical bias of NRHE entries for those areas where the wartime aerial photography was available, but this only illustrates the value of Historic England's historic aerial photograph archive. The Severn Vale NMP mapping results have also revealed that the needs of 20th century warfare has significantly changed the historic landscape within the project area, altering the perception of these landscape areas and their sense of place, which has been transformed from rural to industrial, country to peri-urban.

The possible medieval deer park at Leckhampton demonstrates the importance of using multiple aerial photographs and lidar images alongside historical evidence to increase understanding of past landscapes. NMP methodology allows for all available aerial photographs, lidar images and documentary sources to be viewed alongside each other to build up a more accurate picture of disparate and sometime fragmentary features in the landscape.

Within the Severn Vale project area, there is a relative paucity of evidence on aerial photographs for subsurface features that date from the prehistoric, Roman or early historic

periods, although other archaeological techniques and HER records demonstrate that such remains are widely distributed. The relative scarcity of such sites in the NMP project results is probably a combined consequence of the rapid expansion of urban areas in the post-war period predating much of the available aerial photography, geology that is problematic for cropmark formation, a variable depth of accumulated alluvial and agricultural soils and the extent of surviving or only recently plough-levelled ridge and furrow earthworks. As the latter are further reduced by modern agricultural practices, the evidence from the NMP survey suggests that more sub-surface features will be exposed and that future aerial reconnaissance in these areas may identify further sites when climatic and soil conditions are conducive to cropmark formation. Fortunately local curatorial archaeologists are aware of these issues and routinely recommend geophysical survey and/or trial trenching in advance of development proposals.

Results from the Severn Vale NMP project have increased known heritage assets recorded on the NHRE by 28% within an area of 737 square kilometres. This new archaeological information enhances not only the NRHE, but also the Gloucestershire HER, South Gloucestershire HER and Bristol HER, directly informing strategic heritage protection, which is particularly valuable in an area where strategic development land allocations are currently focused. The Severn Vale NMP mapping has produced interesting and revealing data that aids our understanding of the historic landscape within the project area, better informing strategic decision-making and evidence-based management of heritage assets.

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# APPENDIX 1 Second World War bases, camps and airfields

A comparison of landscape character of the main Second World War bases, camps and airfields in the Severn Vale project area pre-war, during the war and in the present day.

| Site & Location | Phase No | NRHE | State prior to WW2 | Use In WW2 | Function today |
|---|---|---|---|---|---|
| Military camp, Gotherington | 1 | 1580919 | Farmland | Munitions store | Building remains in copse - Secondary woodland |
| RAF Stoke Orchard | 1 | 1430206 | Farmland | Grass operational airfield & technical site/ RAF camp | grass airfield reverted to arable;<br>Part civic amenity site;<br>Part The Aerodrome business park |
| RAF Staverton | 1 | 1430177 | Commercial grass airfield | RAF Staverton operational airfield & technical site/ RAF camps | Gloucestershire Airport;<br>Anson Business Park;<br>Ashville Business Park;<br>Meteor Business Park; |
| RAF Moreton Valence | 1 | 1406485 | Farmland | RAF Moreton Valence operational airfield & technical site/ RAF camps | Part Javelin Business Park; part The Old Airfield industrial estate;<br>part M5 motorway;<br>part agricultural;<br>Part St Joseph's Travellers Park |
| RAF Moreton Valence camp | 1 | 1583716 | Farmland | RAF satellite camp No 1 for accommodation | Secondary woodland |
| RAF Moreton Valence camp | 1 | 1583715 | Farmland | RAF satellite camp No 2 for accommodation | Secondary woodland |
| RAF Moreton Valence camp | 1 | 1583717 | Farmland | RAF sick quarters site | Depot |
| RAF Moreton Valence camp | 1 | 1583714 | Farmland | RAF satellite camp No 3 for accommodation | Secondary woodland |
| RAF Moreton Valence camp | 1 | 1583710 | Farmland | RAF satellite Communal Site | Secondary woodland |
| RAF Moreton Valence camp | 1 | 1583718 | Farmland | RAF sewage works | Disused site |
| RAF Moreton Valence camp | 1 | 1583713 | Farmland | RAF satellite camp No 4 for accommodation | Secondary woodland |

