Archaeology and Aggregates in Derbyshire and the Peak District

A Resource Assessment and Management Framework

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With contribution from D.G. Passmore

Archaeological Research Services Ltd
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Contents

List of Tables

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Summary

The Derbyshire and Peak District Aggregates Resource Assessment Project was undertaken to develop the historic environment evidence-base and assist in future management and decision-making in relation to archaeology and aggregate extraction. The project has been funded by the Aggregates Levy Sustainability Fund distributed by English Heritage on behalf of the Department fro Environment, Food and Rural Affairs (Defra). The project was undertaken by Archaeological Research Services Ltd in partnership with Derbyshire County Council and the Peak District National Park Authority.

The archaeological resource for Derbyshire and the Peak District has been characterised through application of the 'landform element' approach (Passmore and Waddington 2009). This approach seeks to partition the landscape by delimiting distinct geomorphological units, such as Carboniferous Limestone, Millstone Grit or sand and gravel terraces, and then identifying the types of archaeological associations and the types of evaluation and mitigation techniques that can be usefully applied.

This report comprises four sections:

Chapter one provides an introduction to the project and the methodologies employed in the characterisation of both the aggregate and archaeological resources, including the aerial photograph mapping component which has revealed 862 new sites and added significantly to the known archaeological resource of the county. The additional sites identified through aerial photograph transcription relate directly to four of the key aggregate-bearing landforms i.e. Carboniferous Limestone, Magnesian Limestone, Sherwood Sandstone and the sand and gravel terraces of the Trent Valley.

Chapters two and three are overviews of Derbyshire and the Peak District, dealing first with the geological, geomorphological and palaeoenvironmental background, and secondly with the historical and archaeological background. Chapter three also highlights the relevance of certain key archaeological associations with the regional research agenda tied to the East Midlands Regional Research Framework (Cooper 2006).

Chapters four to six are the main body of analysis relating to the archaeological resource and divided down by landform element. Chapter four discusses the hard rock landforms (e.g. Carboniferous Limestone, Sherwood Sandstone), Chapter 5 deals with the pre-Holocene superficial landforms (e.g. sand and gravel terraces), and Chapter 6 discusses the Holocene superficial landforms (e.g. alluvium, peat). Within these chapters, the assessment is presented in relation to specific archaeological and palaeoenvironmental associations, and it is also highlighted where specific archaeological techniques are particularly suitable.

Chapter seven represents the management framework and guidance resulting from the preceding analysis and includes reference tables summarising the archaeological associations for each landform element as well as highlighting the suitability of different archaeological evaluation and mitigation techniques.

An important component of this project has been the linkages made with other on-going aggregate resource assessments, most importantly those in Nottinghamshire and Leicestershire, to provide a consistent level of baseline data and also a consistent approach across this part of the East Midlands, which includes the aggregate-rich and archaeologically sensitive, Trent Valley and its tributaries.

The information from this project has been made available to planners, curators and the public as part of the HER record and the NMR. A guide, in the form of a booklet which will also be made available on-line, has been produced to assist mineral operators, consultants, archaeological contractors, curators and planners in their approach and decision-making to archaeological considerations as part of mineral planning applications.

The project has delivered the following outcomes:

- Assistance in shaping mineral applications and supporting curatorial responses to development applications.
- Improved understanding of the type of archaeological associations with different geological landforms in the study area thus supporting a more informed approach to programmes of evaluation.
- Enhancement of HER and NMR data for the aggregate producing geologies in Derbyshire and the discov-

ery and recording of many new sites through examination and accurate transcription of aerial photographs and the production of a detailed GIS.

- Improvement of the evidence base that will inform question-led approaches to archaeological assessment, evaluation and mitigation in relation to aggregate extraction proposals.
- Helped raise awareness and foster a more informed understanding of different stakeholder's positions across different sectors.
- Promoted extensive consultation and sharing of ideas across neighbouring local authorities which should assist in delivering a more consistent approach.
- Delivery of a management tool, the project booklet, for use by all stakeholders that dovetails with the recently produced national guide.
- Delivery of an in-depth project report that assesses in detail the landforms and their archaeological associations, and the implications for the suitability of different methodologies and techniques.

1. Introduction

"as the geologist repeoples our planet from fossil remnants of the fauna and flora of its successive strata, each group presenting characters by which it may be distinguished from all others, so we exhume materials for the reconstruction, or rather for the elucidation of the history of mankind" (T. Bateman Ten Years Digging in Celtic and Saxon Grave Hills, in the Counties of Derby, Stafford, and York from 1848 to 1858.1861, ii-iii).

Derbyshire and the Peak District is the most heavily quarried area of the British Isles, due to its diverse geology and the richness of its mineral wealth, which has attracted settlement and industry for millennia.

This project characterises and analyses the archaeological resource in relation to aggregate bodies for Derbyshire and the Peak District through application of the landform element approach. The landform element approach seeks to partition the landscape by delimiting distinct geomorphological units and then identifying their archaeological associations, the degree of preservation and the type of evaluation and mitigation techniques that can be usefully applied (see Passmore et al 2006; Passmore and Waddington 2009). The geology of Derbyshire and the Peak District is divided into discrete landform units (see chapter 2) and specific archaeological associations have been identified for each unit through analysis of the archaeological resource using the mapped data acquired from the aerial photographic transcription component of this project and by analysing the Historic Environment Record data and the National Monuments Record data in a GIS environment (chapters 4-6). With archaeological associations identified, it is possible to use this study to underpin decision-making and programmes of archaeological work in response to aggregate development. Furthermore, this study should assist in identifying the most suitable evaluation and mitigation techniques, designed to maximise the knowledge gain, whilst also providing the most economic methodology for mineral operators. Drawing on the preceding assessment, Chapter 7 comprises a management framework and guidance. This guide will be of use to curators, planners, archaeological consultants and contractors and the miner-

Figure 1.1 Tunstead and Topley Pike (foreground) Carboniferous Limestone quarries flanking the deeply-incised gorge of the River Wye to the east of Buxton. (NMR SK 1072_60 NMR 20256_2 22-JUN-2005. © English Heritage. NMR).

als and aggregates industry, and should assist in facilitating open and informed dialogue and the identification of the most appropriate methods based on a question-led approach. This study directly contributes to the aims of the recently published minerals and archaeology practice guide (MHEF 2008) and provides the type of map-based evidence called for. This regional study and guidance nests below the national guidance referred to above (ibid), providing more detailed data and a guide to appropriate field methods specifically for Derbyshire and the Peak District. Although specific to Derbyshire and the Peak District, this study has taken cognisance of neighbouring counties, particularly Nottinghamshire, Staffordshire and Leicestershire, who together share the majority of the aggregate-rich Trent Valley. Through close co-operative working with allied projects in these counties it is intended that a more consistent approach and archaeological responses to mineral extraction in this area will be achieved, in accordance with the aims of the national practice guide.

The key areas studied by this project contain reserves of crushed rock aggregates, particularly Carboniferous and Magnesian Limestone, sand and gravel, and to a lesser extent crushed sandstone.

The main sources of sand and gravel are in the impressive river valleys of south Derbyshire: the Trent and the lower reaches of the Derwent and Dove. The Sherwood Sandstones to the north-west of Derby provide crushed rock aggregates together with sandstone aggregate derived from the Millstone Grit series rocks of the Peak District, though the main sources are the Carboniferous Limestone of the White Peak and the Magnesian Limestone in the north-east of the county.

1.1 Location and Scope of Work

Derbyshire and the Peak District National Park extend over a combined area of 329,127ha and are drained by two principal tributary river systems, the Derwent and Dove, both of which ultimately drain southwards into the main river flowing through the county, the Trent. However, parts of the county are drained by other systems, such as the Rother which drains North East Derbyshire and flows into the Don, and the Etherow which drains the area around Glossop before flowing west into the Tame. Large-scale sand and gravel extraction takes place along the course of the Trent valley whilst hard rock extraction is heavily concentrated on the Carboniferous Limestone plateau of the Peak District National Park and its environs. The Carboniferous Limestone plateau forms the central area of the county and for the most part lies between 200m and 400m above Ordnance Datum. The Millstone Grit series is located in an approximate horseshoe-shape around the limestone plateau and typically lies between the 300m and 600m contour. All these areas have experienced heavy quarrying in the past and continue to do so today. However, a new threat that has developed in recent years is the acquisition of fluorspar, which can require the removal of large quantities of limestone in order to gain access to the mineral, but can also be seen in the re-quarrying of old mining spoil. Over and above the principal aggregate-bearing geologies noted above, there is also a long history of extraction relating to the Coal Measures in the east of the county, as well as the pockets of high-quality clay, again largely in the east and south of the county, which provided raw materials for the pottery and brick-making industries. These are discussed in more detail in the separate landform element chapters.

1.2 Aims and Objectives

The principle aims of this project have been to:

- Improve knowledge of the archaeological resource of the aggregate producing areas of Derbyshire and the Peak District National Park
- Provide the appropriate tools to facilitate decisions regarding strategic planning, management and preservation of archaeological sites and historic landscapes within those areas,
- Increase public, industry and other stakeholders' awareness of the archaeology and historic landscapes within the aggregate areas.

The specific objectives which feed into the overarching aims are to:

- Define the aggregate resource for Derbyshire and the Peak District National Park through the identification of the relevant geologies and their spatial extent.
- Assess the state of knowledge of the archaeology of each aggregate area (of distinct geological origin).

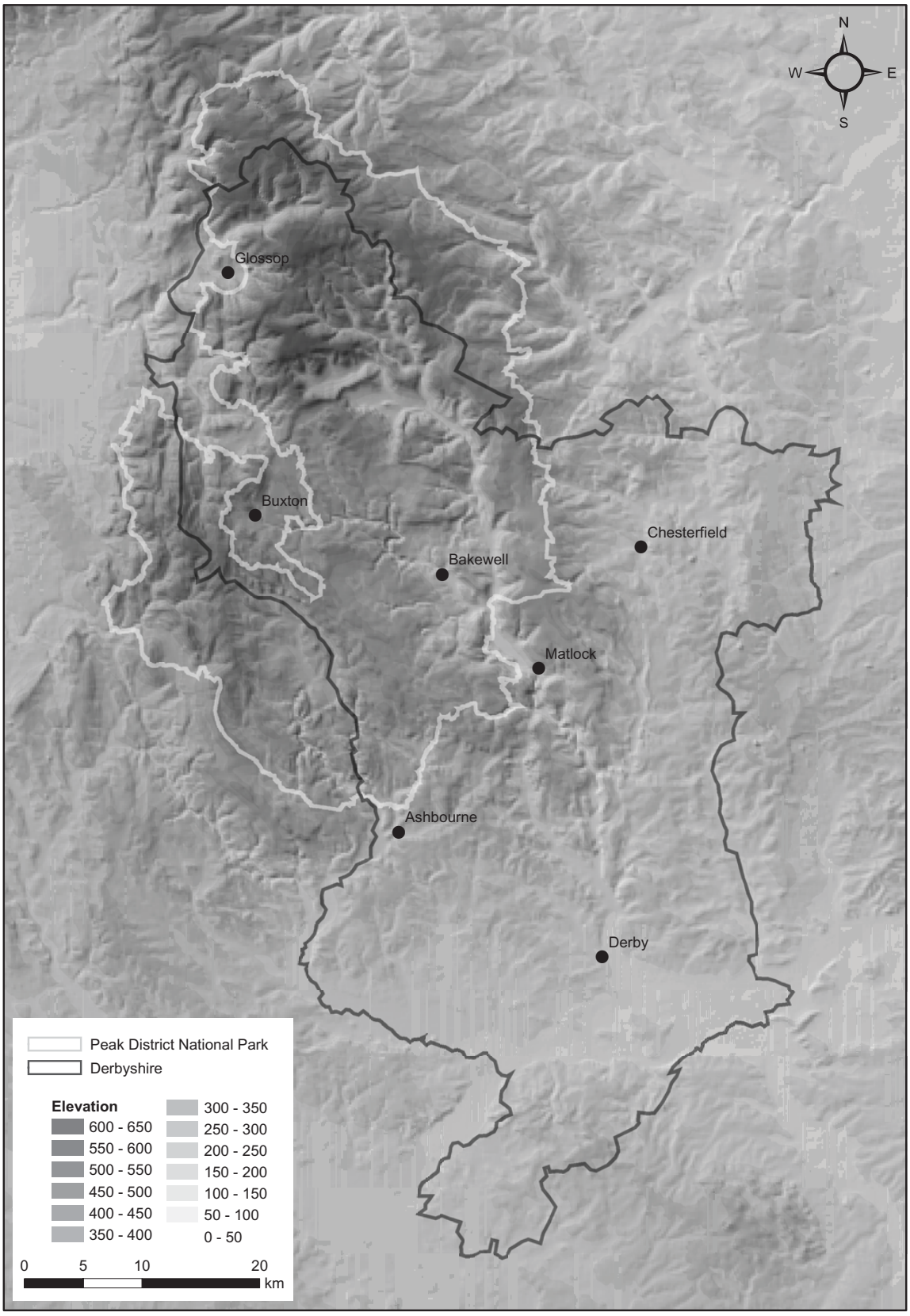

Figure1.2 Derbyshire and the Peak District.

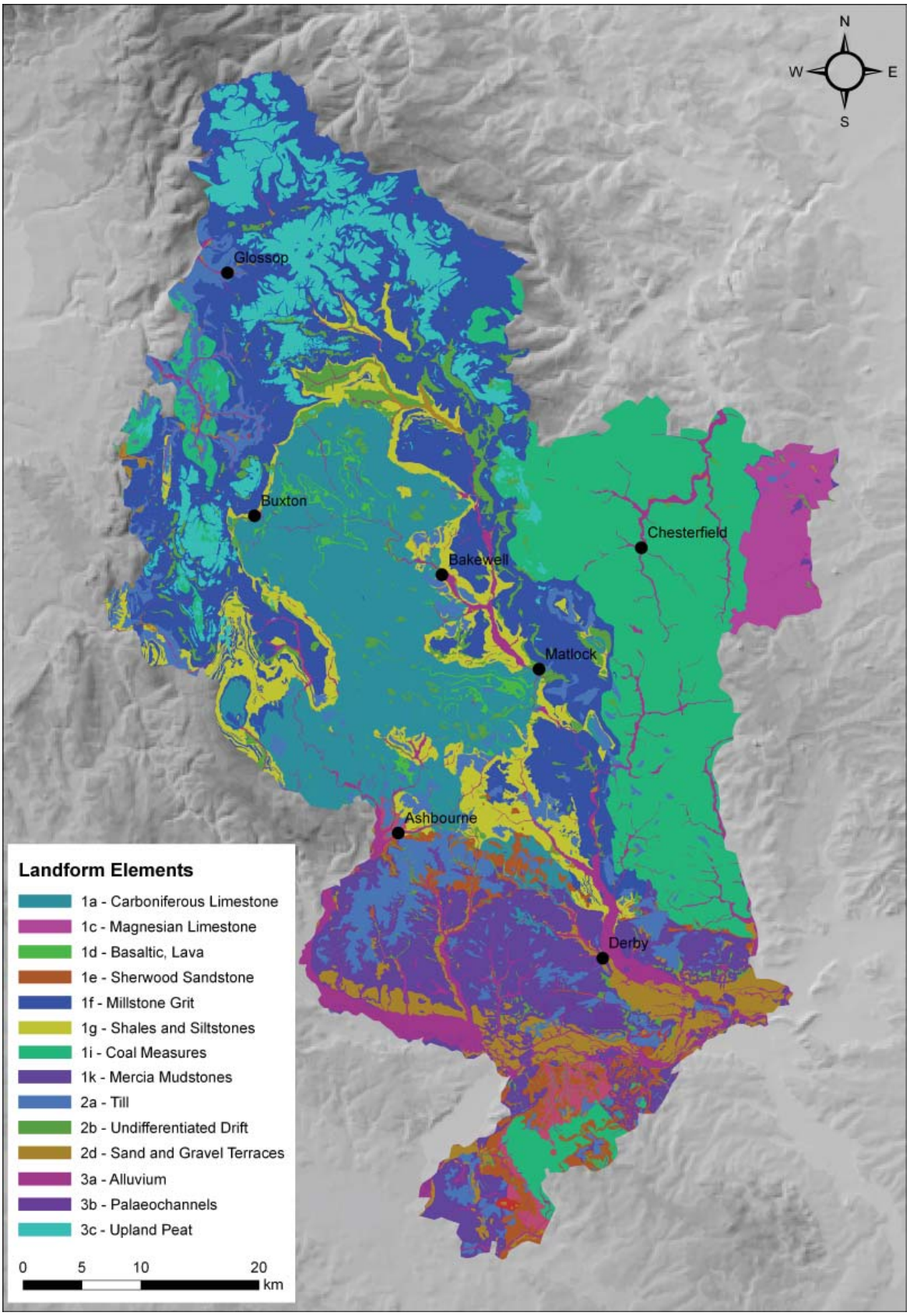

Figure 1.3 Derbyshire and the Peak District with all landform elements shown. Landform elements which are absent from the above list are either not present within this study area (e.g. 1j – Jurassic Limestone) or are incorporated within landforms with identical associations in this area (e.g. 1b – dolomitised limestone incorporated within 1a – Carboniferous Limestone). This has resulted from the compilation of a unified list encompassing landforms across the East Midlands, to allow for a united management approach across county boundaries.

- Collate available archaeological data for the aggregate areas studied.
- Produce a geoarchaeological assessment of the study area that will include the results of a preliminary evaluation of landform settings and potential archaeological associations in the Derbyshire Area.
- Develop an archaeological research framework that consists of an assessment and agenda in respect of aggregates areas.
- Provide information to inform the development of policies by the Mineral Planning Authorities and devise evaluation and mitigation strategies for activities related to aggregates extraction.
- Produce high quality baseline data for mineral planning decisions in respect of strategy and individual cases, by defining all actual and potential areas of aggregates working and collating the available archaeological data for those areas, using a GIS-linked database.
- Check, correct, refine and validate all existing HER records for aggregate areas not completed during the 2007/2008 HER enhancement Project to enhance baseline HER data for the remaining aggregate-producing areas in Derbyshire in the same way as for the first phase of this project, so that the HER is fit for the purpose of informing mineral planning.
- Increase the understanding of the archaeology of aggregate areas amongst the aggregates industry and the public.

1.3 Method Statement

1.3.1 Defining the Aggregates Resource

This consisted of the identification of the relevant geologies and their spatial extent, using data held by the British Geological Society (BGS) and by Minerals planners at both Derbyshire County Council (DCC) and the Peak District National Park Authority (PDNPA). Past, active, dormant and potential extraction areas were identified using minerals planning data from both DCC and PDNPA for post-1948 activity, and earlier Ordnance Survey data for pre-1948 extraction.

The result of this stage was a map of currently quarried geologies and those which have been exploited in the past. These geologies were then identified as a "potential" resource.

1.3.2 Assessing the Archaeological Resource

All existing data has been researched, collated and synthesised from the numerous sources noted below. The data relating to the archaeological resource and aggregates resource formed the basis of the GIS that has been the principle analytical tool for this project. The following sources were utilised:

- Historic Environment Records (HER)
- National Monuments Record
- Scheduled Ancient Monuments, SM at Risk, Conservation Areas, Registered Parks and Gardens and Historic Battlefields
- BGS geological data (1:50,000 scale bedrock and superficial coverages)
- Data from grey literature reports and published sources
- Individuals, societies and organisations with information concerning archaeological remains within the study area
- The Portable Antiquities Scheme database
- Historical Landscape Characterisation (HLC) studies
- Aerial photographic data

1.3.3 Historic Landscape Characterisation

The Historic Landscape Characterisation information for Derbyshire and the Peak District was incorporated within the GIS analysis as part of this project. The data is a useful record of post-medieval landscape development and also as a 'snapshot' of the existing historic elements of the landscape. Within this project the HLC data was analysed in relation to both underlying landforms and also to check whether it was possible to see specific archaeological as-

sociations. It was found that the HLC data had little to add as a predictive tool for the distribution of archaeological remains and the potential of landforms to host undiscovered remains. The HLC data works on generic terms for landscape usage which cross landforms and therefore cannot be directly applied to specific archaeological associations in most cases. HLC data can be of use in restoration of extraction sites as part of the sustainable measures of a project and also in determining 'setting' impacts, as it provides a record of the historic development of the landscape. HLC should be viewed as a complementary database to be consulted at the same point in minerals planning decision as other initial consultation.

1.3.4 Aerial Photographic Transcription

A separate report has been prepared detailing the aerial photograph transcription component of this project (Bacilieri 2010), though all pertinent information is also incorporated within this document, in this chapter and in the chapters dealing with the relevant geologies. The aim of this element of the project was to produce accurate mapping and a record of all archaeological features from all periods that can be identified within the defined aerial photograph transcription study blocks which were targeted on areas of present and likely future aggregate extraction. This work has added significantly to English Heritage's National Mapping Programme (NMP) which aims to produce a comprehensive map of the archaeological resource in England, using information from aerial photographs. The NMP work has also enhanced the information held by the HER for the aggregate-producing areas by providing information on previously unknown archaeological sites and more accurate and detailed transcriptions of sites already known. This additional information has been fed into the resource assessment in relation to the relevant aggregate-producing landforms and has provided additional data to inform the management framework.

The total area mapped amounted to 375 km2. This met the requirements of English Heritage's National Mapping Programme (NMP), using the same methodology and scope as the NMP. A detailed cover search revealed that the numbers of aerial photographs held by the NMR for the proposed study area were:

- Verticals: 6910
- Obliques: 2214
- Military obliques: 152

Total: 9276

A cover search undertaken with the Cambridge University Unit for Landscape Modelling revealed a total of 733 oblique aerial photographs and these totals were in line with usual expectations for the size of area to be covered by the project.

The aim of the aerial photograph transcription element of this project was to produce accurate digital mapping on to 1:10,000 Ordnance Survey base maps and a record of features from all periods which are visible as cropmarks, soilmarks and earthworks on existing aerial photographs. The detailed methodology and results of the National Mapping Programme component of this project are reported in full in the report noted above (Bacilieri 2010). A manual for the National Mapping Programme project outlines aspects that are pertinent to this particular project and this methodology is summarised below, which also includes amendments to the methodology made during the course of the project as a result of the complexity of certain remains particular to the Peak District uplands.

1.3.5 HER Enhancement

The Derbyshire HER is maintained in the HBSMR software which meets the agreed national data standards. However, due to several data migrations and lack of resources all the data did not conform to agreed standards and was in need of enhancement and editing. The Derbyshire and Peak District HER Enhancement Project undertaken during 2007/8 completed this work for the Carboniferous Limestone areas whilst the Magnesian Limestone and Sherwood Sandstone areas were completed as part of this project. HER files and datasets were individually checked against Ordnance Survey data, the NMR, published reports and grey literature reports. Where possible, new data, such as plans and surveys undertaken as standalone reports, were scanned in and appended to the corresponding HER entry. Unpublished archaeological interventions were incorporated as well as any further additional reports such as the 240 farm survey reports undertaken by PDNPA survey archaeologists. This enhancement was an important element of the process of assessing the archaeological resource of the aggregate producing areas and will enhance the evidence-base for decision making as a part of aggregate planning.

The formulation and utilisation of good data standards are crucial to the usability of the HER. Following enhancement, the datasets are clear and easy to use and will be available for dissemination in digital form.

Resources used:
- HER site files and library;
- PDNPA site files and library
- HER digital data;
- PDNPA digital date
- NMP data
- OS map data
- Published sources
- Unpublished work
- Grey literature

1.3.6 GIS and Data Management

A major objective of this project was the creation of a comprehensive GIS database of archaeological sites in Derbyshire and the Peak District. Initially, information from the various HERs within the study area was exported into a format compatible with the project's GIS (ARCGIS). Base mapping was supplied from existing digital mapping held by DCC. The NMP mapping results were also incorporated into the GIS as they became available. All archaeological data was integrated and has been resupplied in polygon and line form to the local authorities in MapInfo format for inclusion into the HERs.

1.3.7 Data assessment

All data, once gathered, were collated and the distribution of archaeological remains of different types and periods were analysed in relation to such categories as geology and their potential to inform key debates identified in the Regional Research Framework.
The assessment and analysis stage has formed the bulk of this report (see chapters 4.1-6.3). A key point to note from the data assessment is the disparity between the number of existing HER and NMR records. A count of the HER and NMR records relating to each landform is given at the start of each chapter, and the incongruity between the two is discussed further in the research agenda (Chapter 8).

1.3.8 Geoarchaeological assessment

Dr David Passmore of the University of Newcastle upon Tyne has undertaken a geoarchaeological assessment of the study area including the results of a preliminary evaluation of landform settings and potential archaeological associations in the Derbyshire Area, included in this report as Chapter 2. The approach followed that outlined in Passmore et al (2002, 279):

'Central to this approach is the identification of landform elements and their associated sedimentary sequences. Landform elements (cf. Stafford & Hajic 1992) are defined as discrete landform units that have homogeneous geomorphological and topographical characteristics that can be defined at a variety of spatial scales. Previous research has shown that there is a direct link between particular types of landforms and their archaeological and palaeoecological associations.'

Other examples of landform elements and their specific archaeological associations can be seen in Waddington and Passmore (2006), Waddington (2008, 22) and Passmore and Waddington (2009).

The evaluation of each landform was based on a desktop analysis of:
- Bedrock and superficial geology maps and accompanying memoirs published by the BGS
- Ordnance Survey map coverage at 1:10,000 and 1:25,000
- Ordnance Survey historic maps (1st Edition County Series)
- Aerial photograph coverage
- Published mineral assessment

- Field visits and observation.

The results of this assessment form chapter 2 of this report.

1.3.9 Formulating research agenda and strategy

Priorities for research within the aggregates areas were identified and where possible have been linked to the themes within the Regional Research Framework agenda and those for the emerging framework for the Trent Valley. The topics identified for feeding into the regional research agenda are noted and discussed at the close of Chapter 7.

1.4 Project Outputs

The aerial photograph transcription undertaken for this project, and the abstracted landform element coverages have been provided to the two mineral planning authorities which cover this study area to allow for the application of this guidance in minerals planning and archaeology. This project report, along with the National Mapping Programme (aerial photograph transcription) report and guidance booklet derived from this report, are available for download from English Heritage's HELM website (www.helm.org.uk) and from the Archaeological Research Services Ltd web-site (www.archaeologicalresearchservices.com).

2. Geology and Quaternary Environments

Dr. David Passmore
Newcastle University

The landscape and rich mineral resources of Derbyshire and the Peak District are a legacy of geological processes spanning the Carboniferous (c.360-290 million years ago), Permian (c.290-248 million years ago) and Triassic (248-205 million years ago) periods, and the more recent geomorphological process associated with Quaternary glacial and interglacial episodes over the past 2.5 million years. In combination these have shaped the physical form of the landscape and have, in addition to providing important mineral resources, controlled its soil and hydrological characteristics that in turn have exercised an influence on human activity in the region from Palaeolithic times to the present day. This chapter provides a brief overview of (i) the major landforming episodes over geological and Quaternary timescales, and (ii) the record of Holocene vegetation and river valley floor development including the role of human impact on regional environments.