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| RAF Staverton camp | 1 | 1585377 | Farmland | RAF satellite camp for accommodation | Staverton Park (mobile homes) |
| RAF Staverton camp, Parton Lane | 1 | 1585450 | Orchard | RAF satellite camp for accommodation | Residential housing |
| Workers' Hostel, Shurdington Road | 1 | 1587216 | Farmland | Hostel for GAC factory, Brockworth | The Cheltenham Chase Hotel |
| Workers' Hostel, Shurdington Road | 1 | 1587221 | Farmland | Hostel for GAC factory, Brockworth | Abbotswood housing estate |
| Workers' Hostel, Staverton | 1 | 1585374 | Farmland | Hostel for Dowty factory, Staverton | Staverton Technology Park |
| Bishop's Park workers temporary site, Bishop's Cleeve | 1 | 1580886 | Farmland | Accom for Smith's Industries, Bishop's Cleeve | Malvern View Business Park |
| 2 GAC shadow Factories, Stoke Orchard | 1 | 1580924<br>1580925 | Farmland | Shadow factories for GAC aircraft production | Coal Research Establishments |
| Bentham shadow factory | 1 | 1530837 | Farmland | Shadow factory for GAC aircraft production | Industrial estate |
| RAF Little Witcombe | 1 | 1586995 | Farmland | RAF accommodation camp for Birdlip telecomm site | Abandoned site in secondary woodland |
| RAF Barnwood camp | 1 | 1587244 | Farmland | RAF/army accommodation camp for RAF Barnwood | Eastbrook Rd Trading Estate |
| RAF Innsworth | 1 | 1585409 | Farmland | RAF base | Army base |
| RAF Innsworth camp | 1 | 1585413 | Farmland | RAF satellite camp | Abandoned site – derelict in pasture field |
| RAF Innsworth camp | 1 | 1585411 | Farmland | RAF technical site | Innsworth Technology Park |
| RAF Innsworth camp | 1 | 1585417 | Farmland | RAF satellite camp for accommodation | Partly derelict in pasture field |
| RAF Innsworth camp | 1 | 1585415 | Farmland | RAF satellite camp for accommodation | Housing – service married quarters |
| Ullenwood military camp | 1 | 1586986 | Parkland | Military camp and hospital | Ullenwood Court – part Civil Defence Training Centre; part Business Park; part residential housing |
| Chargrove House, | 1 | 1587014 | Orchard | Military camp | Business centre |

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| Chargrove | | | | | |
| RAF Quedgeley, | 1 | 1583179 | Part WW1 shell filling factory; Part farmland | RAF maintenance unit - Sites Nos 1,5,7 and HQ | Part Waterwells Business Park; part Kingsway residential housing estate: part |
| RAF Quedgeley | 1 | 1583190 | Farmland | RAF maintenance unit – No 4 site | The Quadrant Centre industrial estate |
| RAF Quedgeley | 1 | 1583176 | Farmland | RAF maintenance unit – No 2 Site | Quedgeley Trading Estate West |
| RAF Quedgeley | 1 | 1583191 | Farmland | RAF maintenance unit – No 6 site | Quedgeley East Business Park |
| RAF Quedgeley | 1 | 1583174 | Farmland | RAF maintenance unit – No 3 Site | Residential housing |
| Bentham | 1 | 1584813 | Farmland | Civic government offices | Government Communications Headquarters |
| Paul Camp, Edge | 1 | 1583031 | Farmland | Military camp - army tyre depot | Residential housing Paul Camp |
| Gloster Aircraft Company | 1 | 1031173 | WW1 aircraft factory and grass airfield | Large aircraft factory complex & airfield | Part Gloucester Business Park; part residential housing |
| Military camp, Harry Stoke | 2 | 1595533 | Farmland | Military camp | Abbey Wood Retail Park |
| Military camp, Harry Stoke | 2 | 1595527 | Farmland | Military camp | Bristol Business Park |
| Military camp | 2 | 1593732 | Farmland | Military camp | Residential housing |
| Military camp, Patchway | 2 | 1593188 | Farmland | US military camp | Rolls Royce manufacturing complex |
| Military camp | 2 | 1591638 | Deer Park | US military camp | Bristol Golf Course |
| GAC Filton & RAF Filton | 2 | 1359348 | WW1 aircraft factory, RNAS station & grass airfield | Large aircraft factory complex, factory airfield and RAF airfield | Bristol Filton Airport |
| Filton airfield | 2 | 1591489 | Farmland | USAAF and army camp | Patchway Trading Estate |
| Little Stoke camp | 2 | 1593225 | Farmland | US Army camp | Residential housing |

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| Military hospital, Frenchay | 2 | 1076335 | Frenchay Park Sanatorium | US military hospital | Frenchay Hospital |
| RAF Pucklechurch | 2 | 1594751 | Farmland | No 11 Barrage Balloon Centre | Trading estate and HM Prison |
| Military camp, Yate | 2 | 1593921 | Farmland | Military camp | Playing Fields |
| Military camp, Kyneton | 2 | 1107258 | Parkland | Military camp | Farmland |
| Military camp, Thornbury | 2 | 1588477 | Farmland | HQ 6th Regiment (Severn), Maritime Royal Artillery | Disused camp extant in scrubland |
| Eastwood Park | 2 | 1589122 | Parkland | Air Raid Precautions Centre | Government training centre till 1997. Now training centre & conference centre |
| Tortworth | 2 | 1589120 | Parkland | US Military hospital | HM Prison Leyhill |
| Military Camp, Westwood | 2 | 1591792 | Farmland | Military camp | Fairway Industrial Centre |
| Military Camp, Yate | 2 | 1593732 | Farmland | Military camp | Yate Shopping Centre |
| The Park camp, Minchinhampton | 3 | 1364031 | The Park | US military camp | Open common land |
| Lypiatt Park camp | 3 | 1600564 | Parkland | US military camp | Lynnswood Pinetum & farmland |
| Painswick House camp | 3 | 1600488 | Parkland | US military camp | Parkland |

# APPENDIX 2 Scheduled Monument assessments

| *AMIE UID* | Site Name | Type | Damage (Y/N) | SM Polygon inaccuracy (Y/N) | Last HAR site visit | Latest evidence/notes |
|---|---|---|---|---|---|---|
| *115659* | Ashleworth Tithe Barn | Building | N | Y | 30/05/1989 | Not suitable for AP interpretation. Also Listed. |
| *1310256* | Deerhurst monastic site and multi-period settlement | Earthwork and Subsurface Deposits | Y | N | 09/08/2001 | EARTH.GOOGLE.COM 01-JAN-2005 ACCESSED 03-JAN-2014 - Affected by Flood Defence Scheme since last visit in 2001. (Havard, T. (2009) Deerhurst Flood Alleviation Scheme: Archaeological Evaluation and Watching Brief. Cotswold Archaeology: Cotswold Archaeology, CA Typescript Report 10002. doi: 10.5284/1009510). Land parcels in pasture. |
| *117657* | Churchyard cross in St John The Baptist's churchyard | Structure | N | Y | 25/08/2009 | Not suitable for AP interpretation. Also Listed. |
| *115197* | Matson moated site | Earthwork | N | N | 14/01/2000 | EARTH.GOOGLE.COM 01-JAN-2006 ACCESSED 03-JAN-2014 - No visible damage since last visit. Still in maintained grassland. |
| *115329* | Llanthony Secunda Priory | Building, Earthwork and Subsurface Deposit | Y | Y | 14/09/1993 | NMR 26753/22 27-OCT-2010 - Road and building developments have crept into southern area of SAM. Land remains grass parkland, with an area of rough grass to the west. Study also discovered that the site of the Priory church actually lies outside the scheduled area, to the north under the railway sidings HER: 20807. Five elements of the Priory are also Listed. |

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| ***1119912*** | St Oswald's Priory (St Catherine's Church) | Building, Subsurface Deposits | N | Y | 10/01/1998 | EARTH.GOOGLE.COM 16-JUL-2007 ACCESSED 03-JAN-2014 - Unclear if the polygon is accurate, unclear if any damage - though little has changed since 1998, except a cleared, landscaped, gravelled area to the south of the priory wall - The remains of the Priory are also Listed. |
| ***115504*** | Little Cloister | Structure | N | N | 22/09/1994 | Not suitable for AP interpretation. Also Listed. |
| ***1431065*** | Infirmary Arcade | Structure | N | Y | 22/09/1994 | Not suitable for AP interpretation. Also Listed. |
| | Wall N of bishop's Palace | Structure | N | Y | 22/09/1994 | Not suitable for AP interpretation. Also Listed. |
| ***115510*** | St Mary's Gateway | Structure | N | N | 22/09/1994 | Not suitable for AP interpretation. Also Listed. |
| ***1084864*** | Tanners' Hall | Subsurface Deposit and Structure | Y | Y | 10/01/1997 | Not suitable for AP interpretation. At Risk but solution agreed and awaiting implementation. SAM polygon may be slightly out. |
| ***115261*** | Glevum Roman colonia | Subsurface Deposit | N | Y | 01/01/1988 | 14 individual polygons. Not suitable for AP interpretation. |
| ***Various see 115261*** | Remains of Roman wall | Subsurface Deposit | N | Y | 31/03/1984 | 4 individual polygons. Not suitable for AP interpretation. |
| ***Various see 115261*** | 47 and 49 Eastgate Street | Subsurface Deposit | N | N | 31/03/1984 | Not suitable for AP interpretation. |
| ***115431 and 115427*** | Eastgate and stretch of city wall | Subsurface Deposit | N | N | 30/07/1990 | Not suitable for AP interpretation. |
| ***1044785*** | Grey Friars' Church | Structure | N | N | 15/12/2006 | Not suitable for AP interpretation. Also Listed. |
| ***115340*** | Blackfriars | Building and Subsurface Deposit | N | Y | 14/03/1989 | Not suitable for AP interpretation. Also Listed. |
| ***527061*** | Tower of St Michael's Church | Building | N | N | 15/01/1991 | Not suitable for AP interpretation. Also Listed. |