2.1 Carboniferous geology (c. 360-290 million years ago)

The solid geology of the Peak District is dominated by Carboniferous rocks that form a large structural anticline orientated north to south, and often termed the 'Derbyshire Dome'. At the core of the dome in central and southern parts of the Peak District massif, Carboniferous Limestone (landform 1a) constitutes the oldest exposed rock formation in the region and forms the limestone plateau of the White Peak (Fig. 1.3). Formed at a time when the area that was to become the Peak District lay at equatorial latitudes, the limestones were deposited in warm, clear seas and may be differentiated according to the depositional environment; thickly bedded pale grey 'shelf' limestone was deposited in relatively shallow water and is the primary constituent of the 'White Peak', while darker grey 'basin' limestone reflects deposition in deeper waters and exhibits strongly folded and relatively thin bedding. In some localities the development of reefs has given rise to a particularly hard and fine-grained 'reef' limestone that is notable for its rich fossil content, and two belts of dolomitised limestone occur in the south east of the region. Dolomitised limestone contains a proportion of dolomite or magnesium within its chemical makeup. Impermeable beds of dark basalt (locally termed 'toadstone' – landform 1d) also lie interbedded within the White Peak limestone and reflect seafloor or intrusive lava flows emplaced during volcanic activity in the early part of the Carboniferous period between c.360-310 million years ago. Towards the end of the Carboniferous Period veins of lead, zinc and copper ores were deposited by the movement of mineralising fluids in faults in the limestone.

Today the Carboniferous Limestone of the 'White Peak' generally lies between 300-350m OD and exhibits many of the features associated with the erosion, weathering and solution of limestone, including deeply incised gorges, pavement, sinkholes and cave systems. The 'reef' limestone has proved resistant to subsequent erosion and has given rise to distinctive steep conical hills ('reef knolls') such as Bunster Hill (Dovedale), Beeston Tor (Manifold valley) and High Tor (near Matlock). Interbedding of impermeable basalts within the limestone has locally controlled the location of spring lines and cave morphology through the existence of perched water tables, both of which have proved attractive localities for human activities since Palaeolithic times. The combination of a free-draining and alkaline geology and deposits of Late Devensian loess (see below) has given rise to a rolling landscape with highly fertile soils that, in the context of Holocene upland environments in Britain, have been and continue to be unusually conducive to agriculture and grazing. The Carboniferous Limestone landscape also has an industrial legacy of disused mines and spoil heaps that reflect the recent historic exploitation of metalliferous ores in the limestones (see chapters 3 and 4.1 for more in-depth discussion).

The Carboniferous Limestone is overlain by younger Carboniferous sandstones and shales of the Millstone Grit Series (c.300 million years old), although these rocks have been lost to erosion in the central and southern part of the dome and survive today as outcrops that form a broad horseshoe-shaped ring to the west, north and east of the White Peak (Fig. 1.3). The Millstone Grit series (landform 1f) reflects a succession of fine-grained muds, sands and coarse sands deposited in shallow coastal waters by river deltas draining emergent mountains to the north. Silt and clay was the first of this series to be deposited and presently form well-bedded shales that only rarely outcrop in the study area (landform 1g). Subsequent deposits of sand and coarse sand have given rise to sandstones and 'gritstones' that are generally porous, well- cemented and relatively resistant to erosion (landform 1f); these rocks outcrop to elevations of c.300-600m OD around the White Peak plateau to form the upland moors of the 'Dark Peak' and

distinctive escarpment and valley topography along the eastern margins of the Peak District, notably at Stanage Edge and Froggatt Edge. In contrast to the typically agricultural landscape of the White Peak, the high plateau surfaces of the Millstone Grit are typically covered in 2-4m of blanket peat while fringing slopes with thick yellow clays support moorland and unimproved rough pasture.

The youngest Carboniferous rocks in the study area are the Carboniferous Coal Measures (landform 1i) which extend from the eastern edge of the Millstone Grits to underlie the lower terrain on the eastern side of Derbyshire. Comprising interbedded sandstones, conglomerates and fine-grained clays, ironstones and coal beds, these rocks reflect the rhythmic alternation of delta sedimentation and marine incursions on the margins of warm tropical seas and, in particular, the development of thickly vegetated and extensive swamplands that was to form the greater Yorkshire, Derbyshire and Nottinghamshire coalfield. Subsequent uplift, folding and differential erosion has given rise to a ridge and valley landscape with the latter developed in the softer shales, mudstones and coals.

2.2 Permian geology (c. 290-248 million years ago)

Following a major phase of tectonic uplift at the end of the Carboniferous period and formation of the Derbyshire Dome the succeeding Permian period is represented in the north-east of Derbyshire by an outcrop of Magnesian Limestone (landform 1c), part of a belt of this rock type that extends north into North Yorkshire (Fig. 1.3). This limestone represents deposition in a relatively shallow and landlocked sea (termed the Zechstein Sea) under warm conditions some 250 million years ago. Today the Magnesian Limestone forms a broad, eastward-dipping escarpment that is locally dissected by steep gorges cut by Quaternary meltwater rivers (see below). Light and fertile soils are developed over much of the rolling terrain and support arable agriculture.

2.3 Triassic geology (c. 248-205 million years ago)

To the south of the White Peak the relatively low and undulating terrain in the southern part of Derbyshire is underlain by early Triassic red sandstones of the Sherwood Sandstone Group (landform 1e) and mudstones and sandstones of the mid-late Triassic Mercia Mudstone Group (landform 1k) (Fig. 1.3). By this time the Permian Zechstein Sea had disappeared and the area that is now Derbyshire lay at latitudes of 10° - 20° north, equivalent to that of the modern Sahara desert. The Triassic formations represent extensive accumulation of riverine, aeolian and chemical sediments in lowlands adjacent to the eroding mountain belts to the north.

The Sherwood Sandstone Group overlies Millstone Grit to the east of Ashbourne and comprises well-bedded red sandstones with beds of conglomerate that represent former channel and flood deposits. To the south the Mercia Mudstone Group underlies much of southern Derbyshire including the Trent valley and predominantly comprises red and green mudstones and interbedded sandstones. The marked aridity of contemporary environments was associated with oxidisation of iron compounds within the deposits giving rise to the distinctive red colouration of many of these Triassic sequences, while thin horizons of gypsum and rock salt in the Mercia Mudstones probably reflect evaporation of mineral-rich waters in shallow floodplain salt-lakes and mudflats.

Triassic rocks in the study area are generally associated with low-lying and gently rolling terrain and, being typically covered with a variable thickness of unconsolidated Quaternary sediments (see below), are rarely exposed at the surface. In contrast to the deeply incised gorges and river valleys in the limestone uplands, the sandstones and mudstones of southern Derbyshire are cut by broad and open river valleys that include the arterial Trent. Here, agricultural land-use is well-developed with extensive areas of improved pasture and some arable cropping.

2.4 Quaternary environments

2.4.1 Pleistocene (pre-Holocene) fluvial sequences (c. 2.6 million years ago – 12000 BC).

In recent geological times the most significant modifications of the Derbyshire and Peak District landscape have occurred as a result of climate changes during the past 2.5 million years of the Quaternary period. The region was overrun by ice during at least one glacial phase of this period, the Anglian glaciation c.425,000 years ago (Marine Isotope Stage 12), and deposits of till (landform 2a) in central and southern parts of the study area most probably date to this time. These include extensive spreads of till to the south of Ashbourne and smaller deposits on the

eastern Millstone Grits and to the north-east and south of Derby. Recent work (White et al. 2010) has also documented stratigraphical evidence for an additional post-Anglian-pre-Devensian glacial incursion down the eastern side of England into the Wash basin, and which may have encroached from the west into the Lower Dove and Middle Trent Valleys in the vicinity of Etwall, Egginton and Burton-on-Trent. This glacial episode has been attributed to MIS 8 (c. 245,000 years ago) (White et al. 2010). During the last glaciation, the Devensian (c.20,000 thousand years ago), Derbyshire and the Peak District lay immediately beyond the southerly ice limits except for the northern and western margins of the Peak District western fringe which experienced localised glacial erosion and deposition of significant spreads of till. To the south of the Devensian ice limits the region experienced cold periglacial conditions that promoted localised freeze-thaw erosion of exposed rocky crags and tors and accumulation of talus and 'head' deposits on valley slopes (included within landform 2b). Extensive spreads of wind-blown fine silt (loess) were also deposited across the landscape at this time and this forms the parent material for rich loamy soils that are characteristic of much of the Carboniferous Limestone and the Magnesian Limestone area of North East Derbyshire.

The impact of glacial meltwater has had particular geomorphological significance in Derbyshire and the Peak District with respect to both erosional and depositional landforms and sedimentary sequences. Meltwater will have played a key role in the incision of spectacular river gorges such as those in Dovedale and Monsal Dale, and in the development of cave systems in the White Peak limestones and in the 'grips' of the Magnesian Limestone of North East Derbyshire. It has also been instrumental in the formation of extensive Quaternary sand and gravel deposits in valley floors that are preserved in the modern landscape as upstanding flights of river terraces (landform 2d). Some local terrace fragments survive in upper and middle parts of the Derwent valley, notably around Brough-on-Noe and in the vicinity of Bakewell and Rowsley near the confluence of the River Wye. But the most extensive and well-documented Pleistocene terrace sequence in the study area occupies the middle reaches of the Trent valley and the lower reaches of its southerly-flowing tributaries, the River Derwent and River Dove. In combination with the broader Trent Valley sequence these landform-sediment assemblages provide the best geomorphological evidence of multiple glacial phases in this part of Britain; indeed, in the context of British Quaternary fluvial archives the River Trent has been identified as being the most northerly British river valley to contain both an extensive pre-Devensian terrace sequence and a record of significant Palaeolithic artefact assemblages (see reviews by Howard et al. 2007; Bridgland 2010).

Since Howard et al.'s (2007) review of the Pleistocene record of the Trent, the region's terrace sequence has been the focus of the ALSF-funded Trent Valley Palaeolithic Project which has sought to enhance the understanding of the context of Palaeolithic archaeological records derived from the Trent deposits (White et al. 2007; 2009; 2010; Bridgland 2010). Accordingly, the overview of the fluvial sequence presented here, as reviewed by Howard et al (2007) and more recently by White et al. (2010) is liable to require modification of the chronology and interpretation with the further publication of this latest research.

The established record of sand and gravel terrace preservation in the Trent system (Howard et al. 2007; White et al. 2010 and references therein) is believed to represent all glacial stages between the Devensian (MIS 2 c.110,000-12,000 years ago) and Anglian (MIS 12 – c. 455,000-400,000 years ago) with the exception of MIS 10 (c.360,000 years ago) (Table 2.1) and, throughout the broader Middle Trent Valley, reaches elevations up to c.65m OD (Wilford Hill Terrace). In addition to cold-stage sand and gravel deposits, the Trent record also includes interglacial deposits associated with the Ipswichian interglacial (MIS 5e – c.130,000-110,000 years ago) and (downstream of the study area) MIS 7 (c.245,000-186,000 years ago) (Table 2.1). Ipswichian sites include two nearby localities in the Allenton-Boulton area of the Derwent valley and are notable for featuring mammalian remains including hippopotamus (Knight and Howard, 2004). An early human presence in the region may be inferred by Lower and Middle Palaeolithic artefacts recorded in terrace sediments that are provisionally correlated with MIS 8 (including the Etwall Sand and Gravel at Hilton and Willington) (c. 245,000 years ago) and MIS 4 (Beeston Terrace) (c. 75,000 years ago), respectively, but since much of this material appears to have been heavily rolled and abraded it is acknowledged there may have been significant reworking from older deposits (Howard et al. 2007; White et al. 2009). Much of the Holocene archaeological record is located on Pleistocene-age gravel terraces, especially those associated with the Late Devensian deglaciation of the region that flank (and extend beneath) Holocene alluvial valley floors (Knight and Howard 2004).

2.4.2 Holocene river environments (c. 12000BC – Present Day)

While the primary focus of post-glacial settlement, subsistence and ritual activity in regional river valley floors has focused on upstanding Pleistocene sand and gravel terraces, the Trent Valley has an exceptional record of archaeologi-

cal and palaeoenvironmental evidence that has been recovered from Holocene alluvial deposits (landform 3a); often revealed by sand and gravel extraction, these records include prehistoric fish-weirs, log-boats and metalwork and are especially rich with respect to Medieval and later bridges and in-channel and riverside structures (Knight and Howard 2004; Howard 2005; Howard et al. 2008 and references therein). Organic-rich Holocene floodplain sediments (landform 3b) (especially those preserved in palaeochannels) have also proved to host a rich array of pollen, insect, and plant macrofossil assemblages (e.g. Knight and Howard 2004; Smith and Howard 2004).
Early Holocene river environments in the Middle Trent were characterised by stable, multi-thread (anastomosed) channels and floodplains that supported mixed deciduous woodland (see below). Many reaches may have experienced progressive abandonment of secondary channels with increasing floodplain stability, but from around 4000 cal BC there was a change in the character of floodplain environments including localised deforestation and, as evidenced by large numbers of tree trunks stratified within fluvial sands and gravels, an enhanced rate of channel bank erosion. Neolithic and early Bronze Age palaeochannel fills also testify to channel cut-off during this period. Human impact on floodplain and terrace vegetation becomes increasingly marked during and after the Bronze Age and by Romano-British times much of the Middle Trent valley floor had been cleared for pastoral and arable agriculture. From later prehistoric times, and especially the early historic period, Trent Valley floodplains are notable for featuring the onset of alluviation of relatively inorganic red-brown silts and clays which in some localities have been found to bury Romano-British archaeology. These sediments are believed to reflect, at least in part, an acceleration in catchment soil erosion with the expansion of Romano-British agriculture and associated developments in plough technology (Knight and Howard, 2004).

Between the end of the Roman occupation and c. AD 1500 the middle reaches of the Trent appear to have witnessed major changes in river channel environments, including a transformation from meandering to laterally-unstable, braided channels by the tenth century, followed by development of a laterally-stable, anastomosed channel network between the tenth and fourteenth centuries (Knight and Howard, 2004). A reversion to a single-thread meandering channel was accomplished by the fifteenth century and has persisted to modern times. Transformation of medieval river environments has been recorded in many UK river systems (Lewin, 2010) and in part reflects the increasing level of human modification of channel and floodplain environments during these times.

2.4.3 Holocene vegetation record

Barren periglacial landscapes of Late Devensian Derbyshire and the Peak District were replaced during the early Holocene climatic amelioration by the spread of mixed deciduous woodland over much of the landscape bar the highest elevation plateaux (Tallis and Switsur, 1990). Early woodlands were dominated by birch and pine and were followed by variable amounts of hazel and elm. By the climatic optimum of the mid-Holocene around c.5000 cal BC, the region hosted a closed mixed-deciduous forest cover which also included oak, lime alder and ash. Climax woodland composition is likely to have varied with altitude and edaphic factors; in the area of Robinson's Moss, north of Longdendale, Derbyshire, Tallis and Switsur (1990) found alder, lime and possibly beech predominant in lower elevation hillslopes below c.425m OD, pine, oak and elm in upland forest areas up to c.460m OD and scrub woodland of birch, hazel and willow at higher elevations below the moorland fringes at 500m OD. On the low elevation valley floors woodland composition was initially dominated by pine and birch, but from c.7000 cal BC wetter parts of the floodplain typically developed alder carr with willow and poplar along riparian margins while drier areas and adjacent free-draining sand and gravel terraces featured oak, lime, elm and hazel (Howard 2005). From c.5000 cal BC a combination of wetter climatic conditions, soil deterioration and possibly also the inadvertent or deliberate impact of Mesolithic woodland disturbance prompted the development of blanket peat (landform 3d) and the retraction of scrub woodland at higher altitudes in the Southern Pennines (Tallis 1991). This process accelerated between c.3500-3000 cal BC by which time blanket peats in the region had almost reached their modern extent (Tallis 1991).

The period c.4000-1500 cal BC, spanning the Neolithic and Early Bronze Age saw the arrival of agricultural economies to the region and a concomitant transformation of valley floor and hillslope landscapes. Early farming activities during Neolithic times may have been particularly focused on fertile and free-draining fluvial terrace surfaces adjacent to major river courses while in upland parts of the South Pennines evidence of accelerated woodland disturbance occurs only in later Neolithic times (Tallis 1991). By the Early Bronze Age, however, many parts of the regional forest cover had been reduced to a woodland patchwork with areas of pasture and cereal cultivation (Knight and Howard 2004). This process accelerated during later prehistoric times so that by the Late Iron Age and Romano-British periods much of the landscape, including the Trent Valley corridor (Knight and Howard (2004) and the gritstone uplands of the Peak District (Long et al. 1998), were extensively cleared and managed for pastoral and,

especially at lower elevations, arable agriculture. The extension of agriculture into relatively marginal parts of the landscape during the Roman period may represent the highwater mark of regional settlement and appears to have been followed by a reduction in activity and a refocusing of intensive agriculture on more sheltered lower valley side and valley floor settings during the later part of the first millennium AD (Knight and Howard 2004). The frequent survival of Medieval ridge-and-furrow field systems has been attributed, at least in part, to a transition from arable to pastoral agriculture in the immediate post-medieval period in the aftermath of climatic deterioration, plague and agrarian crises (Knight and Howard 2004).

Age (x1000 yrs BP)	MIS	British Stage Name	Lower Derwent Valley	Middle Trent / Lower Dove Valleys
0-10	1	Holocene	Holocene alluvium Ambaston Sand and Gravel	Holocene alluvium Hemington Sand and Gravel
10-80	2	Late Devensian	Chaddesden Sidings Sand and Gravel	Holme Pierrepont Sand and Gravel
	3	Middle Devensian		
	4	Early Devensian	Allenton Sand and Gravel	Beeston Sand and Gravel
80-130	5a-d			
	5e	Ipswichian	Crown Inn Bed / Boulton Moor	
130-190	6		Borrowash Sand and Gravel	Egginton Common Sand and Gravel
190-250	7			
250-300	8		Ockbrook Sand and Gravel	Etwall Sand and Gravel
300-340	9			
340-350	10			
350-430	11	Hoxnian		
430-480	12	Anglian	Eagle Moor Sand and Gravel	Eagle Moor Sand and Gravel Findern Clay
	Pre-12			Wilford Hill

Table 2.1 Summary of the fluvial sequence in the Lower Derwent and Middle Trent / Lower Dove valleys (after Howard et al., 2007; White et al., 2010). Grey shading indicates interglacial stages.

2.5 Aggregate Extraction in Derbyshire and the Peak District

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2.5.1 Historic Exploitation

As is noted within the introduction, and throughout the landform assessment chapters, the exploitation of the mineral resource is intrinsically linked to the history of the county and National Park. During prehistoric periods, raw materials were won from the ground in the form of chert or copper for tool-making, whilst the lead seams of the Carboniferous Limestone provided a raw material which the Romans shipped around the known world. From the medieval period onwards, the Peak District saw an explosion in lead mining which has resulted in one of the most distinct archaeological landscapes in the country. The combination of water power and natural resources from the Coal Measures to the Millstone Grit uplands powered the mills and machines of the Industrial Revolution, at the same time as valuable and semi-precious minerals were being mined from the rock. Whilst, as can be seen, there is a tradition of extraction relating to a wide variety of natural resources, aggregate extraction specifically is a relatively modern phenomenon. There are two major sources of aggregate within the study area – crushed limestone from the Carboniferous and Magnesian Limestone belts, and sand and gravel from the wide expanses of river valley, particularly along the banks of the Trent.

Aggregate extraction in Derbyshire has a long history, with the exploitation of the Trent Valley reserves recorded as early as the 16th century, though demand greatly increased in the 19th century with the increasing needs of an arterial road system. Up until the 1920s most of the gravel produced in the Trent Valley was dredged from the river and it was only when these supplies ran out that large scale exploitation of the terrace deposits began. The invention of pre-mixed concrete boosted demand still further and WWII and the subsequent reconstruction and development saw a huge demand for sand and gravel, particularly for the production of concrete, and it was in the crucible of post-war expansion that the modern aggregate quarry industry was forged.

The extraction of Derbyshire limestone for the production of lime and for building dates back to at least the Roman period, and the scars of medieval and post-medieval limestone quarrying are still visible in the uplands of the Carboniferous Limestone and on the Magnesian Limestone plateau. The advent of the rail and canal systems in the 18th century precipitated a huge increase in the limestone industry as mass export allowed Derbyshire to supply the growing chemical industries of North West England and rural agricultural improvements across the north. By the twentieth century limestone was a major component of road construction and was also being used as a flux in the constantly burning blast furnaces of Sheffield and other industrial towns.

2.5.2 Current Extraction

In more recent times, despite the protection of National Park status, and due in principally to the existence of old permissions, Derbyshire has supplied 6% of the entire national output of land-won primary aggregates and has 9% of the national permitted reserves (PDNPA 2009, 3). As of 2009 when the Peak District National Park Minerals Strategy (PDNPA 2009) was published, there were 47 active quarries in the Peak District with 10 of those being limestone quarries. The 28 currently-worked sites output c.8.7 million tonnes of product in comparison to 109 working sites in 1955 outputting only 1.6 million tonnes (PDNPA 2009, 4), testament to the sheer scale of some of the operations in the latter portion of the twentieth century.

In comparison to the limestone extraction, the permitted reserves of which are estimated to last for 98 years at the current rate of extraction, it is estimated that there are only 8 years of sand and gravel permitted reserves remaining (source: Derbyshire Minerals Core Strategy consultation strategy).

The distribution of the existing and ceased minerals permissions reflects the principal areas of mineral working described above. Substantial concentrations can be seen around the central Carboniferous Limestone plateau, the gritstone dome of Stanton Moor and the area around Matlock and Cromford, and across the sand and gravel terraces of the Trent Valley.

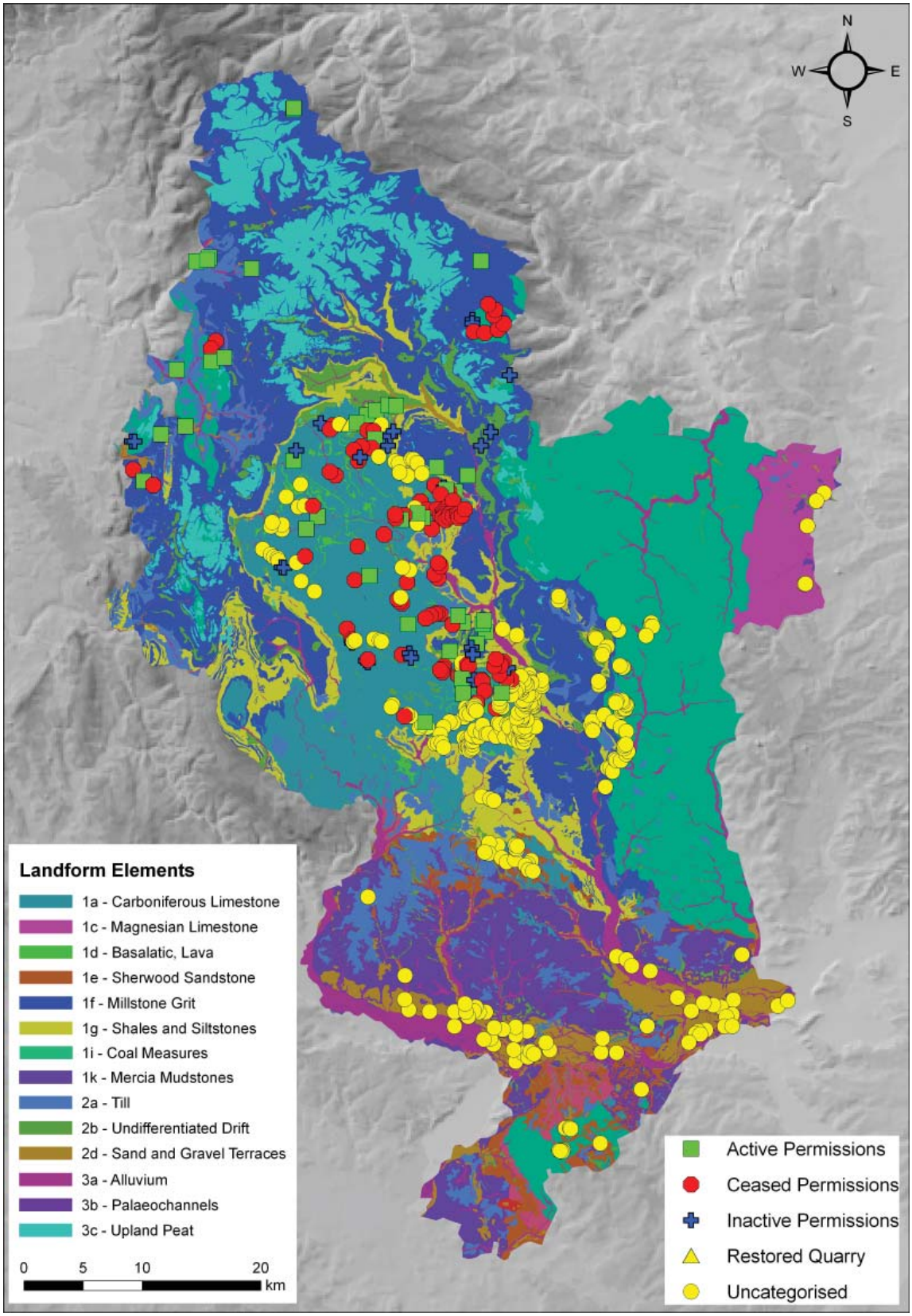

Figure 2.1 – Minerals permissions within Derbyshire and the Peak District. (source: British Geological Survey – Minerals UK).

2.5.3 Future Extraction

Whilst all future aggregate extraction will be subject to rigorous planning controls, the status of the Peak District as a national park means there are further environmental and landscape impacts which are considerations. Minerals Policy Statement 1 (MPS1): Planning and Minerals (CLG 2006) outlines a specific policy in regard to minerals development within National Parks:

"Do not permit major mineral developments in National Parks, the Broads, Areas of Outstanding Natural Beauty and World Heritage Sites except in exceptional circumstances. Because of the serious impact that major mineral developments may have on these areas of natural beauty, and taking account of the recreational opportunities that they provide, applications for these developments should be subject to the most rigorous examination. Major mineral development proposals should be demonstrated to be in the public interest before being allowed to proceed. Consideration of such applications should therefore include an assessment of:

1. the need for the development, including in terms of national considerations of mineral supply and the impact of permitting it, or refusing it, upon the local economy;
2. the cost of, and scope for making available an alternative supply from outside the designated area, or meeting the need for it in some other way;
3. any detrimental effect on the environment, the landscape and recreational opportunities and the extent to which that could be moderated.

Planning authorities should ensure that for any planning permission granted for major mineral development in these designated areas, the development and all restoration should be carried out to high environmental standards, through the application of appropriate conditions, where necessary, and be in character with the local landscape and its natural features.

Proposals in these areas which are not considered to be major mineral developments should be carefully assessed, with great weight being given in decisions to the conservation of the natural beauty of the landscape and countryside, the conservation of wildlife and the cultural heritage and the need to avoid adverse impacts on recreational opportunities" (CLG 2006).