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| ***115265*** | Kingsholm Palace (site of) | Subsurface Deposit | N | N | 10/01/1998 | Not suitable for AP interpretation. Also Listed. Land remains as managed grass parkland. |
| ***1100135*** | Churchyard cross in St Giles churchyard | Structure | N | Y | 16/11/2009 | Not suitable for AP interpretation. Also Listed. |
| ***117731*** | Churchyard cross in St Mary's churchyard | Structure | N | N | 09/08/2002 | Not suitable for AP interpretation. Also Listed. |
| ***117729*** | Most House moated site | Earthwork | N | N | 25/08/2009 | Available APs show the moat to be densely lined by trees and vegetation and therefore not suitable for AP interpretation. Moat House also Listed. At Risk but solution agreed and awaiting implementation. |
| ***117414*** | Churchyard cross in Holy Trinity churchyard | Structure | N | N | 14/01/2000 | Not suitable for AP interpretation. Also Listed. |
| ***117420*** | Moated site and fishponds at Church Farm | Earthwork | N | Y | 23/10/1998 | LIDAR SO9419 Environment Agency DTM NOV-2013 - Available APs show the moat to be densely lined by trees and vegetation and therefore not suitable for conventional AP interpretation. Land use not changed since 1999. |
| ***117424*** | Leckhampton camp and tumulus | Earthwork | N | N | 31/10/1986 | Next Perspectives PGA Imagery SO9418 08-APR-2010 - Recent Aps show that although scrub vegetation is visible on the ramparts and barrow, it is managed and not changed since 1999. No damage evident. |
| ***117465*** | Moated site and fishpond at Urrist Barn, 220m south west of Yew Tree Farm | Earthwork | N | N | 14/01/2000 | Been infilled/denuded prior to 1999, earthworks faint on recent APs. Now under pasture but used for hay previously? No obvious recent damage. |
| ***117433*** | Moat and fishpond at Bentham Manor | Earthwork | N | N | 20/04/2000 | EARTH.GOOGLE.COM 01-JAN-2006 ACCESSED 06-JUL-2014 - No visible damage since last visit. Still in maintained in managed grass parkland. |

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| ***117453*** | Dryhill Roman villa | Subsurface Deposit | Y | Y | 27/01/1987 | EARTH.GOOGLE.COM 01-JAN-2006 ACCESSED 06-JUL-2014 - Some ploughing although recently under pasture. Some drainage ditches may have been added in 2006, unclear what if any damage. Note [exact location of Villa has not been determined from original excavation reports - general area only has been scheduled] |
| ***117456 and 1259629*** | Two bowl barrows, known as Crippet's Wood round barrows, 560m and 590m north east of Dryhill Farm | Earthwork | Y | Y | 07/12/2001 | EARTH.GOOGLE.COM 01-JAN-1999 ACCESSED 06-JUL-2014 - Southern barrow (No.23) not visible on APs, but is partially in cultivated field (the other half is in dense woodland). AP in 1999 also shows manure dump or soil stripping; if earthwork left of barrow in field may now be completely damaged. Northern barrow (No.13) also not clearly visible - in pasture on recent APs. Further investigation required to identify state of barrows currently and reappraise the documentary evidence. |
| ***117459*** | Crippets long barrow, 680m north east of Dryhill Farm | Earthwork | N | N | 04/10/2007 | CRANHAM LIDAR SURVEY 2009 - Available APs show the barrow to be densely covered by trees and vegetation and therefore not suitable for AP interpretation. But was visible as an earthwork on lidar. GCC records slight encroachment by plough (HER GCC: 163). |
| ***117447*** | Three bowl barrows, known as Emma's Grove round barrows | Earthwork | N | N | 25/08/2009 | CRANHAM LIDAR SURVEY 2009 - Available APs show the barrows to be densely covered by trees and vegetation and therefore not suitable for AP interpretation. But The largest barrow was visible as an earthwork on lidar. The others were not discernible. |

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| ***117450*** | Crickley Hill camp | Earthwork | N | Y | 13/11/1992 | EARTH.GOOGLE.COM 01-JAN-2006 ACCESSED 06-JUL-2014 - No obvious damage but there are likely to be localised damage from footpaths and possible scrub vegetation, however this is a managed site. |
| ***115209*** | Hucclecote Roman Villa | Subsurface Deposit | N | N | 27/01/1993 | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 30-JUL-2014. Site not visible on APs assessed. Site remains partly under playing field of school and partly under Charlie's way access road as shown by scheduled monument polygon on GIS. Condition as visible from APs unknown. |
| ***115593*** | Moat and probable site of Woolstrop Manor house, Quedgeley | Earthwork | N | N | 21/01/2002 | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 30-JUL-2014. Tree and shrub growth has increased notably since first recorded on historic APs, though appears to remain managed. No damage evident |
| ***115599*** | The Mount moated site, Haresfield | Earthwork | N | N | 08/08/2001 | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 30-JUL-2014. Available APs show the moat to be densely covered by trees and vegetation and therefore not suitable for AP interpretation, though some earthworks on the building platform were visible on historic aerial photographs and recorded. No lidar coverage was available for the moat site so it was not possible to map the moat as part of Severn Vale NMP project. |
| ***115587*** | Manor Farm house and moat, Quedgeley | Earthwork | N | N | 18/12/1998 | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 30-JUL-2014. Available APs show the moat to be densely covered by trees and vegetation and therefore not suitable for AP interpretation. Although lidar coverage |

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| | | | | | | was available for the moat site, it was only first return data (showing vegetation height and density) and therefore it was not possible to map the moat as part of Severn Vale NMP project. |
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| ***201445*** | Hillfort and associated Romano-British occupation at Little Abbey, Alveston | Earthwork | Y | Y | | NMR 26757/016 27-OCT-2010. Some poaching may be causing damage but denudation may have occurred before scheduling. |
| ***201536*** | Banjo enclosure 245m north west of Lower Hazel Farm | Earthwork | N | Y | | EARTH.GOOGLE.COM 17-APR-2005 ACCESSED 14-OCT-2014. Managed rough ground? Only damage may be from tracks which cut across the enclosures' banks at various points. |
| ***201506*** | Bowl barrow re-used as a moot 205m SSE of Chelwood | Earthwork | N | N | | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 30-JUL-2014. The field is still ploughed but a square-ish area around the barrow seems to be left fallow, though tractor tracks still go through the fallow area. The barrow was much denuded before scheduling. |
| ***201491*** | Iron Age defended settlement 525m ENE of Elberton Manor | Earthwork | N | Y | | LIDAR Environment Agency ST6088 2006. The hillfort is in dense woodland so not possible to determine any damage, but earthworks still visible on lidar. |
| ***201518*** | Ruin of St Helen's Church, Rudgeway | Building | N | N | | EARTH.GOOGLE.COM 13-DEC-2006 ACCESSED 30-JUL-2014. Scaffolding in place in 2006 over the remaining tower, but the scheduled area remains managed grass. Not really suitable for AP interpretation. Also Listed. |
| ***201568*** | Medieval preaching cross, Iron Acton | Structure | N | N | | Not suitable for AP interpretation. Also Listed. |

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| ***201562*** | Moated site and associated features - Acton Court, Iron Acton | Earthwork | N | N | | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 19-JAN-2015. Earthwork garden features and ridge and furrow still visible on lidar and APs as earthworks. Shrub plants increasing in size and number on garden periphery |
| ***201588*** | Ram Hill Colliery and Dramway | Building, Earthwork and Subsurface Deposit | N | N | | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 26-JAN-2015. Increased tree cover over site building. Site in peri-urban location so little change to setting. Not really suitable for AP interpretation. Also Listed. |
| ***1480415*** | Brandy Bottom Colliery, part of Parkfield Colliery | Building, Earthwork and Subsurface Deposit | N | N | | EARTH.GOOGLE.COM 13-JUL-2013 ACCESSED 26-MAY-2015. Increased tree cover over site .Site in peri-urban location, but Shortwood Quarry Landfill site now abuts southern edge of site. Not really suitable for AP interpretation due to tree cover. |
| ***201258*** | Bury Hill camp, Moorend | Earthwork | Y | Y | | Condition of hillfort assessed recently by Sue Adams. 2015 BURY HILL HILLFORT, WINTERBOURNE, SOUTH GLOUCESTERSHIRE Historic England Research Report Series (forthcoming) |
| | | | | | | |
| ***201616*** | Moated site in Whitcliff Deer Park 375m south east of Comeley Farm | Earthwork | N | N | 07/05/2010 | EARTH.GOOGLE.COM 14-MAR-2013 ACCESSED 31-JUL-2015. Earthwork features extant in grassland |
| ***205213*** | Symonds Hall long barrow | Earthwork | Y | N | 28/11/1995 | Next Perspectives APGB Imagery ST 7995 15-APR-2014. Most damage is antiquarian but ploughing or tractor marks are creeping onto boundary and going through middle of long barrow, potentially making it worse. |
| ***205208*** | Rowden Wood long barrow | Earthwork | ? | ? | 26/01/1993 | LIDAR Environment Agency ST7796 DTM_2M 2005-2010. The possible mound referred to visible on LIDAR |

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| | | | | | | only - unsure if same feature. Probably not a Long Barrow. Interpretation needs review. |
| ***205205*** | Folly Wood long barrow | Earthwork | ? | ? | 29/01/1987 | LIDAR Environment Agency ST7796 DTM_2M 2005-2010. The possible mound referred to visible on LIDAR only - unsure if same feature though. Probably not a Long Barrow. Interpretation needs review. |
| ***205226*** | Uley Bury camp | Earthwork | Y | Y | 14/08/1997 | LIDAR Environment Agency ST7796 DTM_2M 2005-2010. The polygon needs slight amendment as does not cover whole of hillfort. No recent damage. Area within hillfort is ploughed. |
| | West Hill Romano-Celtic temple | Subsurface Deposit | ? | N | 09/07/1999 | Not suitable for AP interpretation. (Though features may show as cropmarks in future).Area is being ploughed. |
| ***115003*** | Multi-period site on Minchinhampton Common | Earthwork | Y | Y | 11/03/2010 | Next Perspectives APGB SO8500 14-APR-2014 and LIDAR SO8500, 8501, 8600, 8601 Environment Agency DTM_1M 2006. Most of the features are in good condition, but the fairways of the golf course, appear to be causing denudation to some features. |
| ***115021*** | Bowl barrow 100m north east of The Windmill | Earthwork | ? | N | 18/01/2002 | Next Perspectives APGB SO8500 14-APR-2014 and LIDAR SO8600 Environment Agency DTM_1M 2006. Although visible a earthwork on lidar, not visible from APs. Some denudation but unsure if recent. |
| ***115004*** | Whitfield's Tump: a long barrow on Minchinhampton Common | Earthwork | N | Y | 11/03/2010 | Next Perspectives APGB SO8501 14-APR-2014 and LIDAR SO8501 Environment Agency DTM_1M 2006. In pasture, no recent damage apparent. |