In light of the rigorous controls outlined in national policy, the major issues concerning extraction within the national park are outlined in the Minerals Strategy (PDNPA 2009). The issues are:

- Pre-existing permissions where there are conflicts in resolving the need for continued extraction with the necessary environmental controls which can be put in place with new permissions. Review processes are ongoing to attempt to resolve this situation, and where such reviews take place then management of the issues surrounding cultural heritage will inevitably play a part.
- Balancing the need for minerals against environmental impact with new permissions. Within the Minerals Strategy, it is noted that the aim is to implement a gradual reduction in mineral activity in line with the Regional Plan.
- The third issue outlined in the Minerals Strategy details a further three major conflicts perceived:
- As the country's principal source of fluorspar, the Peak District will become the focus of increasing requirements to supply this to industry, including potentially through increasing opencast extraction.
- An increasing requirement for the high-quality dimension stone from the Peak District. This is required for use both outside the Peak District, and also for maintaining the distinctive vernacular architecture which contributes so much to the character of the region.
- A national need for cement which can be supplied both within and without the National Park, balanced against the economic benefits of substantial workings within the Park and the environmental impacts of such workings.

In regards to the rest of Derbyshire, outside the remit of the National Park, future minerals policy will be guided by the Minerals Core Strategy which is currently in development and will be implemented within the next year, replacing the Derby and Derbyshire Minerals Local Plan implemented in 2000 (DCC 2000). Within consultation documents for the Minerals Core Strategy, the key aims to be considered relating to future minerals planning are:

- To achieve the best possible balance between maintaining the economic and other benefits to be gained from mineral extraction in Derby and Derbyshire and its impact on the environment and communities.
- To ensure partnership with industry, communities and neighbouring authorities to and therefore promote a pattern of sensitively located, worked and restored mineral extraction sites.
- To meet the county's contribution to the local, regional and national need for minerals and assist in achieving a progressive reduction of minerals won in the Peak District National Park.
- To work towards the achievement of sustainable economic development and regeneration of the area, including through the delivery of materials for use in industry, the creation of jobs and training and addressing the legacies of the historic economy, especially in areas of identified deprivation.
- To minimise the use of primary resources through efficient working practices, prudent and efficient use of minerals and through the maximum use of recycled and secondary materials.
- To safeguard the valuable and economically viable mineral resources for use by future generations.
- To oversee a reduction in the excessive landbank of permitted reserves of crushed rock in Derbyshire.
- To minimise the adverse social and environmental effects of mineral extraction on local communities to an acceptable level, mitigate against unavoidable social effects and maximise opportunities for community benefits.
- To take account of the impacts of climate change and the potential for flooding, in decision making, minimise and mitigate against unavoidable effects, and make adaptations for the effects of climate change in mineral developments.
- To transport minerals more sustainably, minimise the adverse environmental effects of their transportation, including the effects of moving minerals long distances.
- To ensure that the Potential for effective and high standards of restoration and productive after-use will have been integral to site selection and to the consideration of proposals for mineral extraction. To also ensure that proposals have regard to existing landscape character and the need to protect wildlife and enhance biodiversity.
- To ensure that restoration strategies will also have been developed for particular areas subject to long term cumulative impact of quarrying, such as for the Trent valley and the A515 corridor near Buxton, and will have provided a longer term, more coherent approach to the sustainable development and restoration of sites. (source: Derbyshire Minerals Core Strategy consultation strategy).

The overall picture of future extraction within the Derbyshire and the National Park can be seen as a concentrated version of the issues played out in minerals planning nationwide. It is the role of the planning process to resolve the conflicts between the negative impacts of extraction, the economic benefits and the necessity for minerals. Cultural heritage, and specifically to this project, archaeology and the palaeoenvironment are one of raft of areas impacted upon by extraction. With cultural heritage, however, there can be an opportunity to increase engage with communities, increase our knowledge of the past and turn potential problems into genuine benefits within the minerals process.

3. Historical and Archaeological Overview of Derbyshire and the Peak District

The archaeological remains of Derbyshire and the Peak District are exceptionally rich and varied with a chronological reach spanning the Palaeolithic to the present with the rock art of Creswell Crags and the river valley mills which were the crucible of the Industrial Revolution forming one designated, and one proposed World Heritage Site at either end of this time line. For a more in-depth assessment of the archaeological resource than is possible here there are a number of syntheses to note. Firstly, there is the recent regional resource assessment and agenda: The Archaeology of the East Midlands, An Archaeological Resource Assessment and Research Agenda (Cooper 2006); secondly there is the well-thumbed The North Derbyshire Archaeological Survey (Hart 1981); and thirdly there are a number of texts which have synthesised the archaeological resource of various areas such as Trent Valley Landscapes (Knight and Howard 2004) and the Peak District (Barnatt and Smith 1997, 2nd edition 2004).

Any overview of the archaeological resource of Derbyshire and the Peak District is by necessity divided into two by the topographical split between the upland areas to the north and west, dominated by their association with the bedrock upon which they stand and the mineral and aggregate wealth it provides, and the lowland river valleys and plains to the south and east. The following narrative is split into two parts along the lines noted above. The uplands are discussed first, and the Trent Valley and its environs second. Each overview is dealt with in chronological order.

3.1 The Northern Uplands of the Peak District and Derbyshire

3.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000BC-3900BC)

The earliest evidence for human habitation comes from the cave sites of both the Magnesian Limestone in the east of the county, and the Carboniferous Limestone which forms the high central plateau of the Peak District and is sometimes referred to as the 'White Peak'. On the Carboniferous Limestone, isolated finds at various cave sites including Ravencliffe Cave (Storrs Fox 1910) and Shacklow Wood show the presence of Upper Palaeolithic people on the limestone plateau, as well as at rock shelter sites such as Sheldon (Radley 1968), or the cave sites of Thor's Fissure Cave (Bramwell 1950), Elder Bush Cave (Bramwell 1964) and Ossum's Cave (Bramwell et al 1987), all in the Manifold Valley in the southern Peak District (see also Trent and Peak Archaeological Trust 1993).

There are a number of cave and rock shelter sites in the Magnesian Limestone in the north-east of Derbyshire which have produced Palaeolithic remains: Ash Tree Cave near Whitwell (Armstrong 1956), the Whaley rock shelters (summarised in Radley 1967), and most famously Creswell Crags (Armstrong 1925; 1929; Kitching 1963; Campbell 1971; 1977; Pettitt et al 2007), the latter of which contains the only known Palaeolithic cave art in Britain depicting a range of animals alongside abstract forms.

The picture of Mesolithic activity in Derbyshire and the Peak District, based on current evidence, shows a clear distribution towards the uplands of the north, though this probably represents a bias of fieldwork towards the uplands, typified by fieldwalking programmes (Barnatt pers comm.), moorland flint collection (e.g. Buckley 1924) and, notably, the investigation of cave and rock shelter sites. As with some other periods, it is also probable that remains are more likely to be preserved within the boundaries of a landscape which has never been as intensively developed as the lower-lying areas of Derbyshire.

The cave sites of both the Magnesian Limestone and the Carboniferous Limestone have produced Mesolithic material indicating the continuing attractiveness of these locales for hunter-gatherer subsistence. The rock shelter site at Stoney Low, Sheldon on the Carboniferous Limestone was excavated in the 1960s by Thurston Goodwin and reported on by Radley (1968). The site appears to have been a small shelter utilising a rock fissure, perhaps serving as some sort of hide or hunting camp, as it was located by a water source, and had a laid paved floor with an 'anvil' stone set into it around which was found an assemblage of Mesolithic chipped stone debitage. A second key site for the Mesolithic period is the site of Lismore Fields, Buxton (discussed below), the earliest phase of which was characterised by a huge amount of diagnostic Mesolithic stone tools and waste material (Garton 1991).

Figure 3.1 The Magnesian Limestone gorge of Creswell Crags.

Despite the two sites mentioned above both being located on or near the Carboniferous Limestone, there is also a large amount of lithic evidence from the gritstone moors surrounding the limestone plateau, commonly known as the 'Dark Peak', collected during fieldwalking and upland surveys of peat exposures (Buckley 1924; Petch 1924; Radley 1962; Hart 1981) suggesting a preference for these areas during the Mesolithic. The key sites to note on the Eastern Gritstone Moors are Broomhead Moor and Deepcar with both these sites yielding evidence of some form of occupation. Broomhead Moor hosted evidence of hearths, stakeholes and flint production possibly based around 'paved' areas (Radley et al 1974). The site at Deepcar is of significance as it contains the remains of a stone-built structure or shelter contemporary with a Mesolithic flint and chert assemblage (Radley and Mellars 1964).

3.1.2 Neolithic (3900BC-2200BC)

The site of Lismore Fields, Buxton, on the till and shale at the junction of the Carboniferous Limestone is a unique site. At the site, a large amount of Mesolithic flint and chert was found along with at least three rectangular structures which returned Early Neolithic radiocarbon dates (Garton 1991). Within the uplands, other Early Neolithic material has been recovered from fieldwalking programmes (e.g. Barnatt 1996; Garton and Beswick 1983; Myers 2006) from which Early Neolithic activity and possibly occupation can be inferred. At the Dale View site on Stanton Moor, a tool-rich Early Neolithic flint assemblage was found during excavations, along with a single tiny sherd of Early Neolithic pottery (Brightman and Waddington in press). The sites at Aleck Low and Upperhouse Farm (Hart 1985), which were identified through fieldwalking before then being investigated through excavation, yielded a large volume of pottery in distinct clusters of type – Carinated Bowl, Impressed Ware, and Grooved Ware, which was associated with probable sunken-floored structures (Hart 1981).

The most visible remains from the Neolithic and Bronze Age are the various forms of funerary monuments. A great number of the cairns and chambered tombs were explored by early antiquarians, most notably Thomas Bateman in the mid-19th century, and as such, a great many are known, even if the records we now have are poor when judged by more rigorous modern-day standards. Within the Peak District uplands, there are eleven long barrows (Barnatt

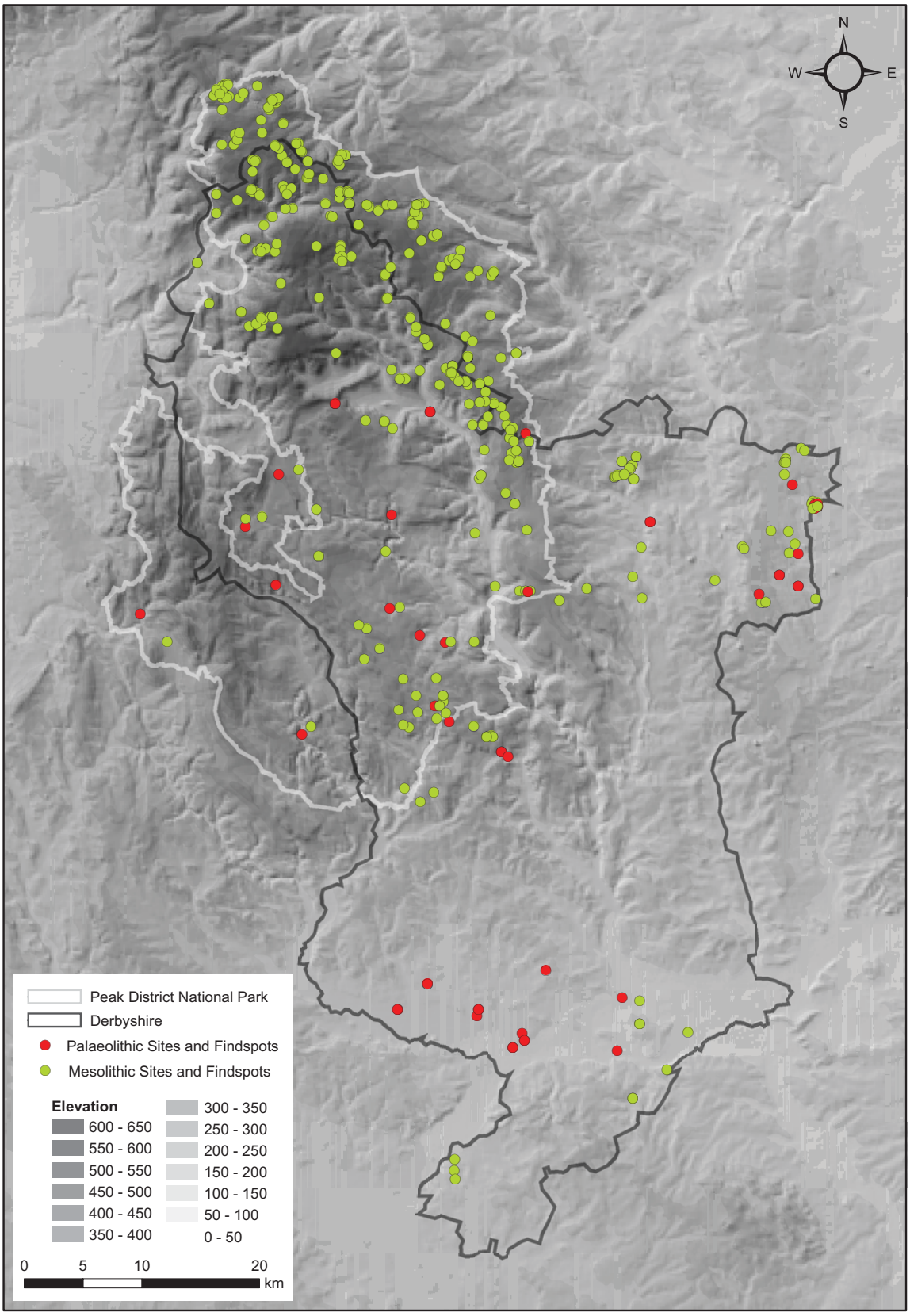

Figure 3.2 Distribution of Palaeolithic and Mesolithic sites and findspots illustrating a clear bias towards the uplands of the north-west, particularly the northern and eastern gritstone moors, though with a distinctive secondary scattering of findspots in and around the Trent Valley, especially for the Palaeolithic period.

Figure 3.3 The Five Wells Neolithic chambered cairn.

1996) located on the Carboniferous Limestone, to which can be added the Whitwell Long Cairn on the Magnesian Limestone (Schulting 2000; Sheridan 2007). Chambered tombs are known at Five Wells, Taddington, Green Low (Manby 1988) as well as Harborough and Bole Hill, and a further eleven have been noted by Barnatt (1996), the majority on the Carboniferous Limestone. Barnatt (1996) differentiates between the smaller chambered tombs such as those mentioned above and the four 'great barrows' at Minninglow, Tideslow (Radley and Plant 1971), Stoney Low and Pea Low, which are on a completely different scale to the smaller sites and Barnatt describes them as a 'rare phenomenon' (1996, 25) only known from the Peak District, the Yorkshire Wolds (Manby 1988) and Wessex (Burl 1979; Wainwright 1989). The 'bank barrow' at Long Low is worthy of note as it is a unique monument for the region, comprising two mounds linked by a huge bank some 210m in length (Barnatt 1996, 89-90).

Alongside the great Neolithic funerary monuments, the Peak District also contains two Later Neolithic henge monuments. While it is unusual to find henge monuments at such a high altitude above sea level and away from active river channels, the fertile soil of the Carboniferous Limestone may well have attracted similar communities to those who dwell in the river valleys of northern England, or the Wessex Chalklands, where the main concentrations of henge monuments can be found. The henge at Arbor Low is clearly a focus of activity with a considerable chronological span. Alongside the henge monument, which contains a now-recumbent stone circle and central setting, there is the Oval Cairn of Gib Hill which is overlain by a barrow mound added in the Late Neolithic-Bronze Age. A similar mound was added next to the southern entrance at Arbor Low straddling the henge bank (Radley 1968; Barnatt 1996). The Bull Ring at Doveholes is the second Peak District henge monument, but what little fieldwork has been undertaken on it provided little material evidence (Alcock 1950; Barnatt 1988). Both of the henge monuments are of similar dimensions and form, both being Class II henges with opposed entrances. They are situated within an easy day's walk from each other and it is possible that other henge monuments may have existed in this area and perhaps along a routeway between these two known sites.

There is a limited wealth, in comparison to further north in the Pennine chain, of 'cup and ring' style rock art on the gritstone of the Derbyshire uplands, which is now thought to originate in the Neolithic period and continue into the Bronze Age (see Burgess 1990; Bradley 1997; Waddington 1998; Beckensall 1999; Waddington 2005; 2007). Rock art

is known from rock outcrops such as at Gardom's Edge (Ainsworth and Barnatt 1998) and Rowter Rocks, with many other recent examples summarised by Barnatt and Robinson (2003). Rock art is also incorporated into monuments such as at the stone circle of Barbrook (Barnatt 1990). The Millstone Grit of the Peak District uplands represents the southern extent of the principal concentration of the 'cup and ring' tradition and therefore has the potential to inform on the nature and usage of rock art over a much wider area, perhaps presenting a coherent story for this enigmatic art form over much of northern Britain.

3.1.3 Early to Middle Bronze Age (2200BC-1200BC)

There is only a small corpus of information for the Early Bronze Age 'Beaker Period' within the uplands of north and west Derbyshire apart from finds from barrows. The known resource comprises pottery from the cave sites of Pinhole Cave (Gilks 1974) and Whaley 2 Shelter (Radley 1967) and also a small cairn at Scarcliffe Park, all of which are situated on the Magnesian Limestone. The majority of known Beaker barrow sites are clustered between Bradwell and Brassington on the Carboniferous Limestone (Hart 1981, 50), which again reinforces the existing link between Neolithic and early Bronze Age groups with the Limestone geologies of the region.

The upland archaeological remains of the Bronze Age are dominated by ritual and funerary monuments, such as stone circles and cairns, the latter being often referred to as barrows, together with the remains of houses, farmsteads and field systems. The cairns are typically of 'bowl barrow' form and can be constructed of either stone or earth, in which respect they are a similar monument to the majority of other known contemporary barrows outside of the Wessex chalklands (Barnatt 1996, 29).

As noted above in the discussion of the Neolithic, the tradition of different forms of cairn and barrow construction change through time, but there is also a spatial and geological element to the distribution which is summarised by Hart (1981, 56-7). Essentially, the cairns/barrows on the Carboniferous Limestone cluster in small cemeteries, are primarily associated with Food Vessels and Beakers, are sited on the crest of a hill or false crest, are considerably larger and tend towards a more uniform roundness. In contrast the cairn/barrows on the Gritstone Moors are thought to be generally later, although this needs to be demonstrated rather than assumed, and are predominantly

Figure 3.4 The bank and ditch of the henge monument of Arbor Low. A number of the recumbent monoliths can be seen to the right which would have originally stood as a stone circle and central cove. The raised mound straddling the bank is made by the secondary imposition of a mound, a practice that has been noted at other henge monuments.

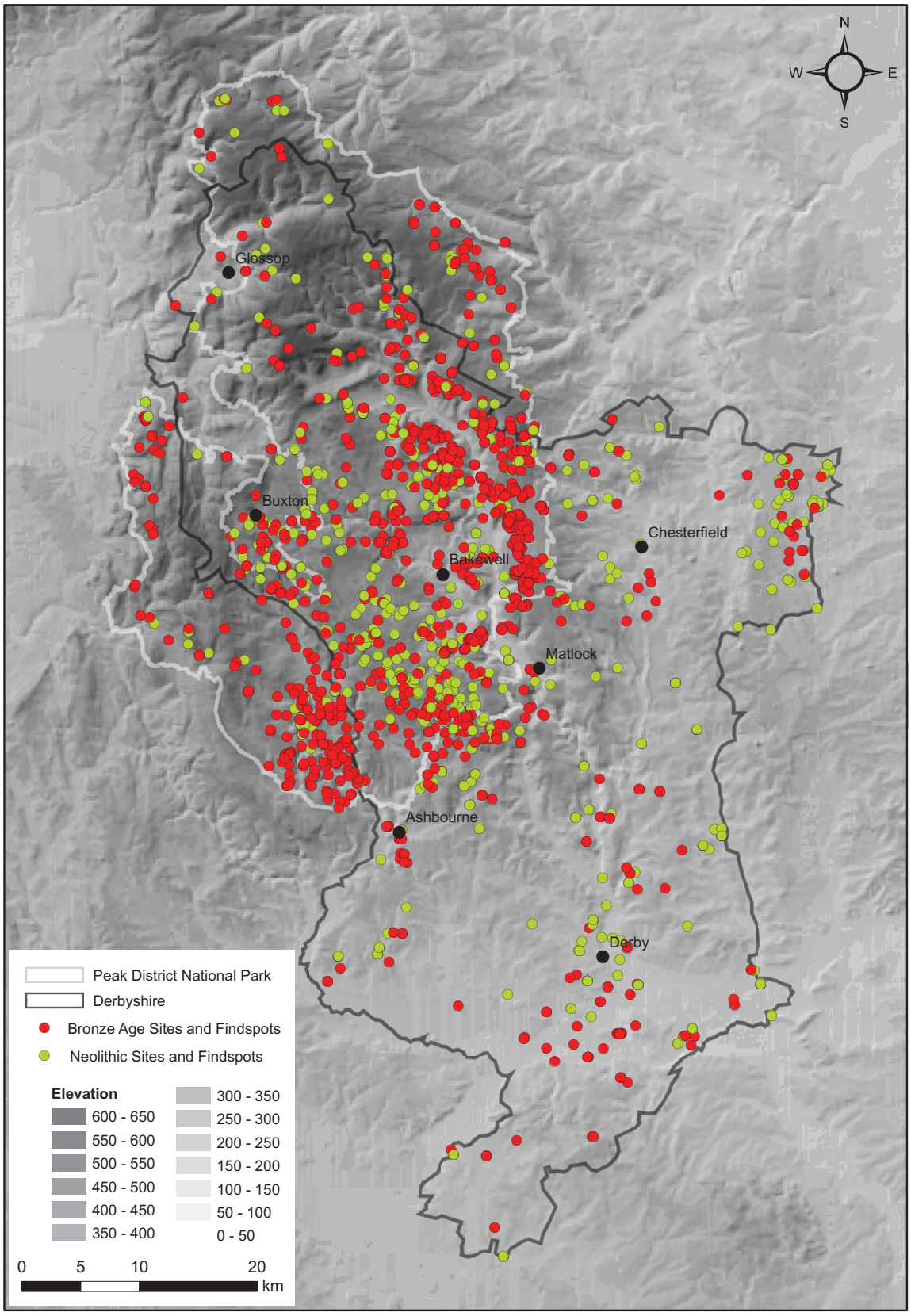

Figure 3.5 Distribution of Neolithic and Bronze Age findspots and sites which illustrates not only the continuing bias towards the uplands, but also the explosion of activity centred on the Carboniferous Limestone plateau and the adjacent gritstone moors.

Figure 3.6 The tomb of Thomas Bateman crowned with a stone replica of a Bronze Age Collared Urn.

associated with Collared Urns, are sited mainly on the 1000ft (305m) contour, are much smaller in diameter, and include a variety of forms and shapes in plan. There are also very large numbers of small, low, often irregular and unkerbed 'clearance' cairns associated with stone-cleared plots and field systems.

The cairns and barrows of the Peak District have been subjected to widespread antiquarian excavation, which is not surprising given that they would have presented attractive and readily-identifiable targets. Notable antiquarians including Greenwell and Rooke, but more importantly Bateman (e.g. Bateman 1848; 1861; Greenwell 1877), who undertook significant campaigns of excavation which are variably recorded in their publications. There have been relatively few modern excavations of cairns and barrows in the uplands, with only 25 sites listed by Barnatt (1996, 17-8), and of these most were of earlier Neolithic monuments such as Marsden's clearing of the long cairn at Minninglow (1982), or the excavations at the multi-period Wigber Low (Collis 1983). Other important excavations of prehistoric cairns and barrows include the Fin Cop barrow investigations by Rooke (1796), the cluster of sites near Great Hucklow (Bagshawe 1863), the 11 sites around Buxton excavated by Micah Salt (Turner 1899). In the 20th century, other important excavations include Heathcote's meticulously conducted excavations on Stanton Moor (1930), the complex barrow site at Hindlow (Ashbee and Ashbee 1981), Green Low (Marsden 1963) and the Neolithic barrow at Tideslow (Radley and Plant 1971). Recent excavations of cairn/barrow sites in the uplands include Biggin (Barnatt 1996), Carsington Pasture (Harding et al 2005) Hognaston (Collis 1996) as well as the unpublished excavations on Eyam Moor and in Bradwell Dale by ARTEAMUS (Archaeological Research Team University of Sheffield)

The gritstone uplands host a wealth of Bronze Age field systems and settlements, alongside the funerary monuments. Perhaps the most important evidence for informing on settlement patterns and land-use in this region is Swine Sty, excavated by the Hunter Archaeological Society (Richardson and Preston 1969; Machin 1971; 1975), which demonstrated that during this period, there was no clear delineation in the landscape between places of settlement and places of funerary activity. Rather, houses for the living and monuments to the dead were built in close proximity to each other perhaps reflecting a change in social and ceremonial organisation whereby families buried their dead close by to their farmsteads (see Barnatt 1994; 1996; 1999; 2000). This phenomenon appears to be mirrored at the Willington site in the Trent Valley lowlands where a similar juxtaposition of funerary monuments alongside what could be settlement structures was noted on the sand and gravel river terraces (Brightman and Waddington forthcoming a).

3.1.4 Late Bronze Age-Iron Age (1200BC-AD43)

A key point relating to the later prehistoric period, and one which is returned in the assessments of landforms, is the notably low number of known sites in comparison to the preceding Neolithic and Bronze Age periods, and the following Roman period. Whilst the most noteworthy sites of the late prehistoric period are often impressive monuments, they are few and far-between. There seems to be little reason to suppose a dramatic drop in the levels of population during the later prehistoric period, and so it is more likely that either the remains of this period await discovery, or in fact they have been recognised but not placed in the correct time bracket. For the uplands of Derbyshire, there are a substantial number of known farmsteads and small settlement sites which are given a putative late prehistoric or Romano-British date. In a similar way, a wealth of cropmark enclosures are known from the fertile Trent Valley which are uninvestigated, but may point to an intensive enclosure and farming of the sand and gravel terraces in the pre-Roman period. Only through the acquiring of tight chronological control following systematic excavation will we obtain the data to begin answering the questions posed by the apparent dearth of late prehistoric activity.

Some of the most prominent monuments of the Late Bronze Age-Iron Age period are the hillforts of the uplands. There are currently seven sites within the Peak District on the Millstone Grit moorlands and the Carboniferous Limestone to which the term 'hillfort' is usually attached, and a further one on the Magnesian Limestone near Creswell. The hillforts or hilltop enclosures of the Peak District include a diverse set of enclosure-type monuments which are yet to be subjected to an in-depth and up to date synthetic study, with only very limited fieldwork taking place on a few of the monuments. Mam Tor was investigated during the period 1965-9 by the University of Manchester (Coombs and Thompson 1979). Targeted excavation on eight house platforms yielded a large assemblage of pottery probably dating to the Late Bronze Age-Early Iron Age. Two radiocarbon dates were obtained from unidentified charred wood relating to the house platforms which gave date ranges of 1700-1000 cal. BC and 1650 – 950 cal. BC respectively placing the occupation of the huts on the site in the later middle Bronze Age, although as the charred wood was not identified to species level it is possible that these dates suffer from an 'old wood' off set giving artificially early date for the activity being dated. A series of radiocarbon dates are awaited from a recent small-scale excavation at Fin Cop (Waddington in press and see below) and these should supply reliable radiocarbon dates on the hillfort occupation.