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| ***1080950*** | Banks and ditch at Glebe Farm | Earthwork | N | N | 14/02/2004 | Next Perspectives APGB Imagery SO 8601-8701 15-APR-2014. No damage apparent |
| ***115040*** | Bowl barrow 450m south east of Upper Hyde Farm | Earthwork | Y | N | 21/09/2001 | LIDAR SO8901 Environment Agency 1m DTM Jan- Feb 2006 / Next Perspectives APGB Imagery SO 8901 15-APR-2014. Plough levelling of the feature has spread the mound material and it was not visible under crop in aerial photographs taken in 2014 |
| ***115016*** | Bowl barrow 400m east of Upper Hyde Farm | Earthwork | N | N | 21/09/2001 | LIDAR SO8901 Environment Agency 1m DTM Jan- Feb 2006 / Next Perspectives APGB Imagery SO 8901 15-APR-2014. No visible damage |
| ***115031, 115027*** | Eastcombe bowl barrows, 230m and 335m west of Nash End Farm | Earthwork / levelled earthwork | ? | N | 16/02/2002 | LIDAR SO8904 Environment Agency 1m DTM Jan- Feb 2006 / Next Perspectives APGB Imagery SO 8904 15-APR-2014. The two earthwork features are not visible in aerial photographs taken in 2014. |
| ***114937, 114975, 114940*** | Haresfield Hill camp and Ring Hill earthworks | Earthwork | N | N | 29/01/1992 | Cranham Lidar Survey 2009 and NMR 18990/14-15 02-JUN-2002. Haresfield Camp, earthworks wooded, Ring Hill and Beacon pasture. No recent damage could be seen. Some revision may be necessary to interpretation. |
| ***114953*** | Dyke camp | Earthwork | N | N | 05/03/1996 | Cranham Lidar Survey 2009. Now only visible a very slight earthwork. Possible revision to interpretation as suggestion this is a medieval wood bank, or boundary not an IA camp. |
| ***114943*** | Gateway to Almonry | Structure | N | Y | 13/11/1995 | Not suitable for AP interpretation. Also Listed. |
| ***114960, 114957*** | Two bowl barrows on Court Hill, 210m and 420m south east of Standish Court Farm | Earthwork | N | N | 10/11/2002 | EARTH.GOOGLE.COM 01-JAN-2006 ACCESSED 19-NOV-2015. Surrounding field ploughed but the barrows are excluded. |

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| ***114963, 114966, 114970*** | Randwick Hill long barrow, round barrows and dyke | Earthwork | N | N | 26/11/1986 | Cranham Lidar Survey 2009. Not clear about damage but a possible revision for the two round barrows is needed. Suggestion from lidar evidence that they may be spoil heaps not BA round barrows. |
| ***115532*** | Painswick Roman villa (W of High Fold) | Subsurface Deposit | ? | ? | 05/02/1992 | Not visible on aerial photographs assessed |
| ***115541*** | Castle Godwyn | Earthwork | N | N | 05/03/1996 | LIDAR Cranham Local History Society Lidar Survey Project 2009 <www.cranhamlhs.org.uk>/ Appears to be more like spoil dump from terracing land when house constructed |
| ***115542*** | Painswick Hill (or Kimsbury) camp | Earthwork | N | N | 19/07/2005 | LIDAR Cranham Local History Society Lidar Survey Project 2009 <www.cranhamlhs.org.uk> / Next Perspectives APGB Imagery SO 8510 10-JUL-2014. In pasture and golf course. No recent damage apparent |
| ***115547*** | Moated site at Sneedham's Green, 220m north east of Green Farm | Earthwork | N | N | 14/01/2000 | Next Perspectives APGB Imagery SO 8713 15-APR-2014. In pasture. No recent damage apparent |
| ***115564*** | High Brotheridge camp, Buckholt | Earthwork | ? | N | 28/10/1992 | LIDAR Cranham Local History Society Lidar Survey Project 2009. Features under woodland canopy so state unknown. From lidar results these look more like wood banks or field or other type boundary banks than a hillfort |
| ***115513*** | Great Witcombe Romano-British villa | Earthwork, Subsurface Deposit, Structure | N | Y | 15/04/2000 | EARTH.GOOGLE.COM 13-JUL-2013. No new evidence to add except adjacent ridge and furrow cultivation |
| ***115125*** | Woodchester Roman villa | Subsurface Deposit | ? | ? | 14/08/1997 | Not visible on aerial photographs assessed |
| ***115112*** | The Toots long barrow, Selsley Common | Earthwork | N | N | 29/03/1994 | Next Perspectives APGB Imagery SO 8303 15-APR-2014/ LIDAR SO8303 Environment Agency 1m DTM Jan-Feb 2006. In grass pasture on |

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| | | | | | | common land. No visible damage other than previous recorded excavations |
| ***1459914*** | Collier's Wood Glass House | Structure | ? | ? | 24/02/1988 | Not suitable for AP interpretation |
| ***115139*** | Bown Hill long barrow 790m south east of Longwood Farm | Earthwork | N | N | 22/01/1999 | LIDAR SO 8301 Environment Agency 1m DTM Jan- Feb 2006 / Next Perspectives APGB Imagery SO 8301 15-APR-2014. In cleared woodland. Heavy scrub vegetation prevents condition assessment |
| ***115142*** | Bowl barrow 720m south east of Longwood Farm | Levelled earthwork / now only cropmark? | N | N | 10/10/2005 | LIDAR SO 8301 Environment Agency 1m DTM Jan- Feb 2006 / Next Perspectives APGB Imagery SO 8301 15-APR-2014. Much levelled by ploughing to the point it is now only visible as a cropmark by aerial survey |
| ***115118*** | Pen Hill dyke | Earthwork / levelled earthwork | Y | Y | 26/11/1988 | LIDAR SO 8101-8102 Environment Agency 1m DTM Jan- Feb 2006 / Next Perspectives APGB Imagery SO8101-8102 15-APR-2014. Part in pasture, part in ploughed field. A large part of the southern half of the feature appears to be much plough levelled, though remote sensing data suggest that it remains extant in woodland at its southern end. |
| ***115128*** | Bowl barrow, known as Woodchester Beaker barrow, 430m west of Longwood Farm | | ? | ? | 20/09/2002 | This monument was not visible on any historic aerial photographs or remote sensing data assessed as part of the Severn Vale NMP |
| ***115106*** | Leonard Stanley Priory | Earthwork | ? | ? | 12/03/1998 | Also Listed. Not suitable for AP interpretation |
| ***113217*** | Uley long barrow, also known as Hetty Pegler`s Tump, 400m south-east of Knapp Farm House | | N | N | 16/06/1999 | Next Perspectives APGB Image SO7800 28-MAR-2012. This monument and it's restoration work is well documented. |

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| ***113212*** | Nympsfield long barrow 500m south of Hill Farm Cottage | | N | N | 16/06/1999 | Next Perspectives APGB Imagery SO7901 28-MAR-2012. Area in grassland, no damage visible from APs. |
| ***113227*** | Bowl barrow known as The Soldier's Grave, 380m south east of Hill Farm | | ? | ? | 20/09/2002 | Not suitable for AP interpretation. (Not visible on available lidar imagery either) |
| ***113269*** | Slimbridge moated site, 70m south of The Old Rectory | Earthwork | N | N | 17/05/2002 | EARTH.GOOGLE.COM 09-SEP-2014. Available APs show the moat to be densely lined by trees and vegetation and therefore not suitable for AP interpretation. |
| ***205258*** | Drakestone camp, Stinchcombe Hill | Earthwork | N | Y | 23/07/1987 | EARTH.GOOGLE.COM 17-APR-2005 ACCESSED 01-JUL-2015. Overgrowing scrub in places, mainly grassland, not more damage other than known footpaths through features. New and updated revision to interpretation necessary. |

# Appendix 3 NMP Methodology

## *NMP Archaeological Scope*

The NMP applies a systematic methodology to the interpretation and mapping of all archaeological features visible on aerial photographs, as set out in Winton (2012, 11). This includes recording sites visible as cropmarks and earthworks but also structures, in particular those relating to early 20th century military activities. The NMP typically records all archaeological features dating from the Neolithic up to the 20th century. The following list summarises which classes of monument are depicted and how they were recorded.

**Earthworks, plough-levelled features and buried remains**
All cropmarks and soil marks which represent sub-surface features of archaeological origin have been recorded. Some earthworks, for example field boundaries, have not been mapped where they are clearly marked on the first edition Ordnance Survey maps unless they are associated with other mapped features. In this case this will be clearly stated in any monument records. Features which have an uncertain date or which are thought to be possible geological marks have been recorded (though not necessarily mapped) where they are associated with or may be confused with other archaeological features.

**Post-medieval field boundaries**
These have not been mapped, except where they are part of larger field systems and are not depicted by the Ordnance Survey. They may be mapped where they have been considered to be regionally or nationally archaeologically significant.