Excavations were undertaken on Ball Cross hillfort above Bakewell between 1952-5 (Stanley 1954), which yielded a pottery assemblage comparable to that at Mam Tor and also suggested that the bank of the hillfort had been comprehensively razed at the end of its use. Most recently, fieldwork was undertaken at the Gardom's Edge enclosure which sits on the Gritstone East Moors by the Peak District National Park Authority and Sheffield University. The fieldwork identified a substantial amount of Late Bronze Age-Early Iron Age pottery associated with 'house' sites within the enclosure (Barnatt et al 1995; 1996; 1997; 1998; 2000) as well as the sequence of construction of the enclosure bank. Radiocarbon dates have been acquired for several features but these await formal publication.

Recent excavations at the site of Fin Cop, which is one of only two hillforts on the Carboniferous Limestone along with Crane's Fort in Lathkill Dale near Over Haddon, have demonstrated the potential of investigation on these poorly-understood monuments. A programme of archival research, earthwork survey, geophysics, test-pitting and excavation produced highly informative results. In particular the excavation revealed a much greater level of preservation than could reasonably have been anticipated with ceramics surviving from approximately 0.2m below the surface in occupation layers undisturbed by the shallow ploughing of the site and good preservation of organic remains, including human skeletons, within the hillfort ditch deposits, on account of the alkaline bias of the soil chemistry which derives from the calcium carbonate parent material.

Evidence for the late Iron Age in the Peak District is scattered and sparse at best. Due to the lack of chronological control for the Iron Age period noted above, it is not yet possible to accurately state whether sites such as the hillforts were in use during this period or whether they date to an earlier period, or indeed whether sites such as the Romano-British settlement at Brushfield on the Carboniferous Limestone had their origins in the late Iron Age. Late Iron Age finds from Harborough Rocks (Makepeace 1990) attest to activity in the uplands though there is a lack of any other definitive evidence. The idea that has often been posited that the Iron Age in the Peak District was 'aceramic' is manifestly inaccurate and needs to dropped. Rather, there has been a lack of excavation on Iron Age sites and hence there are few finds of any sort for this period. Where late prehistoric sites have been excavated they

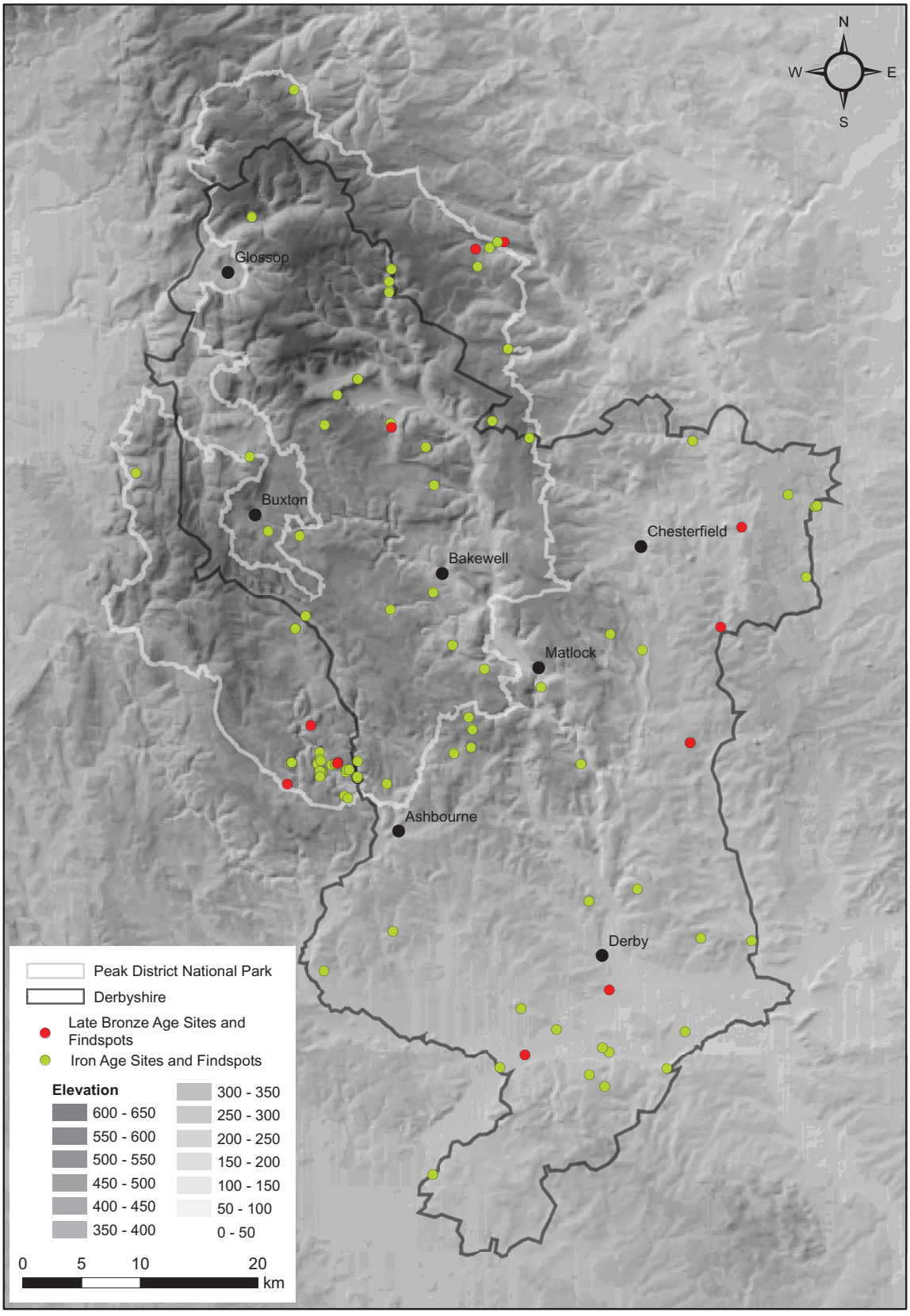

Figure 3.7 Distribution of known Late Bronze Age and Iron Age sites and findspots, which illustrates the dramatic drop off in numbers from the Neolithic and mid-Bronze Age.

Figure 3.8 The scarp-edge fort at Fin Cop on the Carboniferous Limestone. The fort encompasses an area of c. 4ha and is protected on the north and west sides by the steep scarp slope descending into the valley of the River Wye.

have produced late prehistoric ceramics in significant quantities and often from small-scale interventions. This has been shown to be the case at Mam Tor (Coombs and Thompson 1979), Ball Cross (Stanley 1954); Gardom's Edge (Barnatt et al.1995; 1996; 1997; 1998; 2000) and Fin Cop (Waddington in press). Study of the late prehistoric pottery from the region is long overdue and in particular more radiocarbon dates are required from late prehistoric ceramic residues as well analysis of the residues themselves. Work is currently being undertaken on fabric types by Kevin Cootes of Sheffield University as part of his PhD thesis (pers. comm.).

3.1.5 Romano-British (AD43-AD410)

The mineral wealth of the Peak District was no doubt a key reason for the Romans to expand their sphere of influence into the uplands. A network of Roman roads associated with the exploitation of mineral resources crosses the Peak, along with the military sites and settlements which accompany them. Within Derbyshire, the key sites are the Roman forts of Brough on Noe (Navio) and Melandra Castle (Ardotalia) at Glossop, the settlement of Buxton (Aquae Arnemetiae) and the lost site of Lutudarum.

Brough may represent one of the first 'bridgeheads' of the Roman advance into the Peak District as the later Antonine fort was preceded by a Flavian fort dating to the period AD75-120 (Hart 1981, 83) which corresponds with the advances of Cerealis and later Agricola into the north. Following the Antonine rebuilding, the fort was occupied until the mid 4th century (Jones 1967) and it is probable that this represented a key military installation controlling the trade routes in and out of the uplands. The vicus that extended for some distance outside the fort is one of the most comprehensively excavated vici in the Roman Empire (see Bishop et al 1993). The Roman road known as 'Doctor's Gate' linked Brough with Melandra Castle which sits on the edge of the Peak District in the modern housing estate of Gamesley, a part of Glossop, and would have originally guarded the routeways north and west to the forts and settlements at Manchester (Mamucium) and Castleshaw (Rigodunum). To the east the Roman fort at Brough is likely to have been connected to a Roman fort in Sheffield, perhaps below the site of the medieval castle which produced a few sherds of Roman pottery during limited excavations in the 1920s (Armstrong 1930) and on to the Roman fort that guarded the crossing of the Don at Templeborough (May 1922). Little is known of Roman Buxton as no structural evidence for a fort has been uncovered but it is known from the Latin name Aquae Arnemetiae that this was a spa town which developed around a previous 'Celtic' sacred spring, and this was confirmed by the recovery of

a huge amount of Roman period votive deposits during renovation work to a bath house in 1975 (Hart 1981, 94).

The lost 'site' of Lutudarum is known from the stamping of lead pigs which have been found across the Roman Empire as far away as Syria and Libya. While a number of possible sites have been postulated (Lane 1986), the balance of evidence would suggest a location near Carsington, which is still within the orefield. A Roman road from Buxton to the fort and town at Little Chester (Derventio) in Derby would pass through this area, and there are scattered small finds also known from the vicinity (Hart 1981).

There are a number of well-attested sites and field systems which appear to be the archaeological footprint of the native population during the Romano-British period in the uplands of the Peak District although these sites are relatively few and most survive in 'marginal' locations on account of the upstanding remains having escaped the ravages of the plough and 'improvement' during medieval and later times. While there has been little investigation of such sites, the publications by both Hart (1981) and Makepeace (1998) contain descriptive surveys of the known remains. There have also been more recent detailed surveys of upland sites by the Peak District National Park Authority as part of the Moors For the Future Project, and while these surveys are not formally published, they exist as grey literature reports available from the Moors for the Future website, and formed the basis for Sheffield's Golden Frame (Bevan 2007).

3.1.6 Early medieval (AD410-AD1066)

The evidence for early medieval settlement is very thin for the upland areas of Derbyshire and the Peak District, with the archaeological record typified by burials in barrows. It was generally supposed that the uplands were a sparsely settled area during at least the early part of the early medieval period, until the dominion of Mercia extended northwards. It has been more recently suggested, however, that the uplands of the Carboniferous Limestone plateau may have been more heavily settled and have more in common with the fertile lands of the Trent Valley than had been previously supposed (Collis 1983; Jones 1997). It is possible that the lack of known settlement is due to gaps in the archaeological record caused by issues of landscape taphonomy (i.e. later ploughing and 'improvement') rather than resulting from an avoidance of the area by Anglo-Saxon groups. Indeed the early settlement of the area in early medieval times is suggested quite forcefully on account of the presence of pagan Anglo-Saxon barrow burials such as Benty Grange (Bateman 1848) and the heavily Anglo-Saxon place-names of the region, of which many have early compounds, such as topographical names referring to say springs (place names ending in 'well' such as Bakewell) or heathland (place-names ending in 'feld' or 'field' such as 'Brushfield') (see Gelling 1978, 1997 edition).

The 7th century Tribal Hidage records the Peak District as being the kingdom of the Pecsaetan or 'Peak Dwellers' during the early medieval period and it has been argued that the barrow burials are the main archaeological footprint of these people who may have been in origin Brittonic, a sub-group of the Anglian invaders, or a mix of the two (Fowler 1954; Linton 1956; Ozanne 1963). It is supposed that the Peak District only became fully absorbed into the Kingdom of Mercia by the end of the 8th century (Barnatt 1996, 84), although it may have become a buffer state between Mercia and Northumbria as suggested by the later accession of Uhtred of Northumbria as an Earl in the lands of the Pecsaetan and which could explain why many of the Bakewell sculptures are in the Northumbrian style (Stetka 2001). There are between 38 and 63 Anglian-period barrow burials known from the Peak District with around 20 from purpose-built Anglian period barrows, and a further 20 as insertions in earlier barrows, with the rest of uncertain origin (Barnatt 1996, 57). The practice of insertion into earlier barrows may represent either the appropriation of local ancestral remains, a practice well known in other areas such as Bernicia (Scull and Harding 1990), a continuation of a tradition by native peoples stretching back many thousands of years, or a combination of the two.

Aside from the barrow burials from this period, relatively few archaeological remains are known. The Grey Ditch at Bradwell is a linear boundary feature which overlies a Roman-era ploughsoil deposit and appears to have been erected in the immediate post-Roman period to possibly delimit a territory or bar a routeway (Guilbert and Taylor 1992). A small triangular post-built structure at Dale View Quarry returned four radiocarbon dates which showed that the structure most likely belonged to the period cal. AD 550-650, suggesting that there was some form of occupation in the uplands contemporary with a number of barrow burials (Brightman and Waddington in press). So far there is no evidence for Grubenhauser known from the Peak District and the search for such features remains an important objective, particularly if they can be revealed on aerial photographs as they are doing so in increasing numbers throughout northern England and south-east Scotland.

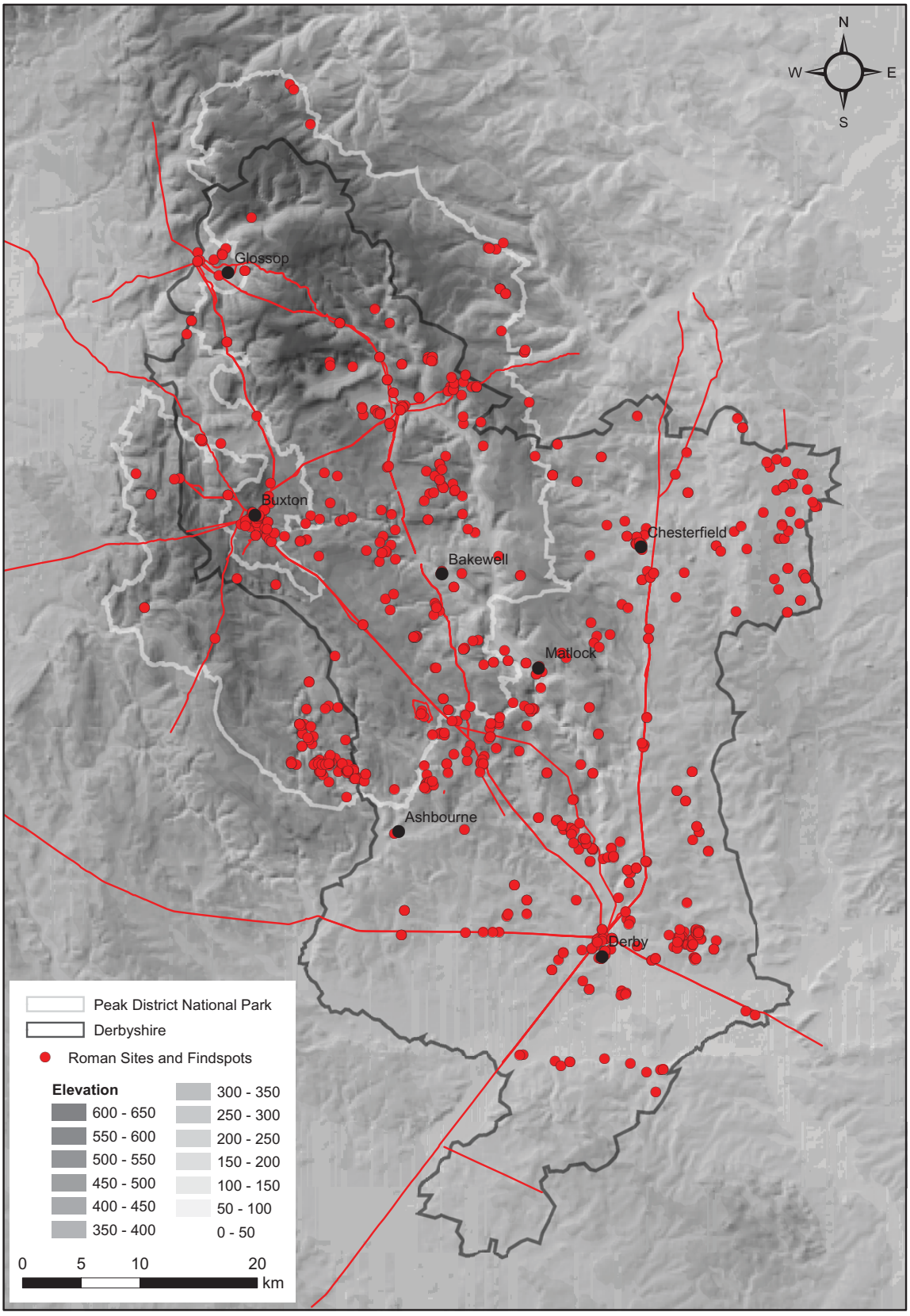

Figure 3.9 Distribution of Roman period findspots and sites and the known Roman road network.

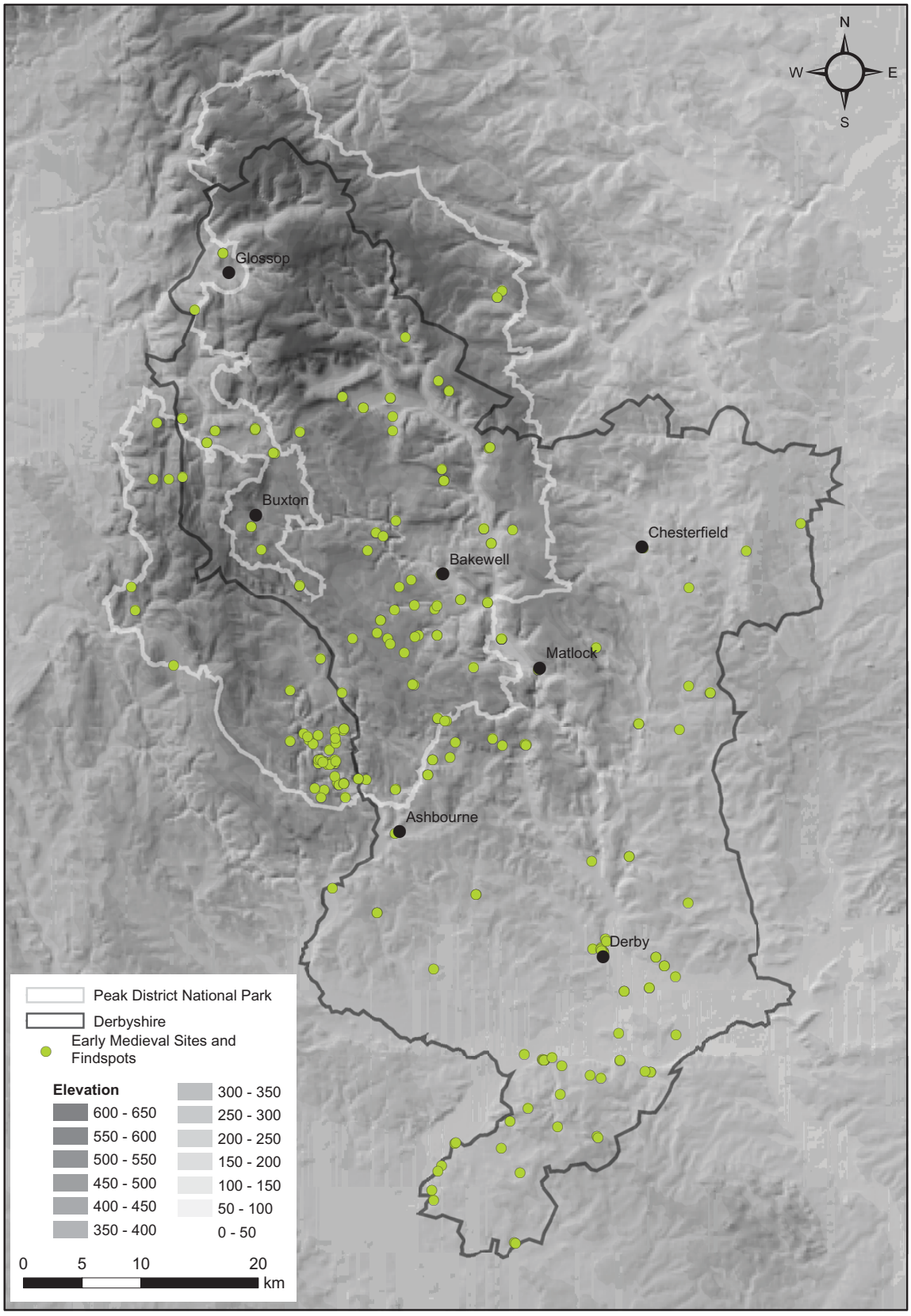

Figure 3.10 Distribution of known early medieval archaeological sites and findspots. Note the sparse nature of the archaeological record for this period in comparison to the preceding and succeeding periods.

Alongside the barrows, probably the most significant corpus of evidence for the later early medieval period is the Anglo-Saxon and Anglo-Scandinavian stonework. Stone crosses are known from Bakewell (mentioned above), Eyam and Wirksworth. The volume of work known from Bakewell and its environs has led to the suggestion that there was a group of sculptors based there (Cramp 1977). The North Derbyshire sculpture work is summarised in Hart (1981) and the full corpus will be published as part of the 'Corpus of Anglo Saxon Stone Sculpture Project' (Hawkes and Sidebottom in prep.). There are also suggestions of surviving Anglo-Saxon fabric in the walls of several churches including the ostensibly 'Norman' church in Bakewell.

3.1.7 Medieval/Middle Ages (AD1066-c.AD1700)

In general the archaeological resource for Derbyshire and the Peak District in the medieval period can be divided into four broad categories. There are the landscape-scale sites such as deserted and shrunken villages and their associated agricultural footprints, there are the large foundations such as monastic granges, halls and parks, there are industrial sites, and lastly there are the urban centres and market towns.

Examples of 'open field' systems and ridge and furrow cultivation can be seen across the Derbyshire uplands. The finest examples of such relict landscapes are listed by Hart (1981, 129) at Wensley, Snitterton, Matlock, Priestcliffe-Taddington, Bakewell, Hopping Farm – Middleton and Smerrill. Many of the large agricultural landscapes survive because they are attached to either Shrunken or Deserted Medieval Villages (SMVs and DMVs respectively). On the Magnesian Limestone there are three known DMVs and two SMVs; on the Coal Measures there are three DMVs and three SMVs; on the East Moors there are seven DMVs and two SMVs, and on the Carboniferous Limestone of the White Peak, there are 19 DMVs and a further 20 SMVs (Hart 1981, 128). This displays a depopulation of the rural landscape during the medieval period; one which continued in the following centuries with the improvement and enclosure of farmland, and ultimately the growth of urban centres and the aggregation of population in the Industrial period.

Manorial centres and granges are known from a number of sites across the uplands, with little preference for geological type, with a further 14 known moated sites listed within North Derbyshire by Hart (1981, 149). By and large granges or their associated enclosures are still visible in some form as earthworks and can be readily identified. The most imposing monuments of the medieval period are the existing castle sites. Some sites such as Castle Hill at Stoney Middleton are little more than the original defensive ringwork with little trace of any original buildings. Pilsbury Castle, near Hartington, however is a superb example of a motte and bailey castle which stands over the routeway formed by the River Dove. Of the known castles in Derbyshire, only two were maintained as defensive works and developed with stone construction: Bolsover and Castleton, although the fortified manors at Haddon Hall and South Wingfield still have imposing and defendable circuits. Bolsover castle is, in its current form, largely a 17th century rebuild (Faulkner 1972), however earlier remains show that it originally comprised a large motte enclosure and smaller inner enclosure on the Magnesian Limestone ridge (Hart 1977). Peveril Castle perched on a precipitous Carboniferous Limestone outcrop above Castleton at the head of the Hope Valley consists of a walled bailey and small stone keep constructed shortly after 1155 (Colvin 1963). The planned Norman town of Castleton which lies below Peveril Castle was also defended by a bank and ditch circuit, remains of which are still upstanding and visible today.

Local industry was widespread in the Peak District. The readily-noticed lunar landscapes left by lead mining largely date in many cases to the post-medieval period, but the exploitation of mineral and stone wealth was widespread through the medieval-Middle Ages period, though probably on a smaller scale. Many landowners and farmers would supplement their agricultural work by undertaking local mining or quarrying on their land. The boom in construction in the medieval period, particularly for monastic or other ecclesiastical buildings, required a steady supply of lead and there are records relating to large workings. For the period 1216-1249, Tideslow Mine on Tideslow Moor produced 350-450 loads per annum (Ford and Rieuwerts 2000, 20) which indicates a sizeable operation. The Domesday Book records that there was significant production at Ashford, Bakewell, Matlock, Wirksworth and Crich, with some earlier extraction at Hope (Barnatt and Penny 2004, 2.9).

The natural resources of the Coal Measures were also being exploited during this period. Small 'bell pits', which are the remains of small-scale coal-winning, can be seen across the area with some of the best examples from Staveley and Barlborough (Hart 1981, 136) on the east side of the county. The quality of the local clays and the natural occurrence of ironstone within the clay also accounts for the scattering of potteries and ironworking sites across the eastern portions of the county (Hart 1981, 136).

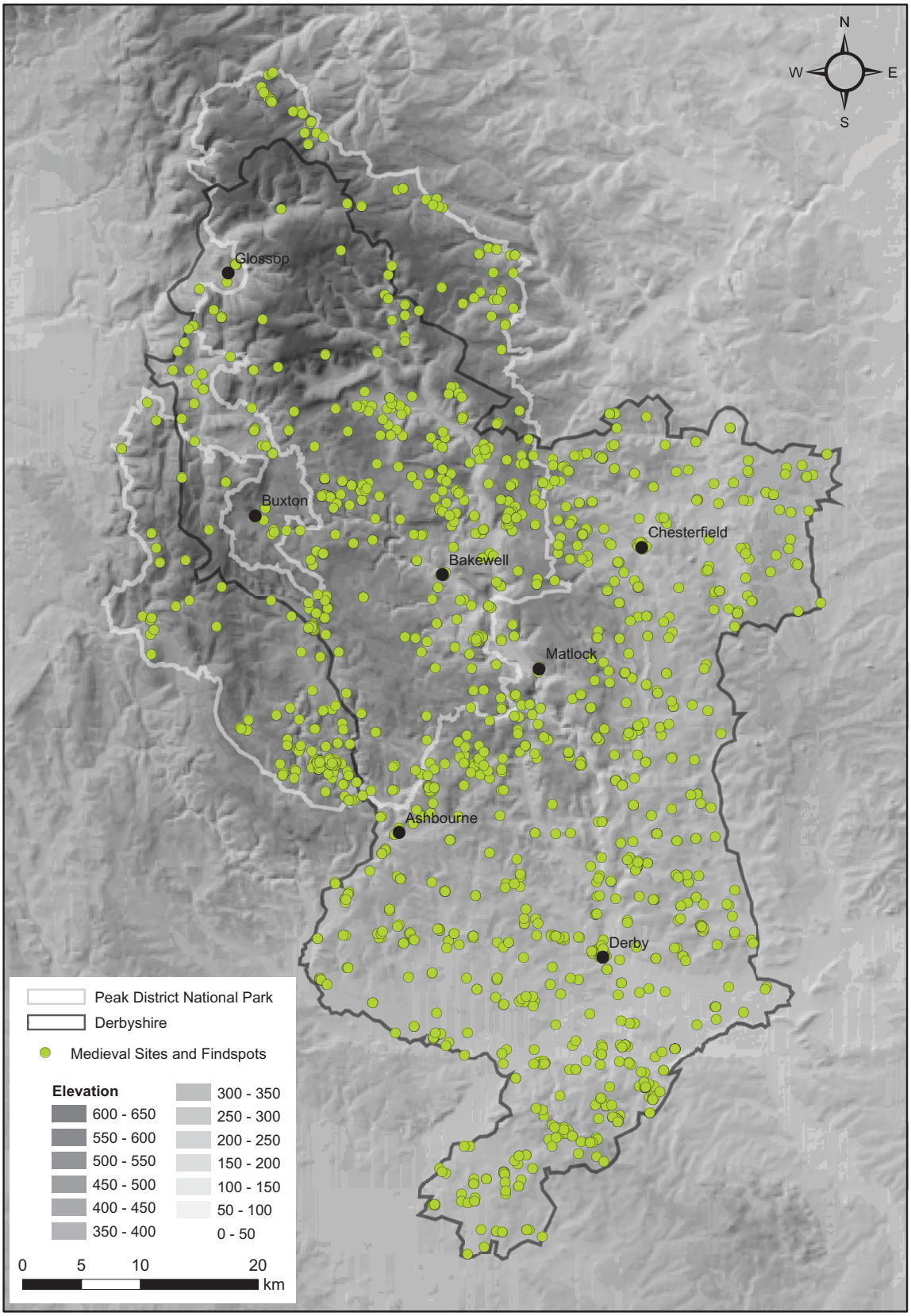

Figure 3.11 Distribution of medieval sites and findspots illustrating the scarcity of known remains in the northern Peak District uplands in comparison to the lower-lying areas and river valleys.

The medieval market towns and villages of north Derbyshire are the forerunners of the principal modern towns of the area, and are relatively well spread across the region. Market charters are known to have been granted to: Glossop, Charlesworth, Castleton, Chapel-en-le-Frith, Tideswell, Bakewell, Monyash, Hartington, Wirksworth, Ashbourne, Chesterfield, Bolsover, Pleasley and Higham (Coates 1965; Hart 1981, 138). Due to the lack of major development in the Peak District National Park area and much of the surrounding uplands, the villages and smaller towns preserve a great deal of the original medieval street layouts, whereas in some of the larger urban centres, such as Chesterfield and Glossop, larger-scale development means there is less of the medieval core remaining.

3.1.8 Post-Medieval – Modern (c.AD1700-present day)

The story of the Peak District and Derbyshire uplands in the post-medieval period is intimately tied to the Industrial Revolution and the harnessing of the natural resources of the region. The archaeological resource of the Peak District uplands in the post-medieval period can be divided into two fairly loose categories. Firstly there are the upstanding buildings such as the mills, and also known sites of previous buildings, and secondly there are the earthwork remains of agricultural change and large-scale industrial practices, most evidently the lead rakes which criss-cross the Carboniferous Limestone areas.

Due to the harnessing of the natural water power that issues from the valleys draining the Peak District uplands, Derbyshire became one of the crucibles of the Industrial Revolution with the construction of some of the earliest textile mills. The Derwent Valley Mills reach from Litton and Cressbrook in the upper Wye valley down to Bakewell, Matlock Bath, Cromford and Belper to Derby, encompassing Arkwright's first mills at Cromford. The mills of the Derwent Valley have been designated as a UNESCO World Heritage Site due to their place in the birth of the factory system and industrialisation.

The exploitation of the natural resources reached its zenith during the post-medieval and Industrial periods. The greatest levels of lead extraction from the veins within the Carboniferous Limestone date to this period (Ford and Rieuwerts 2000; Barnatt and Penny 2004) and the marks left on the landscape by this industry are still highly visible today. With the advent of industrial processes, the demand for coal from the Pennine Coal Measures in the east of the county grew greatly also, and there are still many former colliery buildings standing. Indeed much of the modern landscape of the east of Derbyshire originated in the post-medieval period with, for example, the model worker's village at Creswell standing as testament to a lost period of prosperity based on the natural wealth supplied by the region's geology, and to the provision made by mine owners for their workforce, represented as philanthropic but also reflecting self-interest in keeping the workforce fit and productive.

The final part of the archaeological resource to note for this period, is the railway network and its associated buildings, constructed in order to enable transportation of goods to the emerging urban centres. The Cromford and High Peak Railway is the most notable of the many branches which run across the uplands as it was conceived for the purpose of industrial transportation. It opened in 1830-1 and was an ambitious project which included steam-powered winches at each incline to circumvent the lack of power in the locomotives, and in some cases horse-drawn carriages, which used the line (Rimmer 1985). These railway lines, and also waggonways, are especially well-preserved within the Peak District landscape and form arteries around which early industry aggregated. Lime kilns, brick kilns and stone quarries amongst other types of industry, built up along the line of the High Peak railway allowing the mineral wealth of the Peak District to be rapidly transported to urban centres across Britain. The construction of the railway eclipsed the use of canals and the Cromford canal was ultimately a short-lived enterprise. Despite this, the canal systems in and around the Peak District are an evident fingerprint of the post-medieval period, with perhaps the most obvious feature still visible being the large canal basins (e.g. Bugsworth and Whaley Bridge) around the Peak District fringe which allowed the easier export of the mineral wealth.

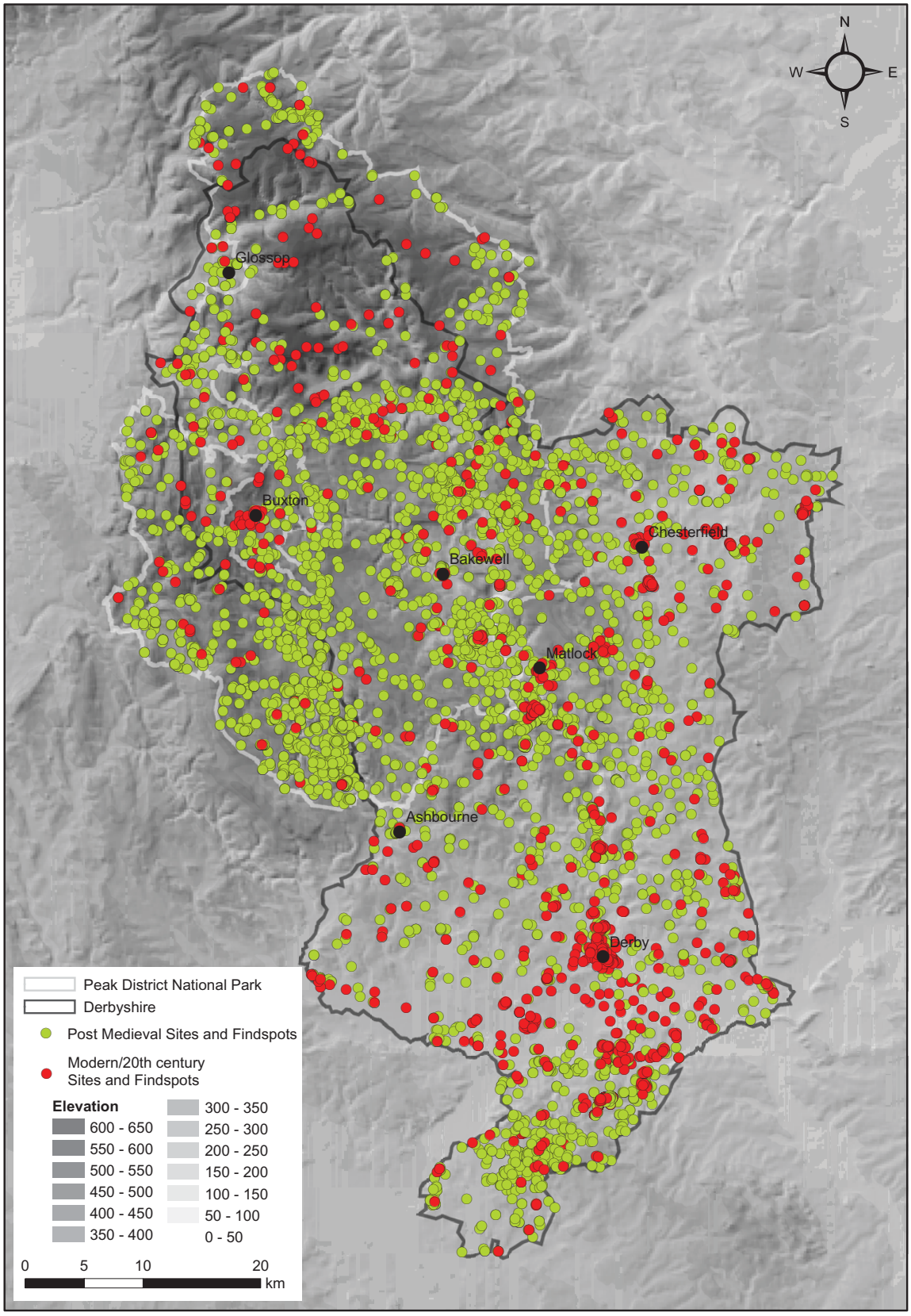

Figure 3.12 Distribution of post-medieval and modern sites.

3.2 The Lowlands and Trent Valley

3.2.1 Palaeolithic (-c.8000BC) and Mesolithic (c.8000BC-3900BC) (see Fig. 3.2 above)

The Palaeolithic and Mesolithic archaeological record for the lowland areas of the county is almost entirely composed of lithics removed from their original context, whether as chance finds, such as the recorded microlith found in a garden in Alvaston (MDR8462) for example, or as parts of lithic assemblages from fieldwalking or residual finds on later sites, such as the Mercia Marina site near Willington (Brightman and Waddington forthcoming), which also had a tree-throw feature of possible Mesolithic origin. Palaeolithic finds recorded in the HER and NMR originate from the sand and gravel substratum and are therefore significantly removed from their original context, providing evidence for Palaeolithic activity further up the river catchment from where they have been transported after their original discard (for example the Acheulian handaxes from the Trent Gravels near Willington and Egginton – NMR 310138 and 310160).

The lack of good evidence for Mesolithic occupation in the river valleys need not mean that there is a real pattern of preference for upland settlement in the millennia following the last ice age. A bias of fieldwork towards the readily-identifiable cave sites of the Peak District, coupled with the relative 'fluidity' of the low-lying landscapes of the Trent Valley means that many potential Mesolithic sites in the Trent Valley and other low-lying areas may have become obscured through alluviation or have never been prospected for in the first place. There have been noticeably few systematic fieldwalking campaigns across the Coal measures and the Trent Valley gravels for instance. It is noted by Knight and Howard (2004, 35) that recent fieldwork has demonstrated a much higher density of Mesolithic finds, and therefore potential sites, than had previously been thought due to the dramatic increase in developer-funded work since 1990.

One site of note is Swarkestone Lowes (Elliott and Knight 1999) which produced a major concentration of Early Mesolithic stone tools and debitage with the raw materials derived from local and regional sources. The site sits on a gravel bluff above the River Trent and has been interpreted as a centre for tool production.

3.2.2 Neolithic (3900BC-2200BC) – Early to Middle Bronze Age (2200BC-1200BC) (see Fig. 3.5 above)

The transition to a farming economy in the Neolithic period saw great changes within the lowlands, and especially the Trent Valley and its tributaries. As with other river valleys across Britain, the Trent became a focus for settlement and ritual, as shown by the discovery of timber buildings, midden pits and the construction of ceremonial monuments such as cursuses and wooden post circles and other arrangements. Through into the Early Bronze Age, the principal archaeological footprints are the funerary monuments of this period, although continued open area excavation is likely to produce evidence for settlement structures which remain elusive on both aerial photographs as well as in geophysical surveys.

Known Early Neolithic settlement is confined to the area around Willington in the Trent Valley. At Mercia Marina, Willington, midden pits containing Early Neolithic Carinated Bowl and plain pottery were excavated (Brightman and Waddington forthcoming). The Mercia Marina site shows parallels of settlement preference with the adjacent area of Hill Farm (Hughes and Jones 2001) as well as the nearby Willington Quarry site (Wheeler 1979; Beamish 2001; 2009), the latter of which produced evidence for trapezoidal structures associated with later Neolithic Grooved Ware pottery. This pattern is also evident on similar sites further afield such as Cheviot Quarry (Johnson and Waddington 2009) and Lanton Quarry (Stafford 2007) which are all on sand and gravel river terraces close to major river courses. All these sites featured groups of midden pits containing Early Neolithic Carinated Bowl pottery that indicates a preference for free-draining, fertile river valley locations, which has been noted for other areas of Britain at this time, such as East Anglia (Garrow 2007) and central southern England (e.g. Gardiner 1984; Ford 1987; Thomas 1999).

Two cursus monuments are known from aerial photography and field investigation at Aston-upon-Trent (Elliott and Garton 1995; Gibson and Loveday 1989; Reaney 1968) and at Potlock (Findern) to the south-east of the Willington Marina site (Guilbert 1996; Wheeler 1970). The excavations at Aston upon Trent (Reaney 1968) uncovered Early Neolithic Carinated Bowl pottery similar to that found at Mercia Marina.

The Neolithic settlement at Willington Quarry was primarily later Neolithic (Wheeler 1979) with large amounts of Impressed Ware pottery excavated along with the footprints of post-built buildings, and a single pit feature at the Mercia Marina site also yielded Impressed Ware pottery (Brightman and Waddington forthcoming).

During the period of the Later Neolithic-Early Bronze Age transition, the known archaeological record comprises almost entirely burial and funerary monuments. Along with the Neolithic occupation already discussed, both the Mercia Marina (Brightman and Waddington forthcoming) and Willington Quarry site (Wheeler 1979) also contained Bronze Age 'barrows' or ring ditch funerary monuments. More recent excavations at the Willington Quarry site have revealed more prehistoric features, including pits, and two burnt mounds with a potentially Late Neolithic/ Early Bronze Age date (Beamish 2001, 9-10; 2009). At Mercia Marina, two ring ditches, one containing a pit with at least two cremation insertions, were contemporary with a number of triangular posthole structures. The Bronze Age activity on the site was shown through Radiocarbon dating to all be roughly contemporary and in the approximate period 1940-1850 cal. BC (modelled posterior density estimate). The Mercia Marina site poses the possibility that there was contemporaneous settlement and funerary activity on the site, as has been postulated for the upland Bronze Age landscape (Barnatt 1996).

A number of enigmatic 'burnt mounds' have been discovered in the Trent Valley and these are thought to date to the Beaker and Bronze Age periods. Until recently, it was supposed that burnt mounds were primarily an upland phenomenon, but a number of sites are now known from the Trent Valley including Willington Quarry (Beamish 2009 noted above). The function of burnt mounds has been intensely debated with possible interpretations ranging from domestic food preparation sites, industrial sites to ritual saunas or 'sweat lodges'. For a full discussion see Buckley (1990) and Hodder and Barfield (1991).

The multi-period site at Swarkestone Lowes (noted above for its Mesolithic component) contains upstanding barrows (Posnansky 1955) but has also yielded an occupation site contemporary with Beaker pottery, pre-dating a ring ditch (Greenfield 1960). The relative lack of known Beaker burials remains a conundrum, but as many Beaker burials occur as 'flat graves' it is likely that more will come to light during open area excavations on the sand and gravel terraces.

3.2.3 Late Bronze Age (1200BC-700BC) – Iron Age (700BC-AD43) (see Fig. 3.7 above)

In the Middle Bronze Age little is known concerning settlement, with the archaeological record comprising almost entirely material culture. The best-preserved finds are the two Aston logboats recovered from organic deposits within the gravels south-east of Derby (Clay 2006). At Mercia Marina (Brightman and Waddington in press a) a single pit was excavated containing Middle Bronze Age Deverel-Rimbury ceramics, and at Willington Quarry, a small amount of pottery in the overall assemblage suggested that there was activity on the site during the Middle Bronze Age (Wheeler 1979). However, this remains a very poorly understood period in the prehistoric settlement sequence in this area and any finds of this period have the ability to contribute significantly to current understanding of this period.

Later Bronze Age and Iron Age excavated remains in the lowlands of Derbyshire are also relatively scarce. A post-built roundhouse was excavated at the Swarkestone Lowes site (Elliott and Knight 1999; Guilbert and Elliott 1999), whilst roundhouses and linear boundary features were discovered at Willington Quarry in the early 1970s (Wheeler 1979). A pit alignment and a number of linear boundary features were sampled at Mercia Marina, Willington (Brightman and Waddington forthcoming) but no definitive evidence was found to tie them to the Late Bronze Age – Iron Age period. In form, however the features resembled pit alignments and boundaries known from Swarkestone Lowes (Knight and Morris 1997; Elliott and Knight 1999) and Aston Hill (Abbott and Garton 1995). During the later Iron Age, there are 'farmsteads' and enclosures known from the Trent Valley outside Derbyshire, but within Derbyshire, only the sites at Chapel Farm, Hemmington (Knight and Malone 1997; 1998) and Little Hay Grange Farm, Ockbrook (Palfreyman 2001) are definitely known, with a possible site at Borough Hill, Walton-on-Trent (Challis and Harding 1975; Hogg 1979).

Whilst there has been little excavated dating to this period, there are a large number of cropmark sites known from along the Trent Valley and in the Derbyshire lowlands, and it is entirely reasonable to postulate that many of these may date to this later prehistoric period. There is an important need to understand the date, form, purpose and conditions of preservation of many of these cropmark sites and evaluating such sites remains an important priority.

3.2.4 Romano-British (AD43-AD410) (see Fig. 3.9 above)

As with the uplands during the Romano-British period, the Trent Valley and the areas around Derby appear to be reasonably heavily settled.

The Roman military presence in the Trent Valley and south Derbyshire appears to be established in the AD50s with construction known at Strutts Park, Derby, and Chesterfield (CARC 1973; Courtney 1975; Ellis 1989). Continuing from this, the major period of consolidation and further construction is during the Flavian period around AD70. At this time the fort at Little Chester north of Derby was constructed (Brassington 1967; 1982; 1982a; 1993; 1996; 1997; Dool and Wheeler 1985; Todd 1967; Webster 1961; Williams 1991; Shakarian in press) along with the other large military settlements at Brough on Noe and Melandra Castle discussed above. It is likely that the Roman settlement at Chesterfield was also founded during this initial advance (Hart 1981, 87). The Romano-British period may represent one of the few periods of history where the archaeological record of the lowlands is directly tied to that of the uplands. As with other areas of the country, the 'imposed' Roman infrastructure is part of a coherent whole, and in Derbyshire, the attraction of the lowlands may lie in the value of the Trent as a route of transportation, which complements the attraction of the neighbouring uplands for the exploitation of natural resources. However, there is no evidence yet that the Derbyshire uplands were incorporated under Roman dominion until the northern advance of Cerealis into the lands of the Brigantes and therefore the limit of Roman Empire may have been drawn across the northern side of the Trent valley from east to west with the Peak District excluded from the early limit of the Roman province.

There are a number of known Romano-British sites, predominantly from chance finds or as part of larger fieldwalking programmes. A few enclosure sites are known and these are clustered together to the north-east of Derby close to the fort and settlement at Little Chester. These include the site of a villa at Little Hay, an enclosure settlement on Giant's Hill, and a rectilinear enclosure to the north of Ockbrook, along with a scatter of artefacts identified through fieldwalking. Added to these, the Willington Quarry site also contained the remains of two Romano-British farmsteads (Wheeler 1979) on the gravel terraces above the Trent.

3.2.5 Early Medieval (AD410-AD1066) (see Fig. 3.10 above)

During the early medieval period, the south of Derbyshire and the Trent Valley was in the heartland of the kingdom of Mercia, which during the height of its power in the late 8th century encompassed an area from the Welsh border to East Anglia, and from the Humber almost to the south coast of England and including London (Hill 1981, 31). The church at Repton, with its surviving Anglo-Saxon crypt, was one of the key religious centres of the kingdom together with the short-lived archbishopric based at Lichfield, and the surrounding area was also a royal centre for many years. The crypt at Repton forms one of the best-preserved Anglo-Saxon period crypts in the country, together with the one below Hexham Abbey in Northumberland, and its finely detailed stone columns provide testament to the stone-working traditions of the Anglo-Saxons which has all too often remained under-stated. A number of other churches, such as St. Michael's at Stanton-by-Bridge are known to have their origins in the early medieval period, and, as with the uplands, there is a considerable corpus of stone sculpture work known to date to this period.

Whilst there is a noticeable lack of large Anglo-Saxon cemeteries from the Derbyshire lowlands, with the exception of King's Wood in the south-east of the county, other counties in the East Midlands along the course of the Trent Valley are comparatively rich in Anglian burials (Vince 2006, 169). The contrast in burial practices between the uplands and lowlands may well indicate the route of advance of the early settlers up the arterial river valleys from the east, and lends credence to the idea that the upland Pecsaetan are perhaps of different or native ethnic stock to the groups that inhabited the Mercian heartlands via the Trent Valley. As with the uplands, however, the Trent Valley does contain examples of Anglian insertions into earlier prehistoric burial mounds such as those at Swarkestone Lowes (Posnansky 1955) and Borrowash (Knight and Howard 2004, 163), which suggests the recognition and appropriation of important ancient sites as previously mentioned.

The archaeological resource for early medieval settlement in the lowlands of the county is based on only a few excavated sites. At Willington Quarry, three widely dispersed grubenhauser (small earthfast structures commonly thought to have an industrial purpose and also known as 'Sunken-Featured Buildings) and a number of scattered postholes have been ascribed to the early Anglian period during the 6th century (Wheeler 1979), while at Catholme, in the extreme south of the county, a later Anglo-Saxon settlement is known (Losco-Bradley and Kinsley 2002).

The Scandinavian invasions of the late ninth century onwards subjugated the entirety of the lowlands of Derbyshire controlled from the centre at Derby, which is one of the reasons for the modern pre-eminence of Derby as the county town (Lewis 2006, 185) and the 'by' suffix. There are scattered findspots known from the Anglo-Scandinavian period, though very little settlement evidence outside the known semi-urban areas. The only known Scandinavian cremation cemetery in the British Isles lies at Heath Wood, Ingleby, where excavations have suggested that it could house the remains of the dead from the Great Army of AD 873-8 (Richards 2004).

3.2.6 Medieval/Middle Ages (AD1066-c.AD1700) (see Fig. 3.11 above)

As with the upland landscape, the archaeological resource for the medieval period is larger than for previous periods, and can be more easily determined through analysis of landscape, in particular the relict field systems and remains of ridge and furrow cultivation. Rural medieval sites are known at Ambaston and Church Wilne on the Trent (Knight and Howard 1994, 104). Limited work was undertaken at the site of Sinfin though this is unpublished (Knight and Howard 2004, 172). The contraction of rural settlement in the later 14th century is attested by shrunken and deserted villages and relict agricultural landscapes in a similar manner to the uplands.

The Trent Valley landscape houses a number of great ecclesiastical foundations as well as secular halls and parks. The Augustinian monastic foundation at Calke Abbey has extensive lands attached, though the hall which now stands on the site is a 16th century secular building. Another Augustinian priory is known from Church Gresley, which, when considered alongside the wealth of field systems visible from aerial photography describes a picture of intense settlement within the Derbyshire reaches of the Trent Valley. Excavated monastic sites include: the Augustinian foundation at Dale Abbey excavated in 1898 by the newly formed Derbyshire Archaeological and Natural History Society (Page 1907); Darley Abbey, north of Derby city centre, which became one of the most important Abbeys in the Midlands, and has been the subject of a number of investigations, although the exact location of the abbey buildings is now lost (Robinson 2001; Shakarian 2008); the ecclesiastical centre at Repton continued in use through the medieval period, though diminished in status in comparison to the metropolitan sees of the emerging urban centres, such as Derby which housed Benedictine nuns, Augustinian and Cluniac cells and two monastic hospitals (Lewis 2006, 199).

In contrast to the industry of the uplands, which was largely based on the extraction and processing of minerals and the exploitation of its natural resources, the medieval period saw the dramatic increase of pottery manufacturing as the dominant industry in the area (see Spavold and Brown 2005; Boyle and Rowlandson 2009).

3.2.7 Post-Medieval – Modern (c.AD1700-present day) (see Fig. 3.12 above)

As with the uplands in the post-medieval and Industrial periods, the archaeological record is dominated by large-scale, though often gradual, change in the agrarian landscape and a growth in the size and reach of urban centres. The enclosure acts of the 18th century replaced much of the medieval farming landscape and laid the foundations for the countryside visible today across much of the Trent Valley.

Industry in the Trent Valley and the Derbyshire lowlands, as in the medieval period, was centred on the ceramics industry. In south Derbyshire the area around Ticknall is of particular importance with 28 kiln sites currently identified (Spavold and Brown 2005). Excavation of the remains of a bottle kiln at Ticknall has recently added new information to an area of research which is largely based on field observation and survey (Shakarian 2008a).

From the point of view of aggregate extraction, the archaeological record for the post-medieval period is perhaps less important to this study than the more ephemeral remains of earlier periods, as in many cases the archaeological resource for this period consists of still-visible upstanding buildings, or locations known through documentary or other evidence. This should, however, not diminish the overall importance of the industrial heritage in telling the story of the region, and where sites of particular importance can be identified, these are noted in the appropriate chapter for the landform element upon which they stand.

3.3 Relative Site Densities

	1a	1c	1d	1e	1f	1g	1i	1k	2a	2b.	2d	3a	3c	Mean
Pal/Mes	0.08	0.46	0.25	0	0.21	0.01	0.05	0.06	0.03	0.06	0.03	0.03	0.31	0.12
Neolithic	0.57	0.26	1.56	0.02	0.11	0.15	0.05	0.05	0.02	0.13	0.13	0.06	0.05	0.24
Bronze Age	1.47	0.21	0.8	0.09	0.75	0.33	0.29	0.09	0.3	0.43	0.26	0.12	0.11	0.40
Iron Age	0.13	0.04	0.05	0.05	0.03	0.01	0.02	0.04	0.02	0.02	0.19	0.03	0	0.05
Romano-British	0.94	0.68	0.95	0.19	0.24	0.43	0.05	0.37	0.37	0.48	0.35	0.46	0.04	0.43
Early Med.	0.21	0.01	0.2	0.15	0.02	0.09	0.03	0.03	0.05	0.05	0.12	0.05	0	0.08
Medieval	1.4	0.61	1.51	1.7	0.38	0.82	0.75	1.31	0.98	1.01	2.3	1.51	0.07	1.10
Post-med - Modern	5.61	2.26	10.1	5.29	1.03	4.79	2.62	1.8	2.59	2.1	2.69	2.89	0.25	3.39
Multi-period	1.28	1.41	1.36	-	0.03	0.1	0.04	0.13	0.03	0.03	0.01	0.03	0.01	0.37
Unknown	-	1.12	-	0.4	0.37	0.35	0.23	0.19	0.31	0.3	1.07	0.68	0.11	0.47
Overall Density	**11.68**	**7.06**	**16.73**	**7.89**	**3.17**	**7.07**	**4.11**	**4.08**	**4.7**	**4.66**	**7.15**	**5.85**	**0.93**	**6.54**

Table 3.1 Relative site densities across all landforms by period, in comparison to an average (mean) for the whole study area. This table relates to those in each landform assessment chapter which break down the period by period analysis to types of site. Landforms: 1a – Carboniferous Limestone, 1c – Magnesian Limestone, 1d – Basaltic, lava, 1e – Sandstones, 1f – Millstone Grit, 1g – Shales and siltstones, 1i – Coal Measures, 1k – Mudstones, 2a – Till, 2b – Undifferentiated drift deposits, 2d – Sand and gravel terraces, 3a – Alluvium, 3c – Peat.