**Military remains**
Military buildings and structures from the Second World War (pre-1945) were recorded and mapped according to the form and extent of the remains, except in some cases where they were marked on Ordnance Survey maps. In this case, this was clearly stated in any monument records.

**Ridge and furrow**
Medieval and/or post-medieval ridge and furrow was also recorded. Levelled and extant fields of ridge and furrow were depicted using different conventions and furrow directions were indicated by arrows.

**Industrial archaeology**
Areas of industrial archaeology have been recorded where the features can be recognised to predate 1945 and where their industrial buildings are no longer extant or not clearly marked on the first edition Ordnance Survey maps. Small local extractive sites were not mapped, except where they formed part of a significant, i.e. particularly extensive, area of extraction.

**Buildings and structures**
Buildings and structures were not generally mapped if first edition or later Ordnance Survey maps depict them. However, in specific contexts (e.g. industrial and military complexes, or country houses) and when in association with other features, they were sometimes mapped.

**Transport**
Major transport features (e.g. canals and railways) have not been mapped except where they are considered to be archaeologically significant.

**Parks and gardens**
Only vestigial features, not botanical features, were mapped. In urban areas only significant parks and gardens were recorded. 20th century features were not mapped.

## *Digital transcription*

The aerial photographs were rectified using a specialist rectification software package (Aerial 5.29 and 5.36) with Ordnance Survey MasterMap 1:2,500 scale base mapping. A digital terrain model function was also used to compensate for steep or undulating topography. Due to the nature of some of the photographs, control points were sometimes hard to obtain and some control points were taken from soft boundaries i.e. hedges and diffuse field boundaries. However, all control points typically had an average error of less than two metres; meaning that each photograph was rectified to an average level of accuracy of less than two metres to the 1:2,500 scale base map.

Archaeological features were then traced, using standard NMP drawing conventions (see below), from rectified photographs and lidar tiles in AutoCAD Map 3D 2012. The Ordnance Survey advise their 1:2,500 scale map data has an accuracy of ±0.4 metres for rural towns and ±1.1 metres in all other rural areas. Therefore, the archaeological features transcribed for the National Mapping Programme will on average be accurate to within two to three metres of true ground position.

# Appendix 4 Project Archive

All new monument records were created and existing ones updated or revised in the NRHE database (AMIE). All monument records within the NRHE database are given a unique identifying number and for clarity are referred to as for example, NRHE: 1234567, throughout this report. Each monument record provides a textual description of the site, as well as information on sources such as the best aerial photographs of the site and other indexed information.

Within the HEA catalogue of archive items; a Measured Drawing Record was created for the digital NMP transcription for all of Phase 1. This drawing number is linked to all relevant monument records. An overall Event Record provides information on the project as a whole; for example why, when and who carried it out. This is also linked to all monument records created or amended during the project.

The official title of the project on the NRHE database is: “Severn Vale NMP”. The Event Record for this project is: 1577274; the Project number is EHC01/230, the Archive Number is AF00381 and the Measured Drawing number is MD003257.

All monument records created and updated were exported from AMIE as flat tables to the relevant HER, along with all mapping produced as ESRI .shp files at the cessation of the project.

# Appendix 5: Project sources

## *Aerial photographic sources*

The main photograph sources consulted were:

Historic England Archive Services
Engine House
Fire Fly Avenue
Swindon
SN2 2EH

Tel: 01793 414 600

archive@historicengland.org.uk

The collection of aerial photographs viewed comprised vertical sorties from the RAF, Ordnance Survey and Meridian Airmap Ltd, taken from 1941-2006; as well as specialist oblique photography taken between the 1930s and 2007, including the Aerofilms collection. Historic England's in-house aerial photographer, Damian Grady, took the most recent oblique photography.

**Monument sources**

Monument information was consulted from the following:

National Record of the Historic Environment database (AMIE)

Monument records can be viewed online at: http://www.pastscape.org.uk/

Gloucestershire County Council Historic Environment Record and South Gloucestershire County Council Historic Environment Record.

Monument records can be viewed online at:

http://www.heritagegateway.org.uk/gateway/default.aspx

Bristol City Historic Environment Record

Monument records can be viewed online at: http://maps.bristol.gov.uk/kyp/?maptype=js

**Other sources**

Historic Ordnance Survey maps were also consulted as an additional source to aid interpretation, including the first edition and current Ordnance Survey maps. As were 19th century tithe maps digitised by Gwatkins and provided, for reference only, through GCHER.

Geological information was obtained from maps produced by the British Geological Survey (BGS) and soil maps via the 'Soilscapes' website of the National Soil Resources Institute (http://www.landis.org.uk/soilscapes/) developed at Cranfield University.

Google Earth (http://www.earth.google.com) was a very useful resource, particularly the ability to compare photographs from different periods.

Books, journal articles and grey literature were also referred to as well as some internet resources (see References section).