Table 3.1 above provides further context to the discussion of general period-by-period distributions above and relates to the individual landform assessments in the following chapters. Carboniferous Limestone has a substantially higher density of sites overall, with the individual densities for all periods except for the Palaeolithic and Mesolithic higher than the study area mean. From the Neolithic through to the Mesolithic period these are substantially higher than the mean. It should be noted that the densities for landform 1d are artificially skewed by the substantial number of large sites which span across the Carboniferous Limestone and the lava beds (1d) in relation to the very small total surface area. Whilst the site densities for sandstones (1e) and shales (1g) are also higher than the mean total density of 6.54 for the study area, it is the density for the sand and gravel terraces (2d) which is of most interest. Sand and gravel terraces are of particular interest to this assessment, as this landform is highly sensitive archaeologically and also represents a key reserve of aggregates. The two density figures which are of particular interest for landform 2d are those for Iron Age and Unknown Date, as these are both noticeably higher than the mean figures for these periods and predominantly represent cropmark enclosures – a sensitive and poorly-understood form of archaeological feature.

Examining the densities from a period perspective reinforces much of the general overview presented above. For Palaeolithic and Mesolithic entries, the highest densities occur on those landforms where there are caves (e.g. Magnesian Limestone – 1c), or on upland, largely unimproved landforms such as Millstone Grit (1f) and Peat (3d). For the Neolithic period, it is clear that the highest densities of sites are on the limestone geologies with the greatest densities on the Carboniferous Limestone (1a), whereas in the Bronze Age, the Millstone Grit (1f) uplands are also a clear focus of activity. The low density of Iron Age sites across the entire study area indicates the need for more detailed analysis and identification of such sites, with the only landforms containing 'substantial' Iron Age remains being the Carboniferous Limestone (1a) and sand and gravel terraces (2d). Known Roman-period sites across the study area are largely uniform showing some variance across landforms, though with a noticeable drop off on peat (3d) and the Coal Measures (1i). Whilst Roman activity is both unlikely to exist and difficult to prospect for on the peat uplands, the drop-off in density on the Coal Measures probably represents a lack of identification on this landform, or a truncation of old remains by post-medieval and modern industry. As with the Iron Age, the early medieval period is poorly-understood in general with few sites known, and, again, the key landforms where the densities are noticeably higher are Carboniferous Limestone (1a) and sand and gravel terraces (2d).There is an interesting pattern within the densities relating to the post-medieval and modern periods, most noticeable in the figures for the sandstones (1e) and

mudstones (1g), in which landforms with low prehistoric and early historic densities have high post-medieval densities, potentially indicative of substantial industry which may have removed much evidence of earlier archaeological activity.

The relative densities noted above and detailed in Table 3.1 are also highlighted within the individual landform assessment chapters, where the densities for each period are broken down further by site type and compared against a mean for the whole study area.

4. Solid Geology Landform Assessments

The following eight chapters (4.1 – 4.8) represent the assessments for the eight bedrock landform elements. On these landforms there is only a shallow and discontinuous drift cover, and the bedrock geology is the principal driver of archaeological and palaeoenvironmental associations. The associations, along with evaluation and mitigation issues, are summarised for all landform assessment chapters in the tables in Chapter 7.

4.1. Landform 1a – Carboniferous Limestone

Landform element category 1a comprises Carboniferous Limestone bedrock with a shallow discontinuous drift cover, where the bedrock is the dominant geological type relating to past land use. The Carboniferous Limestone extends over 44,941.52ha, which accounts for 13.65% of the total area of Derbyshire and the Peak District.

The Carboniferous Limestone is found in the central and southern Peak District where it forms what is known colloquially as the 'White Peak'. It is a landscape that at its most general comprises a high area of plateau bisected by deeply incised limestone gorges. Today this landscape supports rolling fields of pasture, although with cultivation on the increase. The plateau area tends to range between 300 – 350m above Ordnance Datum although there are many localised high points that provide wide vistas across this southern end of England's spine. Being a permeable rock, the limestone is free-draining and this, combined with the alkaline bias of the rock, has given rise to the unusual situation of a highly fertile landscape, due at least in part to the loess soils, conducive to both pastoral and arable agriculture on what is a high upland setting in the context of the British Isles, and therefore attractive for settlement throughout most periods of the past.

The Carboniferous Limestone is chemically similar to the Magnesian Limestone (Landform 1c, Chapter 4.2), although the topographic setting is slightly different. The Carboniferous Limestone is a plateau at relatively high altitude surrounded by the 'horseshoe'-shaped formation of the Millstone Grit (Landform 1f, Chapter 4.5), whereas the younger Magnesian Limestone to the east, in very general terms, forms the easterly dip slope beyond the high ground of the Millstone Grit, looking towards the lowlands of Nottinghamshire and Lincolnshire. The Magnesian Limestone landscape sits at a much lower altitude than the Carboniferous Limestone and runs in a linear band as an escarpment whereas the Carboniferous Limestone is in-effect a central dome of high ground with deep gorges and many dry valleys criss-crossing the massif. The grey-white Carboniferous Limestone is a harder rock than the more sandy-coloured Magnesian Limestone which tends to be less coarse and more easily shaped. Nevertheless, the similarity of bedrock geology means that comparisons between the two landforms can be used to draw conclusions about the types of archaeology which they may host (See chapter 7) as they support similar soils and therefore land-use. It must also be noted that the two limestone geologies are also topographically distinct with perhaps a more-intensive post-medieval and modern land-use on the Magnesian Limestone.

The significance of the Carboniferous Limestone in relation to this study is that it is one of the most heavily quarried landforms within the study area. Carboniferous Limestone is quarried for both aggregate and dimension stone and is of a particularly high quality and keenly sought.

4.1.1 Aerial Photograph Transcription Block 1

Block 1 of the aerial photograph transcription focused on two large areas of the northern Carboniferous Limestone illustrated in Fig. 4.1.2 below. A third area is also included here even though it fell within Block 3, as it examined an area of the southern Carboniferous Limestone encompassing Ballidon, Aldwark and Bonsall.

The three areas of aerial photograph transcription on landform 1a have a total area of 18,500ha meaning that just below 25% of the entire landform was subject to aerial photograph investigation.

The major archaeological association with the Carboniferous Limestone noted through the aerial photograph transcription is the vast quantity of observable lead mining and limestone extraction remains. The proliferation of post-medieval and modern extraction is discussed below in the overall discussion of archaeological associations, but

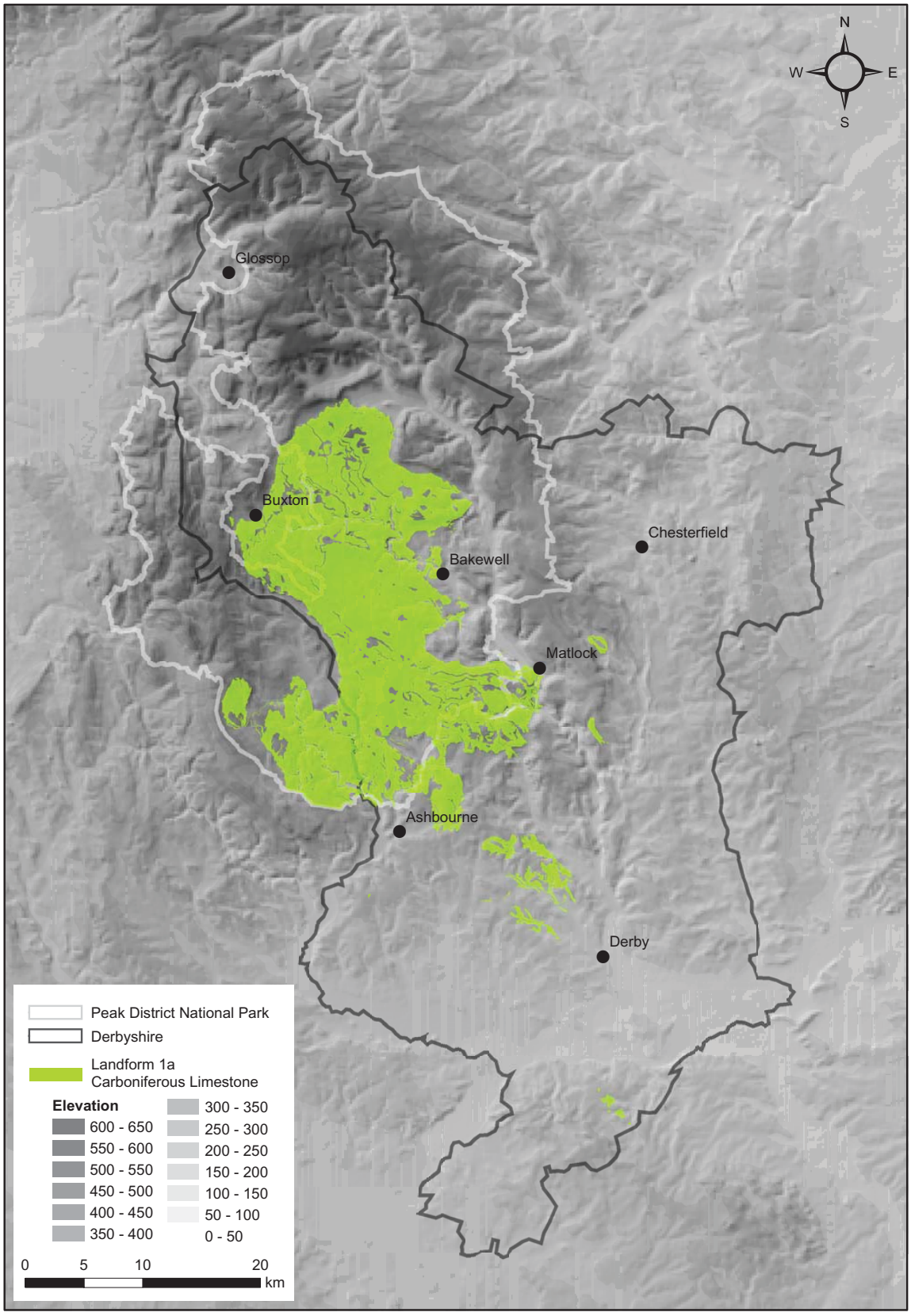

Figure 4.1.1 Extent of landform 1a – Carboniferous Limestone

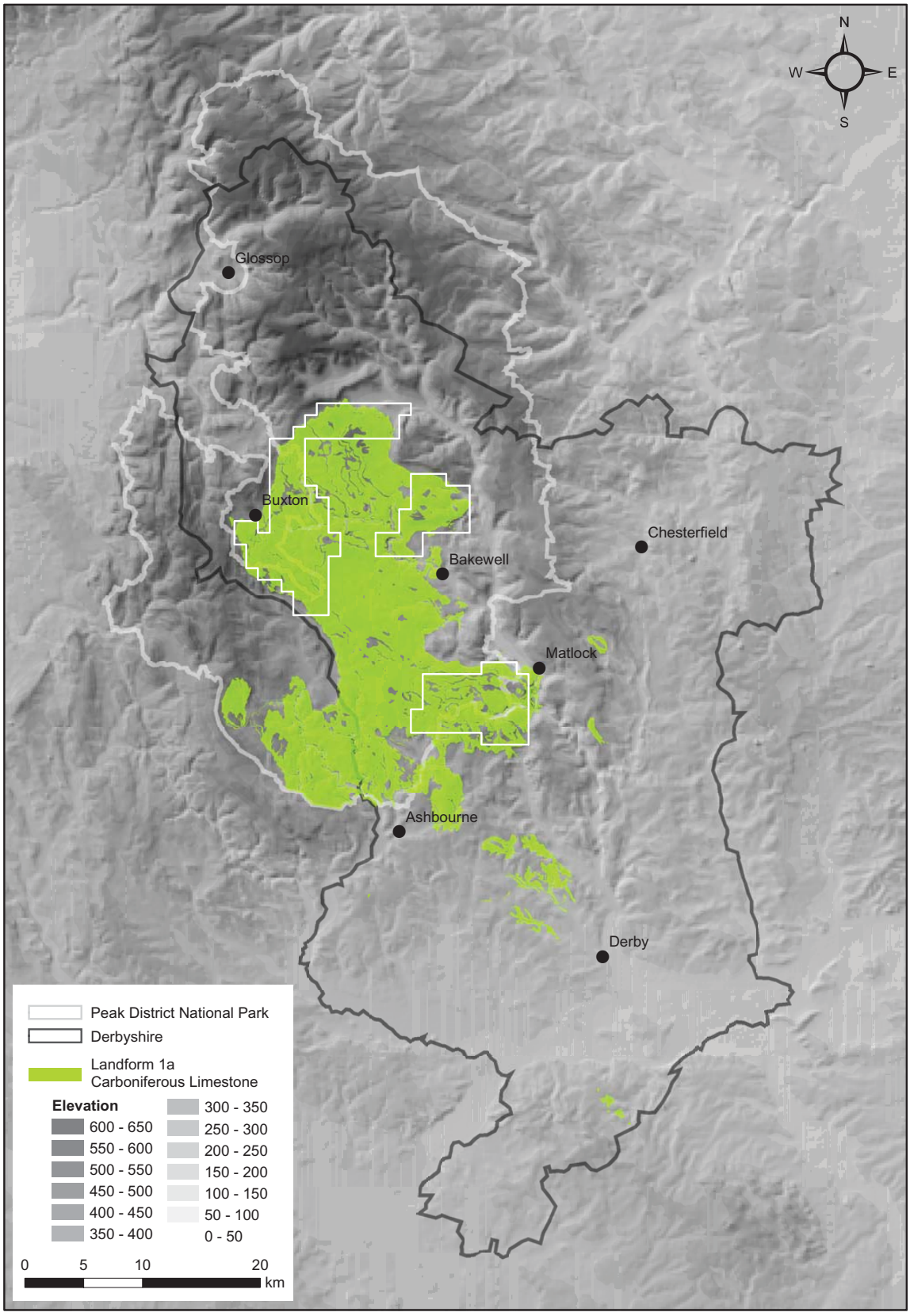

Figure 4.1.2 Extent of landform 1a showing Block 1 and portion of Block 3 which examined the Carboniferous Limestone.

it should be noted here as the aerial photograph transcription has provided a detailed mapping of the known remains in the study blocks (Fig 4.1.3).

Another major outcome of the aerial photograph transcription has also been to reinforce the picture of the medieval and post-medieval agricultural landscape through the detailed mapping of ridge and furrow. The extent of ridge and furrow and the potential effects that this can have on mitigation are discussed below, but the extent of this can be illustrated, for example, by the ridge and furrow remains mapped around Foolow (Fig. 4.1.4). Whilst the specific associations of fossilised extant ridge and furrow field systems must be noted, it is also important to state that much of the ridge and furrow remains mapped as a part of this project are recorded on old aerial photography, some stretching back to the 1940s. In many places, modern agriculture or development has removed the extant ridge and furrow, but in these cases, the aerial photograph transcription, along with databases such as Historic Landscape Characterisation (HLC), provide a valuable record of the post-medieval and modern land-use and potential impacts on archaeological remains. For areas within the Peak District uplands, farm surveys provide an accurate current assessment of the condition and survival of any ridge and furrow mapped from earlier aerial photography.

Due to the broadly pastoral nature of the modern agriculture practiced on the Carboniferous Limestone, there is the possibility of better preservation of upstanding remains than on other, more arable landforms, such as the fertile valley deposits of the sand and gravel terraces and alluvial floodplains (see chapters 5.1 and 5.3). The preservation of upstanding remains has already been illustrated by the survival of the lead mining and some ridge and furrow, where it has escaped modern agriculture and development. There are also a number of sites mapped as part of the aerial photograph transcription, which illustrate the survival of upstanding remains dating to the later prehistoric or Romano-British period. For example the Romano-British remains near Chelmorton Flat south of the River Wye (Fig. 4.1.5).

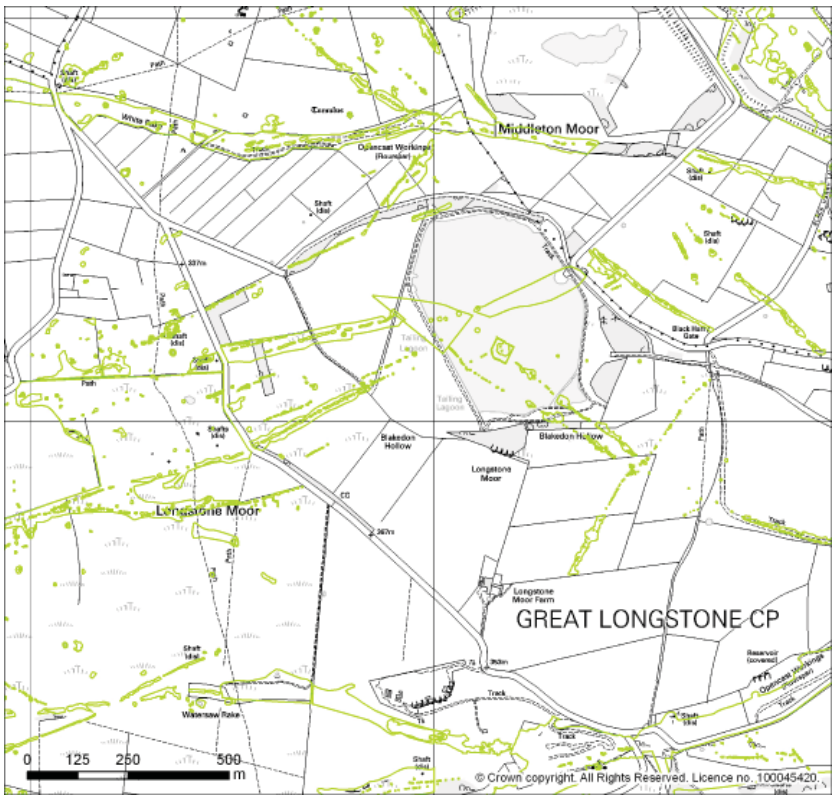

Figure 4.1.3 Extract of aerial photograph transcription showing the network of lead rakes and associated lead mining remains on and around Longstone Moor. The settling lagoon in the centre of the illustration also shows the impact that modern industry can have on landscape-scale remains.

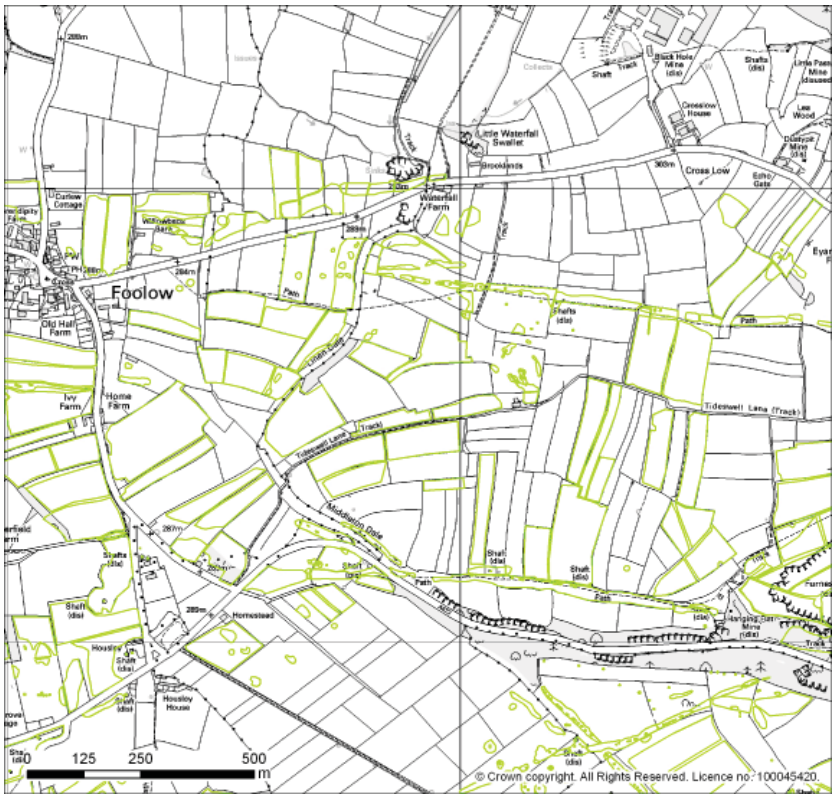

Figure 4.1.4. The extensive ridge and furrow field systems east of Foolow west of Eyam and Stoney Middleton.

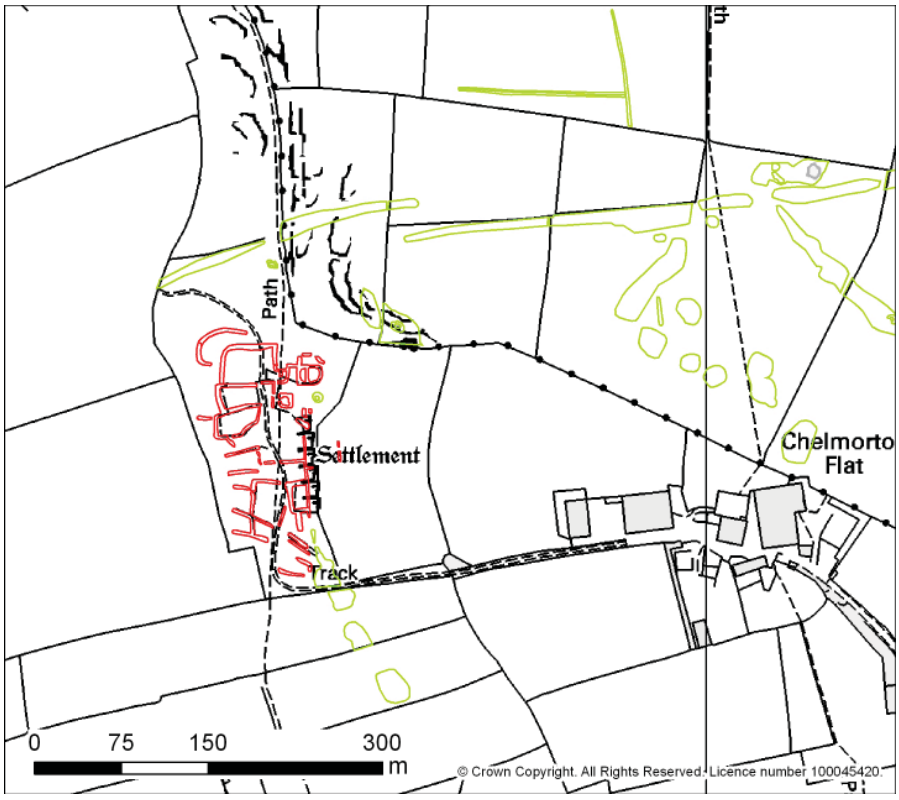

Figure 4.1.5 The Iron Age/Romano-British settlement near Chelmorton Flat (shown in red). This illustrates the refinement of mapping that can be achieved through aerial photograph transcription.

4.1.2 Archaeological Associations (Chronological)

The Carboniferous Limestone landform hosts 3861 HER entries and 2026 NMR entries of which 637 are duplicated giving a total number of known archaeological and historical sites of 5250 within the combined lists. The breakdown of the sites within this combined list are presented in Table 4.1.1 below, where they are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. The Carboniferous Limestone hosts a total site ratio of 11.68 sites per 100 hectares in comparison to the study area mean of 6.54. This is the highest density for any single landform with the exception of landform 1d, which is itself artificially overinflated. The density of known sites on the Carboniferous Limestone is partially a product of a focus of fieldwork on this landform, but is also genuinely indicative of its importance for past settlement and activity through most periods.

Period	No. of Sites	Sites per 100ha	Mean sites per 100ha	%
Pal/Mes	**38**	**0.085**	**0.12**	**0.8**
Cave	7	0.016	0.0046	0.15
Findspot	26	0.058	0.0611	0.55
Lithic Scatter	5	0.011	0.0456	0.11
Neolithic	**254**	**0.565**	**0.24**	**5.35**
Cave	9	0.02	0.004	0.19
Findspot	186	0.414	0.1216	3.92
Artefact Scatter	27	0.06	0.0173	0.57
Burial Cairn	27	0.06	0.0094	0.57
Stone Circle	2	0.004	0.0006	0.04
Settlement	1	0.002	0.0027	0.02
Henge	2	0.004	0.0009	0.04
Bronze Age	**661**	**1.471**	**0.4**	**13.92**
Barrows/Cairns/Burials	525	1.168	0.3019	11.05
Cave/rock shelter	3	0.007	0.0021	0.06
Enclosure/Field System	2	0.004	0.021	0.04
Findspots	126	0.28	0.1146	2.65
Mining remains	1	0.002	0.0006	0.02
Standing Stones/Circles	5	0.011	0.0155	0.11
Iron Age	**58**	**0.129**	**0.05**	**1.22**
Enclosure/Field System	17	0.038	0.0091	0.36
Findspot	39	0.087	0.021	0.82
Hillfort	2	0.004	0.0027	0.04
Inhumation	1	0.002	0.0006	0.02
Romano British	**422**	**0.939**	**0.43**	**8.88**
Artefact Scatter (pottery)	8	0.018	0.0152	0.17
Burials/funerary monuments	13	0.029	0.0067	0.27
Buildings/Structural remains	5	0.011	0.0036	0.11
Cave Sites	11	0.024	0.0049	0.23
Enclosures/fields/settlements	86	0.191	0.0565	1.81
Findspots	248	0.552	0.1572	5.22
Industrial Sites	3	0.007	0.0049	0.06
Roads and associated sites	48	0.107	0.0945	1.01
Early Medieval	**94**	**0.209**	**0.08**	**1.98**
Barrows/funerary monuments	28	0.062	0.0109	0.59
Battlefield	1	0.002	0.0003	0.02
Crosses/sculpture	12	0.027	0.0106	0.25
Earthworks/ditch	5	0.011	0.0033	0.11

Findspots	43	0.096	0.0219	0.91
Settlements	5	0.011	0.0067	0.11
Medieval	**627**	**1.395**	**1.1**	**13.2**
Boundaries/Linear Earthworks	64	0.142	0.0386	1.35
Castle/motte	4	0.009	0.0055	0.08
Church/Monastic Grange	44	0.098	0.0897	0.93
Cross/Sculpture	19	0.042	0.0377	0.4
Deer Parks/Associated Structures	11	0.024	0.0423	0.23
DMVs	21	0.047	0.0353	0.44
Enclosures/Field Systems	187	0.416	0.3329	3.94
Findspots	217	0.483	0.0872	4.57
Halls/Farmstead	25	0.056	0.0973	0.53
Industrial Sites	4	0.009	0.0255	0.08
Roads	4	0.009	0.0143	0.08
Settlements	10	0.022	0.0082	0.21
SMVs	17	0.038	0.0219	0.36
Post Medieval	**2520**	**5.607**	**3.39**	**53.05**
Agricultural/Field Systems	298	0.663	0.3776	6.27
Canals	5	0.011	0.0237	0.11
Enclosures	35	0.078	0.0295	0.74
Findspots	66	0.147	0.0313	1.39
Gardens/Lakes/Ponds	44	0.098	0.0684	0.93
Lead Mining	482	1.073	0.1985	10.15
Lime Working	103	0.229	0.0389	2.17
Military Sites	7	0.016	0.0471	0.15
Mills and Associated Buildings	35	0.078	0.1839	0.74
Quarrying	582	1.295	0.3566	12.25
Railway Lines/Buildings	300	0.668	0.3049	6.32
Religious Buildings	139	0.309	0.1541	2.93
Roads/Tracks/Boundaries	177	0.394	0.1918	3.73
Other Buildings	247	0.55	0.4207	5.2
Multi-Period HER Entries	**576**	**1.282**	**0.37**	**12.13**
Agricultural Buildings	15	0.033	0.0006	0.32
Barrows/Funerary Monuments	132	0.294	0.0416	2.78
Boundaries/Field Systems	70	0.156	0.0073	1.47
Cave Sites	48	0.107	0.0012	1.01
Findspots	159	0.354	0.0046	3.35
Lithic Scatters	38	0.085	0.017	0.8
Parks/Gardens	8	0.018	0.0003	0.17
Religious Buildings	36	0.08	0.0024	0.76
Rock Art	1	0.002	0.0012	0.02
Industrial Sites	46	0.102	0.0003	0.97
Unknown Enclosures	17	0.038	0.1523	0.36
Other Buildings	21	0.047	0.0064	0.44
TOTAL	**5250**	**11.682**	**6.54**	**110.53**

Table 4.1.1 Breakdown of all sites on the Carboniferous Limestone by period and site type.

4.1.2.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000BC-3900BC)

The earliest remains associated with the Carboniferous Limestone are found in the cave sites within the limestone gorges (see also Research Agenda – Chapter 7). Many of these caves are used throughout many periods of history due to the natural shelter they offer and also their location within the bottlenecks of natural routeways in the landscape which would have provided opportunities for hunting as well as other, perhaps sacred, activities. While none of the caves on the Carboniferous Limestone have yielded rock art, as at Creswell Crags on the Magnesian Limestone (Pettitt et al 2007), there are a number of sites which have produced remains diagnostic of the Late Upper Palaeolithic period. A Mousterian side scraper is known from Ravencliffe Cave north of Cressbrook (Storrs Fox 1910) and a number of other sites such as Ash Rock Shelter in Lathkill Dale and Shacklow Wood shelter in Calling Low Dale (Hart 1981, 21) have yielded isolated patinated flint pieces of Palaeolithic origin. 'Open sites' of Palaeolithic origin are rare in general, and almost unknown within Derbyshire and the Peak District, though the find of a single flint Creswell point from near Minninglow on the southern Carboniferous Limestone is worthy of note, and indicative of some activity during this period (Manby 1962).

With a few notable exceptions, the evidence for Mesolithic activity on the Carboniferous Limestone comes from lithic finds recovered by fieldwalking (e.g. Hart 1981; Gerrish 1982; Garton and Kennett 1996; Guilbert et al 1997; Makepeace 2005; Barnatt pers com;) or as part of an assemblage from sites where remains from other periods are the primary focus. Examples of this include the Mesolithic remains recovered from the excavations at Wigber Low (Collis 1983) and also the extensive Mesolithic primary working site excavated through test pitting at Fin Cop as part of the investigations into the Iron Age hillfort (Waddington 2010). Aside from cave deposits, there are a number of rock shelter sites, such as that at Sheldon Dale that produced evidence for an anvil stone for stone tool manufacture set into a paved surface (Radley 1968). To these sites can also be added Fin Cop above Monsal Head which has provided evidence, through a test-pitting programme, that it was first occupied during the Mesolithic period as a primary extraction site for the local chert which would have outcropped on the hilltop within the limestone bedrock (Waddington 2010).

The evidence for Mesolithic 'settlements' or sites with an element of permanence is very sparse across the landscape, and often the result of chance lithic finds. The HER and NMR indicate that the early prehistoric period will often be represented by residual finds in other period assemblages. It is important that this is incorporated into the regional dataset alongside the results of fieldwork which is more traditionally used to yield evidence of periods predominantly represented by lithic artefacts, such as fieldwalking.

Although flint does not occur naturally as a primary rock deposit in Derbyshire secondary flint sources in the form of nodules can be found in drift deposits such as the tills and glaciofluvial deposits of the Trent Valley (see landforms 2a and 2d). Therefore flint artefacts of Palaeolithic and Mesolithic age found on the Carboniferous Limestone represent imported material used by the occupants of this area. During the Mesolithic there is widespread evidence for the exploitation of an important local rock that occurs within the Carboniferous Limestone deposits: chert. Chert has identical chemical properties to flint and fractures conchoidally. Some chert can be very fine-grained and of high knapping quality but much of the Peak District chert tends to be fairly coarse-grained and produces typically crude blade and flake tools. The recent discoveries at Fin Cop show that where chert exposures occur close to the surface, and particularly where it can be seen in limestone rock outcrops as on the west side of the Fin Cop crest, there is the potential for extensive chipping floors to survive. In the case of Fin Cop this has been noted by the discovery of over 1700 pieces of chipping waste, most of it from the primary and to some extent the secondary stages of the reduction sequence, in just 16 1m square test pits. The chert artefacts are not obviously distinguishable to the untrained eye but the concern for producing blades is apparent and occasional tools found on these raw material extraction sites includes squat and crude abruptly retouched scrapers, piercers, thick microliths and occasional microburins and a wide variety of opportunistically produced edge-trimmed blade tools. Limestone outcrops should be considered potential foci for Mesolithic chipping sites, particularly if they are easily accessible and are known to have chert deposits in them.

The Palaeolithic and Mesolithic sites account for only 0.8% of the sites noted in the HER and NMR lists with a site density of 0.08 per 100ha, with a further 0.8% of the sites accounted for by multi-period lithic scatters, a great many of which contain Mesolithic material. The ubiquity of Mesolithic finds found during fieldwalking (e.g. Hart 1976; Manby 1962) suggests that Mesolithic activity was widespread across the Carboniferous Limestone and largely remains to be discovered. Unlike with some other landforms, there are few definite topographic associations notable for the known Mesolithic flint scatters. A reasonable portion are known from localised highpoints or ridges which

Figure 4.1.6 Blade tools made from local chert recovered from the Fin Cop excavations (Waddington 2010).

would tally well with some concentrated Mesolithic scatters and known sites on other landforms such as the Unstone sites on the Coal Measures (Hart 1981, 31-32; Chapter 4.7). Examples of such sites on the Carboniferous Limestone include Hill Top Farm north of Parwich and just off the summit of Greenlow Plantation near Aldwark.

4.1.2.2 Neolithic (3900BC-2200BC)

As with the Mesolithic, the majority of Neolithic entries within the HER and NMR on the Carboniferous Limestone are diagnostic stone tools identified through collection from the ploughsoil (see also Research Agenda – Chapter 7) or as part of assemblages from excavated sites, which may represent earlier phases of concentrated activity on the site or residual material from chance discard, though the most famous Neolithic associations of the Carboniferous Limestone are the funerary and ceremonial monuments. It is clear that the limestone plateau was settled by Neolithic peoples due to the large volume of lithic finds known, and also the funerary monuments, and later henge monuments, discussed below, which evidently provided a ritual focus, and one that in its mix of structural forms is idiosyncratic to the region. Despite this clear indication that the Carboniferous Limestone plateau was a focus for Neolithic activity, only one clear Neolithic 'settlement' site is known: Lismore Fields, Buxton (Garton 1991). Lismore Fields lies on the clay till (Landform 2a), though the Carboniferous Limestone lies adjacent to the site. While Lismore Fields is more fully discussed within chapter 5.1, it is the combination of topographical associations including the proximity of the Carboniferous Limestone which is of key importance in the location of the site, and so it is also noted here.

The scale and variety of the Neolithic monuments of the Carboniferous Limestone, including the two Later Neolithic-Early Bronze Age henges, may indicate that the Carboniferous Limestone could be more analogous to the chalk downlands of southern England than to other upland environments in Britain, and it is merely the current lack of known settlement sites and a clear chronology provided by radiocarbon dating that prevents it being thought of as such. Indeed the range, scale and abundance of these monuments provides one of the most important northerly counterparts to the central southern England Neolithic monumental landscapes with which most people are more familiar. The Neolithic monuments of Derbyshire's Carboniferous Limestone are currently a very poorly understood historic asset and yet they form one of the most important and impressive monument complexes in Britain. The great stone mound and passage grave at Newgrange measures c.75m in diameter whilst that at Minninglow in the Peak District, which has been very heavily robbed for walling and the High Peak Railway measures at least 40 m in

Figure 4.1.7 The 'great barrow' of Minninglow, now heavily denuded but still impressive in its scale. (SK 2057_2 5-OCT-1999. © English Heritage. NMR).

diameter and is known to have at least five chambers. Indeed the 'great mounds' of the Peak District form some of the largest chambered tombs in England and even in Britain more generally. There is a yawning gap in the early prehistoric chronology of the region and so far we have virtually no radiocarbon chronology for the Neolithic and the monument complexes of Derbyshire Carboniferous Limestone (see also Research Agenda – Chapter 7).

The distribution of Neolithic stone axe heads can often be a useful indicator of the locations and intensity of settlement. The Carboniferous Limestone of Derbyshire has a high density of such items (Cummins 1979, 6), reinforcing the picture of this landscape as one intensively utilised and settled during the Neolithic period. The majority of known stone axe heads are of Group VI type which originates in Langdale in Cumbria (Clough and Cummins 1988), although there are also significant numbers of Group VII axe heads which originate in Carmarthenshire and also Group XX, the source of which is somewhere within the Charnwood Forest of Leicestershire (Clough and Cummins 1988, 46-7). The occurrence of stone axe heads from such varying source stresses the long range exchange networks available to the Neolithic people of the Peak. The distribution of axe heads agrees with the overall distribution of Neolithic sites which suggests two areas of concentration around the Doveholes area towards the north-west Carboniferous Limestone, and to the southern reaches of the landform in the Carsington area (Hart 1981, 37).

There are few further investigated Neolithic sites on the Carboniferous Limestone, though there are a few that are of particular interest. At Middle Hill near Wormhill, a number of surface scatters were recorded with material including polished stone axe heads, chipped stone tools, and a large assemblage of predominantly later Neolithic Impressed Ware pottery (Hart 1981, 46). This site enjoys fertile volcanic and loess soils and a perched water table due to the proximity of basaltic bedrock within the Carboniferous Limestone (see chapter 4.3 for more on this landform). During the excavations of the Bronze Age and early medieval barrow at Wigber Low near Carsington Water (Collis 1983), a Neolithic 'platform' with accompanying postholes and early Neolithic pottery was discovered beneath the later burial monument. The 'Mildenhall' style pottery represents the most-northerly expression of this particular form and so reinforces the possibility that the division between the uplands and lowlands of Derbyshire also represents a more fundamental meeting point for northerly and southerly cultural traditions.

4.1.2.3 Bronze Age (2200-700BC)

The most visible archaeological resource on the Carboniferous Limestone in the Bronze Age is the funerary monuments, known locally as barrows, although most are more properly categorised as being stone cairns which have since acquired a turf covering. Whilst this is a style of monument which spans from the Neolithic period, and a number of the sites could more correctly be classified as belonging to the period of the Late Neolithic-Early Bronze Age, they are discussed here under the general period heading of Bronze Age. Over 11% of the total entries in the combined lists is accounted for by 'barrows' and associated funerary monuments of this period, with a further 2.78% accounted for by multi-period cairn sites, many of which are originally Bronze Age monuments re-used in later periods, probably as a means of appropriating some form of ownership of the landscape or an appeal to ancient spiritual power and its sanction. In total, the density of Bronze Age remains is over three and a half times greater than the average density for the whole study area. For a detailed study and corpus of cairns on all geologies within the Peak District, see Barnatt and Collis' Barrows in the Peak District: Recent Research (1996).

As with cave sites, cairns are generally an obvious form of archaeological monument, as many exist as upstanding features; they therefore formed foci for antiquarian investigation. Many burial cairns and monuments have been mutilated by this antiquarian interest and also by agriculture, a factor which has less impact on the monuments of other landforms, such as the Millstone Grit (1f, Chapter 4.5). The Carboniferous Limestone is intensively farmed considering its general altitude and this has had an impact on upstanding monuments such as cairns, leaving many low and barely perceptible.

2.65% of the total known entries within the combined lists are accounted for by findspots with a Bronze Age provenance, or lithic scatters with a diagnostic Bronze Age component. This, along with the huge amount of cairn burial, suggests that there is a corresponding amount of Bronze Age settlement on the Carboniferous Limestone which still remains largely invisible. It is likely that the settlement remains are of a more ephemeral nature and may have been destroyed or masked by later agriculture. Indeed this would tally well with what is known of settlement archaeology relating to other parts of Britain where Bronze Age houses can often take the form of timber post-built buildings and therefore are unlikely to be discovered unless large-scale surface stripping takes place. As with other periods where domestic or settlement remains may be largely represented by fragile posthole and pit remains (e.g. Neolithic, Early Medieval), the lack of large-scale open area excavation within the confines of the National Park means that it is difficult to prospect for or identify such features.

Through many later periods, one of the attractions of the Peak District uplands is the mineral wealth contained within the rocks, and it is during the Bronze Age, that ore is first sought. Bronze Age copper mining has been demonstrated at Ecton Hill with a radiocarbon date of between 1880-1630 cal. BC on an antler pick (Barnatt and Thomas 1998), which equates to recently identified Bronze Age copper mining from Alderley Edge in nearby Cheshire (Garner et al1993; O'Brien 1996). An emerging picture of copper mining may well be a factor in the seeming expanse of settlement within the Derbyshire uplands at the start of the Bronze Age, as this area would represent the only ore-producing region in England, and as such would have special value to the settlers and inhabitants. Many of the rich grave goods associated with barrow burials attest to the kind of long range trade and exchange networks associated with a relatively thriving community. Whitby jet and amber necklaces are known, as well as some rare finds such as dolphin bones. The prestige tradition of some of the known grave goods, such as those burials accompanied by bronze daggers at Carder Low, Parsley Hay and Net Low (Barnatt 1996, 44) is a further potential parallel to the prestige burials associated with the Wessex culture of the southern chalk downlands.

The Bronze Age sites account for 13.92% of the sites noted in the HER and NMR lists with a site density of 1.47 per 100ha compared with 0.4 for the study area as a whole. Nearly 11% of the total number of sites on the landform is accounted for by the funerary cairn monuments, these being more visible than other types of archaeological remains. It should not be assumed however, that this means the percentage of Bronze Age remains is artificially high, as it is clear that the tradition of cairn burial is a key element of the archaeological record of the Carboniferous Limestone (see also Research Agenda – Chapter 7).

4.1.2.4 Iron Age (700BC-AD43)

There are relatively few Iron Age sites within the combined HER and NMR lists for the when compared with other periods. The largest proportion of the Iron Age entries are accounted for by enclosures and field systems and individual findspots diagnostic of the Iron Age, the vast majority of which are single metal objects dating to the later

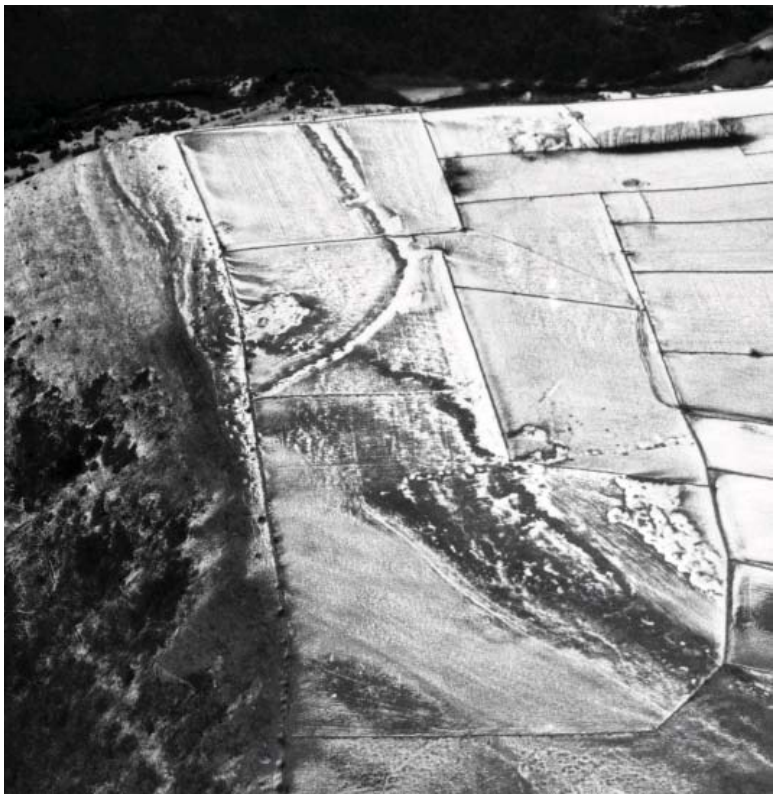

Figure 4.1.8 The scarp edge enclosure of Fin Cop
(NMR SK 1770_7 NMR 17451_81 17-FEB-2000. © English Heritage. NMR).

Iron Age such as belt fittings, buckles and brooches. The Iron Age is perhaps underrepresented in the combined lists due to the fact that few sites can be accurately dated to the period 700BC-AD43 due to the difficulty of putting a date on various upstanding remains because so few have ever been dated and because many potential Iron Age sites have been subsequently obliterated by later ploughing and agriculture. Those features which may well be Iron Age could span the Late Bronze Age through to the Iron Age (possibly including the hillfort sites discussed below) or the Late Iron Age into the Romano-British period and this has no doubt squeezed quite a lot of the HER and NMR entries out of the Iron Age and into these abutting periods.

As noted above, whilst it is possible that the hillfort sites known on the Carboniferous Limestone belong to the Late Bronze Age-Early Iron Age, the new dates available for Fin Cop reveal that the fort itself is of mid-Iron Age date centred on the centuries 400-200BC (Waddington 2010). There are two known 'hillfort' sites on the Carboniferous Limestone: at Crane's Fort, Conksbury, overlooking Lathkill Dale which has only recently been identified (Hart and Makepeace 1993), and Fin Cop on the highest point of a steep bluff overlooking the river Wye as it winds its way through Monsal Dale. The hillforts of Derbyshire and the Peak District have not yet been comprehensively investigated, with only limited fieldwork at a few sites (Preston 1954) such as Ball Cross overlooking the Wye valley above Bakewell (Stanley 1954), Mam Tor overlooking the Vale of Edale and the Hope Valley (Coombs and Thompson 1979) and the recent excavations at Fin Cop and its environs (Wilson 1999; Waddington 2010). There have been five seasons of excavations at Gardom's Edge above the valley of the Bar Brook above Baslow although this enclosure has been dated to the Late Bronze Age and its status as a 'hillfort' remains open to question. Radiocarbon dates are available from Fin Cop and Gardom's Edge and there are two early dates from internal hut platforms at Mam Tor, although these dates do not necessarily relate to the timing of the fort's construction and use.

Recent excavations at Fin Cop have shown that even where earthwork monuments lie within enclosed and improved land (albeit with statutory scheduling) the preservation on the Carboniferous Limestone at least can be much better than expected. Earthwork survey and test-pitting are relatively rapid and cheap prospection techniques which in this case yielded a large amount of information about the archaeology and geomorphology of the site, revealing both an unexpected physical depth of preserved soil and sediment, and also an unexpected time-depth to the known archaeological remains – in this case a Mesolithic chert working site (see also Research Agenda – Chapter 7). There

are also two palisaded hilltop sites known on the Carboniferous Limestone at Dirtlow (now destroyed) and Eldon Hill. Palisaded sites have a long currency dating from the Late Bronze Age through to Roman times but as yet the date and character of the Derbyshire sites remains unknown, further examples being those enclosures known from Tideswell Moor, associated with the Roman road from Navio to Buxton, and also the top of Pindale (K. Smith pers. comm.).

4.1.2.5 Romano-British (AD43-410)

The picture of the Romano-British period on the Carboniferous Limestone is of a heavily-settled landscape with enclosures, field systems and settlements accounting for 1.81% of the total sites on this landform and various stretches of the Roman road system through the Peak District and Derbyshire accounting for a further 1.01%, though most of these entries are stretches of the same roads. The majority of Roman and Romano-British period finds are individual findspots whether identified through metal detecting (mainly the large number of coin finds known) or through fieldwalking programmes (see Hart 1981). The overall density of known Roman-period sites on this landform is 0.94 in comparison to the study area average of 0.43, illustrating that the Carboniferous Limestone is a focus of activity during this period.

On the Carboniferous Limestone the only definitely known and identified Roman town is Buxton (Aquae Arnemetiae) and the full extent of it is not known, probably due to the expansion of the Georgian and modern spa town. It has been suggested that there was a fort attached to the Roman town in the Silverlands area of Buxton (Tristram 1916), though there is as yet no clear evidence to support this. A Roman altar was discovered south of Bakewell (see chapter 6.1) and this accords with suggestions that there may have been a Roman station somewhere in the vicinity of Bakewell, though there is no direct archaeological evidence as yet to support this.

One of the principle reasons for the expansion of Roman influence into the Derbyshire uplands was the mineral wealth of the region which is largely concentrated on the Carboniferous Limestone. In particular the lead and associated metalliferous minerals were exploited which typically occur as vein minerals within the limestone. It is known from stamped lead pigs found across the empire that there was a Roman lead mining centre somewhere

Figure 4.1.9 The Iron Age/Romano-British site at Cowlow near Woo Dale with later quarrying marks visible in the foreground. This site sits on the hill above the Wyedale, and currently lies between the now-closed Topley Pike Quarry and Tunstead Works.
(NMR SK 1072_55 DNR 1583_36 15-SEP-1979. © Crown copyright. NMR).

within Derbyshire known as Lutudarum, though the location has not yet been satisfactorily identified (Lane 1986; Barnatt 1999a). One of the most likely locations is in the Carsington area at the southern end of the Carboniferous Limestone plateau within the lead orefield. Normal Roman military practice would dictate a fort to be placed at the half-way point between the forts at Buxton and Little Chester (Derby), and there are concentrations of Roman finds known from the Carsington area (Hart 1981).

The Roman and Romano-British entries in the combined lists account for 8.88% of the total sites on the Carboniferous Limestone with a site density of 0.94 per 100ha. It is clear that the Carboniferous Limestone is a focus for Roman activity and also native Romano-British farming, and it would seem reasonable to suggest that this is largely due to the mineral wealth of the area together with the greater agricultural productivity of the limestone compared with the surrounding gritstones which have a considerable acidic bias.

4.1.2.6 Early Medieval (AD410-1066)

There are relatively few known early medieval archaeological sites on the Carboniferous Limestone, with the majority accounted for by burial cairns (0.59% of the total sites) and also individual findspots (0.91% of the total sites), predominantly coins, beads and small metal fittings. However the place-name evidence and deserted medieval villages indicate that the Carboniferous Limestone area of Derbyshire was intensively settled during early medieval times. The area abounds with Anglo-Saxon village names with obvious candidates being Brassington, Carsington, Middleton, Wirksworth and Taddington.

A few villages, and also the town of Bakewell, which lies on the very edge of the Carboniferous Limestone, are known to have an Early Medieval origin, though there is very little archaeological evidence to support the documentary and place name evidence. Possibly the clearest archaeological monuments of this period are the two linear earthworks of Cross Ridge Dyke and the Grey Ditch at Bradwell. The Grey Ditch cuts across the line of the previous Roman road in the north of the Carboniferous Limestone plateau and it is possible that these earthworks are representative of a re-imposition of tribal boundaries following the removal of the Roman organisation of the landscape. The Grey Ditch also lies close to the supposed battlefield of 'Eden Tree' where legend supposes that Edwin of Northumbria was defeated and hung from a tree, though this is unlikely as it is generally accepted that Edwin was defeated at the battle of Hatfield Chase in South Yorkshire.

The tradition of cairn or barrow burial is one of the principal expressions of the early medieval peoples who lived in the upland area. The 28 cairns noted here are those monuments which are deemed to be constructed during the early medieval period, though there are a further 132 cairns (2.78% of the total sites) which are classed as multi-period in the combined lists, of which most are Bronze Age monuments reused in the Roman or early medieval periods, possibly as a means of appropriating the landscape. The generalised difference between the cairn tradition of the uplands, and the funerary traditions of cremation cemeteries in the lowlands is discussed in chapter 3, and a full gazetteer of known funerary cairns in the Peak District can be found in Barrows in the Peak District: Recent Research (Barnatt and Collis 1996).

Early medieval stone crosses and other stone sculpture from this period make up a small but significant proportion of the known sites (0.25% of all sites on the Carboniferous Limestone) although this low percentage does not detract from the high significance of this monument form. The corpus of stone sculpture housed at Bakewell church is one of the largest in the county, and the particular style of Anglo-Scandinavian sculpture which it represents has been suggested as representative of a school of carving based in the area (Cramp 1977). Crosses are also known from the churches at Bradbourne, Eyam and also a carved slab from Wirksworth, and these are indicative of significant early medieval settlements in these areas (Rollason et al 1996). The traditional dating of the majority of the north Derbyshire corpus places it within the 8th to 9th centuries AD, though a recent reappraisal has postulated that the tradition is actually set against the reconquest of the English lands by the Kings of Wessex in the 10th century (Sidebottom 1999). Whatever the specific dating of this nationally important corpus, it reinforces the picture of the Carboniferous Limestone as a much more intensively-settled landscape during the early medieval period, than the current archaeological resource suggests.

The surviving early medieval funerary monuments, stone sculpture and earthwork monuments on the Carboniferous Limestone suggest much more intensive settlement of the area than the archaeological remains of settlements currently suggest. It is known from other areas of Britain (as well as other landforms within this study area) that

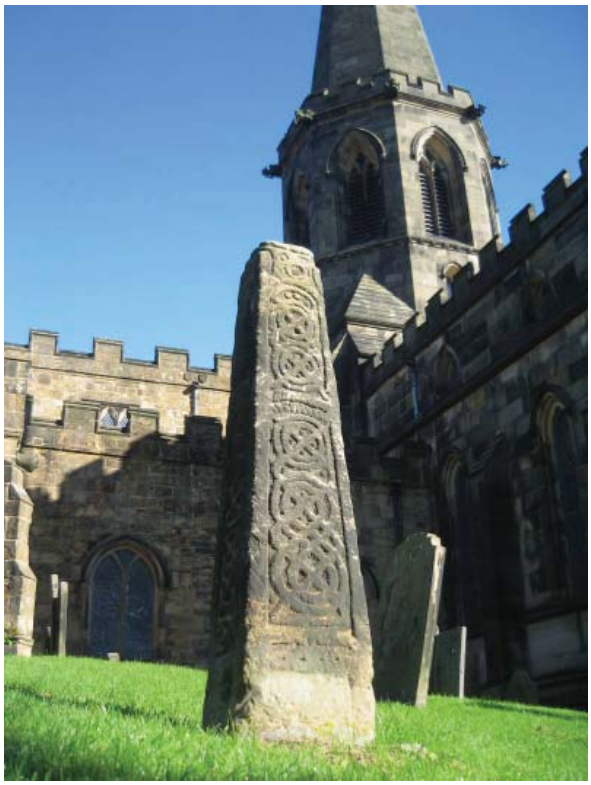

Figure 4.1.10 One of the Anglo-Scandinavian cross shafts in the churchyard of Bakewell Church.

early medieval settlement evidence often takes the form of dispersed pit and posthole structures similar to Neolithic settlement evidence. In a similar way to Neolithic remains, it would seem likely that the lack of known early medieval settlement is not representative of a real pattern, and one of the major factors is that it is likely that early medieval settlements have developed into later medieval and modern settlements and the, often ephemeral, archaeological remains relating to the earlier periods are lost. Many modern villages laid out in ways typical of medieval settlements lie near water sources and there are still the echoes of earlier pagan traditions preserved in the 'well dressings' celebrated through the late spring and early summer. The positioning of such settlements to take advantage of water sources can be seen in the valley side settings of many Peak District villages, and early medieval foundations are preserved in the '-well' ending common on the Carboniferous Limestone and found in place names such as Bradwell, Bakewell, Tideswell and Blackwell.

4.1.2.7 Medieval/Middle Ages (AD1066-c.AD1700)

As noted in Chapter 3, the archaeological resource for the medieval period can be divided into a number of broad categories. The first is that of landscape-scale archaeological sites such as field systems, ridge and furrow cultivation, strip lynchets, boundaries and deserted or shrunken settlements, which are normally visible as earthworks or preserved in field boundaries. Together these sites account for 3.94% of total sites on the Carboniferous Limestone. A further 1.47% of the total known sites is accounted for by multi-period or field systems of uncertain date and ridge and furrow cultivation, some of which may well be of medieval origin. One of the topographic peculiarities of the Carboniferous Limestone plateau is that despite the height above sea level (up to 350mOD) the land is still conducive to both arable and pastoral agriculture. The intensification of agriculture during the medieval and post-medieval periods means that any extraction or development which impacts on a large area within the Carboniferous Limestone will be likely to encounter relict Medieval landscape, though a great deal of such sites continued into use through the post-medieval period, and may have been altered or masked by more settlement or more-intensive agriculture and industry.

The built medieval heritage, including castles or possible castle sites, churches with medieval origins, granges, halls and farmsteads normally have some sort of statutory protection, typically as listed buildings or Scheduled Monu-

ments. Although direct impacts as a result of aggregate extraction are unlikely on such historic assets their setting may well be affected.

There are a number of significant medieval sites on the Carboniferous Limestone of the Peak District. The planned town of Castleton in the Hope Valley was established shortly after the Norman Conquest (Barrett 2006, 6) and the layout of the town, including Peveril Castle and the remains of the substantial earthwork bank and ditch around the town are still visible. Though there has been little archaeological investigation of the medieval origins of Castleton, there is an ongoing community project investigating possible locations of the medieval hospital related to the town (A. Darlington pers. comm.). The royal planned town of Castleton relates directly to the extensive hunting estates around the village which still bears the name 'Peak Forest'. Hunting estates and deer parks are discussed in relation to a number of other landforms. Within the boundaries of partitioned land such as deer parks, there is the potential that earlier remains may have been preserved from the ravages of later agriculture and industry. This significance is in addition to the archaeological significance of the medieval remains themselves.

Pilsbury Castle near Hartington is one of the largest and most imposing motte and bailey castles in Derbyshire, and it sits on a natural high point guarding the Dove Valley, in the same way that Peveril Castle protects the east-west routeway offered by the Hope Valley. As with many of the other castles in the county, it has suffered from a lack of intensive investigation, and little is known beyond its current form (Hart 1981, 146). A small motte and bailey is also known from Castle Hill, Bakewell , and though documentary evidence does not record a castle at this point till 1439 (Hart 1981, 143) excavation evidence has suggested a late 12th century date (Swanton 1972).

Potentially the most significant medieval remains currently known on the Carboniferous Limestone are at the monastic site of Roystone Grange due to the dedicated investigations carried out into all aspects of the site. The Roystone Grange landscape contains multi-period archaeological remains, but the focus is the medieval monastic grange or farming community (Hodges 1991). The granges tied to the parent houses in south Derbyshire, and further afield, are an important archaeological association with the uplands and particularly the fertile landscapes of the Carboniferous Limestone. Granges are typically self-contained farming communities and have the potential to yield a huge amount of information about the organisation of the farming landscape during the medieval period.

Figure 4.1.11 The earthwork remains of the shrunken medieval village of Blackwell. (NMR SK 1271_9 CCX 20627_14 03-NOV-2006. © English Heritage. NMR).

As with almost all of the other periods, the majority of entries within the combined HER and NMR lists is made up of individual findspots (39.89% of all medieval entries, 4.57% of all entries on the Carboniferous Limestone). The majority of these are small metal finds such as coins, belt buckles or saddle fittings, but this again illustrates the amount of information which can be gained from assessing the ploughzone, whether through fieldwalking, test pitting or metal detecting. The majority of such finds come from within, or close to, known medieval sites and settlements, and in many cases within modern settlements which have developed from the medieval period.

Medieval entries within the combined lists account for 13.2% of the total sites on the Carboniferous Limestone with a site density of 1.4 per 100ha.

4.1.2.8 Post-Medieval – Modern (c.AD1700-present day)
There are three main general categories of archaeological site represented in the combined lists for this period: industrial sites, agricultural sites and the built heritage.

Archaeological sites relating to quarrying (12.28% of all sites) and lead mining (10.15% of all sites) account for nearly a quarter of all sites on the Carboniferous Limestone. The impact of lead mining and limestone quarrying on the Carboniferous Limestone is one of the most visible and widespread effects of past human activity (see AP Transcription above). There has been much work undertaken to catalogue and investigate the lead mining remains of the Peak District (e.g. Ford and Rieuwerts 2000; Barnatt and Penny 2004) and much of the large-scale quarrying from this period developed into the larger modern quarries. It is very likely that any large aggregate extraction will impact upon some form of post-medieval or earlier industrial remains as they are so widespread across this landform.

Another visible and widespread archaeological site type dating to this period is the remains of agricultural landscapes primarily expressed as ridge and furrow cultivation, field boundary patterns and lynchet formation. The intensification and increased mechanisation of agricultural processes during the post-medieval period, coupled with the fertile land of the Carboniferous Limestone, created a landscape which was heavily farmed. While post-medieval agricultural remains are of interest as archaeological sites in themselves, an important point to note is that ridge and furrow cultivation, where not ploughed flat, may mask, and therefore preserve, earlier remains beneath. This hinders detec-

Figure 4.1.12 The keep and curtain wall of Peveril Castle above the planned royal medieval town of Castleton.
(Peveril Castle colour NMR SK1482-39- NMR 20450-18 09-NOV-2005. © English Heritage. NMR)

tion of sites by aerial photography but at the same time the mounded up soil ridges provide a layer of protection for earlier remains surviving beneath them. Little work has so far been undertaken on the preservation potential of ridge and furrow landscapes in Derbyshire but these remain potentially one of the most important untapped sources of archaeological evidence (see also Research Agenda – Chapter 7).

As with the medieval period, the built heritage of the post-medieval period is unlikely to be impacted upon by aggregate extraction as buildings of historical value would usually already have some form of statutory protection. Where the built heritage may be impacted upon will be primarily in the lower status vernacular buildings or those associated with industry or in the impact on the setting or the curtilage of listed buildings or conservation areas.

The other type of 'built' site which may be impacted upon on the Carboniferous Limestone are the disused railway lines which account for 6.32% of the total sites on the landform, though a number of these are entries for different sections of the same line. The development of the railway is an important period for the Peak District, as it provided a routeway for the mineral wealth of the Peak to be exported to the emerging industrial centres around Sheffield and Manchester and the import of mineral from further afield. The Cromford and High Peak Railway cuts across the southern reaches of the Carboniferous Limestone and there is the survival, albeit as ruins or vestigial remains, of many of the disused engines and associated structures to still survive along the line, such as winding gear and engine houses associated with the inclines (Rimmer 1985).

4.1.3 Evaluation and Mitigation Issues on the Carboniferous Limestone (see table 7.2 for summary)

As noted above, the Carboniferous Limestone generally hosts well-preserved archaeological remains. Geologically, limestone is free-draining and permeable and the soils derived from this parent material have an alkali bias, though they can become acidic, such as with the limestone heath on Longstone Moor, or as illustrated by the 'liming' of fields as a form of improvement. Preservation of human remains is well-attested from the Carboniferous Limestone, with a wealth of cave burials (e.g. Storrs Fox 1909; 1913; Heathcote 1938; Milner and Johnson 1983) and barrow inhumations known (e.g. Bateman 1848; 1861; Collis 1983; Barnatt 1996), and preservation is also shown within a non-funerary setting by the discovery of a fully articulated skeleton in the ditch fill of the hillfort at Fin Cop (Waddington 2010). This landform also preserves a wide range of other organic materials including animal bone, as recently discovered in the Fin Cop primary ditch fill (Waddington 2010) and at many of the limestone cave sites such as Fox Hole Cave on High Wheeldon Hill (Bramwell 1971) and Dowel Cave further to the north (Bramwell 1959). There is also a high potential for survival of botanical remains as well as other materials including the nationally famous Anglo-Saxon helmet with ivory casing from Benty Grange (Bateman 1848).

The ways in which the Carboniferous Limestone landscape has been exploited over time also has a profound impact on the preservation of archaeological remains and their visibility today and susceptibility to prospection and evaluation. Whilst many areas of the carboniferous Limestone have been cultivated in the past, the tradition in the last couple of centuries has been towards a fluctuation of agricultural styles with a preponderance of grazing but plenty of mixed farming into the inter-war years. With current climate change there are increasing numbers of fields being turned to arable agriculture despite much of this land being above the 300m contour. As much of the Carboniferous Limestone has not been cultivated in recent times this means that one could reasonably expect substantially less truncation of sub-surface remains than in lowland settings where large swathes of land have been subject to centuries, if not millennia, of ploughing and in recent years much of this has been deep ploughing for crops such as potatoes, carrots and some cereal varieties. The amount of ridge and furrow visible from aerial photography could be easily misinterpreted as indicative of a heavily farmed landscape with little chance of sub-surface preservation, however in those places where ridge and furrow remains extant, it is instead indicative of a lack of intensive agriculture during the modern period. Extant ridge and furrow agriculture will have certainly truncated underlying deposits to some extent but this is likely to be to a much shallower extent than where known ridge and furrow has been truncated by ploughing in recent centuries. Although extant ridge and furrow agriculture will have levelled some earthwork remains, the mounding up of soil will also impede cropmark development and therefore the recognition of subsurface archaeology. The lack of known cropmark sites in areas of extant ridge and furrow should not be seen as indicating an absence of archaeology below these agricultural ridges. Rather, such areas are likely to cover well-preserved archaeological remains should they exist on the site. This means that careful attention is required when evaluating potential development sites that have extant ridge and furrow agriculture on them (see also Research Agenda – Chapter

7).

Landscape taphonomy is an important concept in general, as it can be applied to existing monuments of any period which have the capacity to preserve earlier remains beneath them. It is known that the Carboniferous Limestone was an attractive landscape to Late Upper Palaeolithic and Mesolithic hunter-gatherer groups, and it is therefore possible that the Neolithic and Bronze Age funerary monuments which still exist as upstanding monuments across the region may seal earlier remains and land surfaces. This time-depth of archaeology can be illustrated by the site at Wigber Low, where a Neolithic site was sealed beneath a large Early Bronze Age cairn which in turn was reused in the Iron Age/Roman and early medieval periods (Collis 1983).

Despite the amount of agriculture evident on the Carboniferous Limestone, fieldwork has shown that there may be better preservation of artefacts within the ploughsoil than may have been previously thought. This can be illustrated by the large quantity of lithic material recovered by an ongoing fieldwalking survey examining a transect across the geological zones (landforms) of the Peak District (J. Barnatt pers. comm.) and the recent excavations at the hillfort of Fin Cop in Monsal Dale (Waddington 2010). At Fin Cop a scheme of test pitting was adopted as a way of both recording the stratigraphy of the interior of the hillfort and also recording the number of finds within an earlier ploughsoil and the subsoil. Despite the fact that the field had been used to grow root crops in the early twentieth century, which had removed all trace of any earlier ridge and furrow, there was unexpectedly good preservation of artefacts within both the ploughsoil and also within a subsoil deposit below. One 1m2 test pit and a subsequent 6m x 4m trench contained over 200 sherds of Late Bronze Age-Iron Age pottery, which indicates the viability of test pitting on this landform type as a way of compiling a record of the geomorphology of a given area alongside recovery and documentation of the number and condition of any artefacts which may otherwise be lost when using an evaluation or prospection technique which removes the overburden without record.

Figure 4.1.13 Aerial photograph illustrating the differential preservation of upstanding remains within cultivated fields and valley side setting which has not been ploughed (SK 2556_1 18-NOV-1996. © English Heritage. NMR).

4.2. Landform 1c – Magnesian Limestone

Landform element category 1c comprises Magnesian Limestone bedrock with a shallow discontinuous drift cover, where the bedrock is the dominant geological type relating to past land use.

The Magnesian Limestone bedrock present within this study area, is more correctly known as the Cadeby formation, and extends northwards, ultimately to County Durham. Previous ALSF-funded projects have focussed on various other parts of this Magnesian Limestone formation: in County Durham (Hewitt 2008) and more importantly for this project the neighbouring landscapes of West and South Yorkshire (Roberts forthcoming).

Within the Magnesian Limestone landscape of County Durham, there was a number of periods represented within the key archaeological associations: a strong potential for Mesolithic deposits to survive in cave settings, a known Neolithic long cairn, the largest concentration of Bronze Age barrows in the county, a number of Iron Age sites, extensive remains of Late Medieval-Post Medieval ridge and furrow cultivation and a landscape of intense industrial activity based on quarrying and coal mining (Hewitt 2008). It was also noted that cropmarks on the Magnesian Limestone were especially visible (Hewitt 2008).

In Derbyshire's adjacent counties of South and West Yorkshire, for the Magnesian Limestone belt, the aerial photographic transcription noted a much higher incidence of probable Bronze Age barrows than was previously supposed, alongside a landscape which was intensively settled and farmed during the Iron Age and Romano-British periods (Roberts forthcoming.) The Magnesian Limestone in Yorkshire also hosts three known Neolithic long cairns, similar to the example from Whitwell discussed below (Vyner 2008, 2), as well as the landscape surrounding the Ferrybridge henge, which includes barrows, a pit alignment, Romano-British field systems and enclosures. This work has been published in a stand-alone monograph (Roberts 2005).

The significance of this landform to the study is that it is a primary source for quarrying. Although not as heavily exploited as the Carboniferous Limestone (1a), this landform has been quarried for both aggregates and dimension stone.

4.2.1 Aerial Photograph Transcription Block 2

The aerial photograph transcription block 2 (hereafter Block 2) (Fig. 4.2.2) encompassed a total area of 2800ha covering the area around Creswell as well as to the south and west of the settlement. A full report on the Aerial Photograph Transcription component of this practice is also supplied (Bacilieri 2010) as well as a document containing the mapping and all known archaeological sites.

The newly mapped sites are predominantly cropmark enclosures which have been ascribed a provisional Iron Age/ Romano-British or a more general 'prehistoric' designation, or they are associated with agriculture and industry such as medieval or post-medieval ridge and furrow and field systems, or they are associated with the post-medieval industry and industrial villages of the area.

The mapped archaeological remains within Block 2 illustrate a few key associations which are also noted below within the analysis of the HER and NMR records for the Magnesian Limestone as a complete landform. The earliest recognisable remains are cropmarks of uncertain form and provenance which are tentatively ascribed a late prehistoric date as some form of enclosure, For example the ditched enclosure within the later deer park of Scarcliffe Park. The preservation of upstanding remains within the park is a good illustration of the differential preservation which can exist on all landforms, but particularly on agricultural landforms such as the Magnesian Limestone, where land within woods can remain 'set aside' from modern farming.

The largest volume of archaeological features mapped from the aerial photography is medieval and post-medieval ridge and furrow remains. The Magnesian Limestone is still a landscape conducive to agriculture, and the known ridge and furrow clearly illustrates this is a long tradition. Where ridge and furrow exists as extant earthworks, it also illustrates minimal impact of modern agriculture on the upstanding remains, as well as the fact that ridge and furrow remains can mask and even preserve earlier remains (see also Research Agenda – Chapter 7). This is a key point to note for the Magnesian Limestone as the overall density of archaeological sites on this landform is lower than may

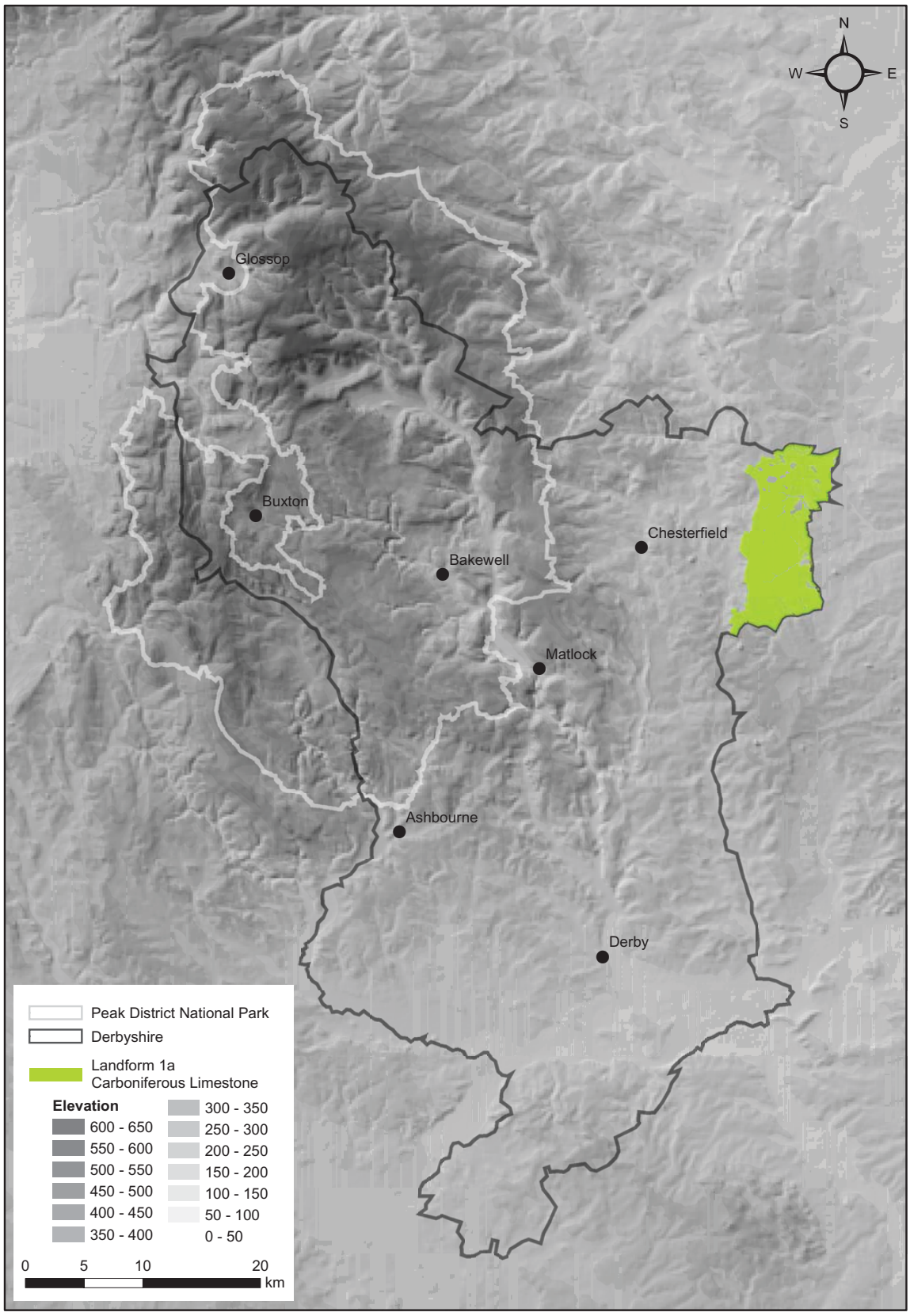

Figure 4.2.1 Extent of landform 1c – Magnesian Limestone

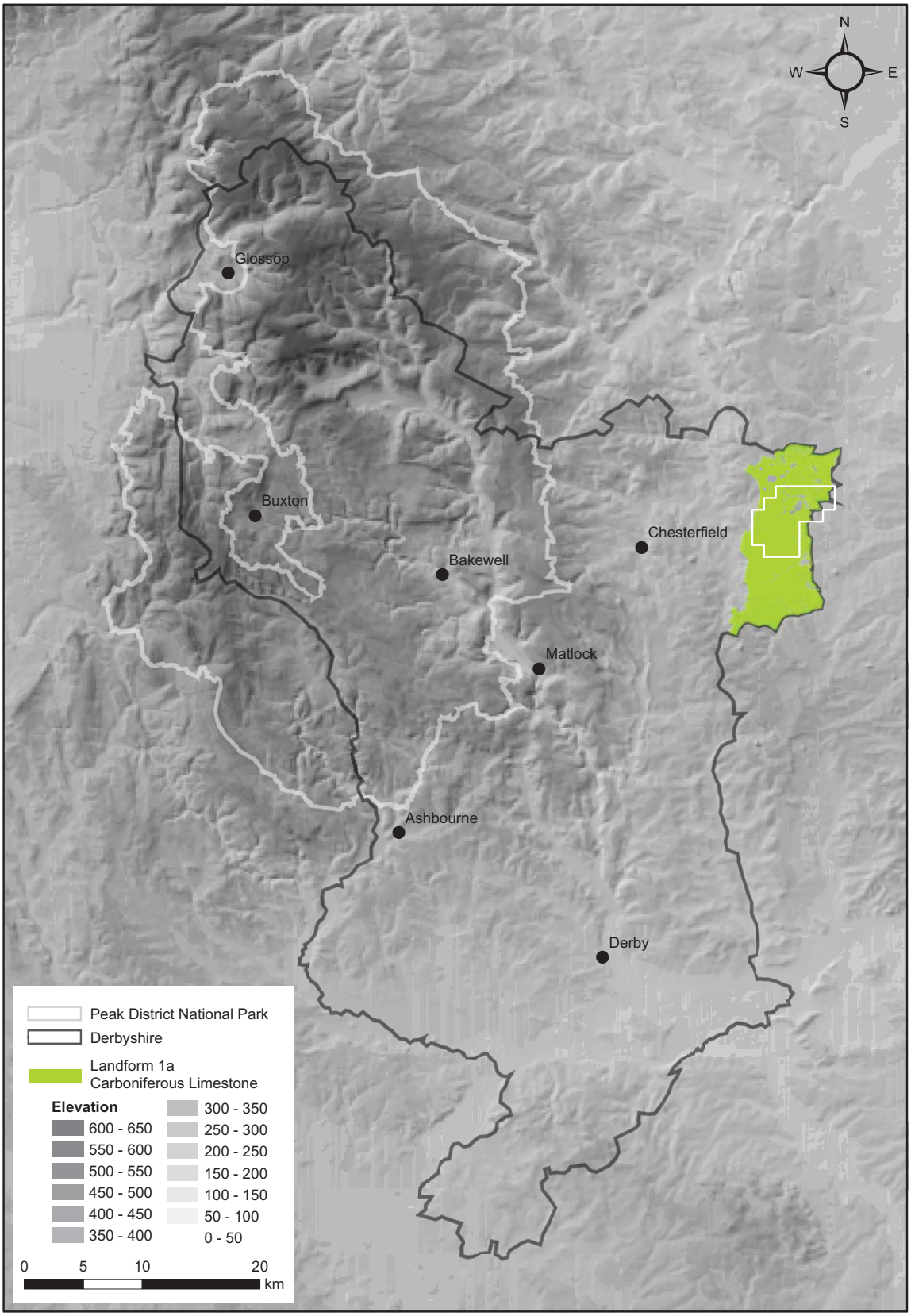

Figure 4.2.2 Location of Block 2 within the Magnesian Limestone.

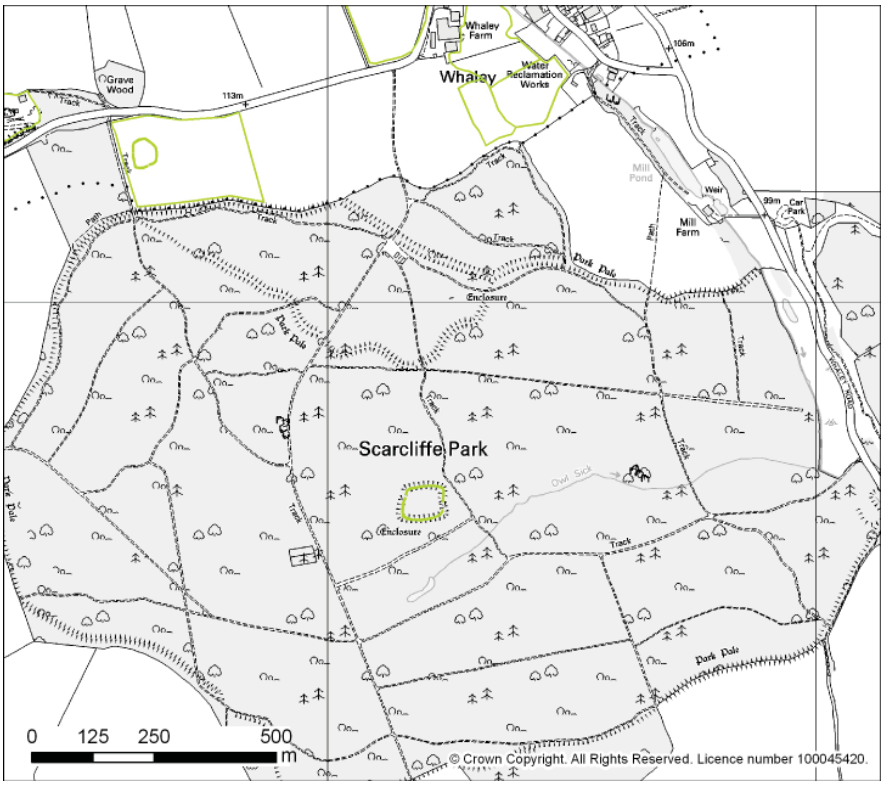

Figure 4.2.3 The Scarcliffe Park enclosure with ridge and furrow field systems and an undated enclosure to the north.

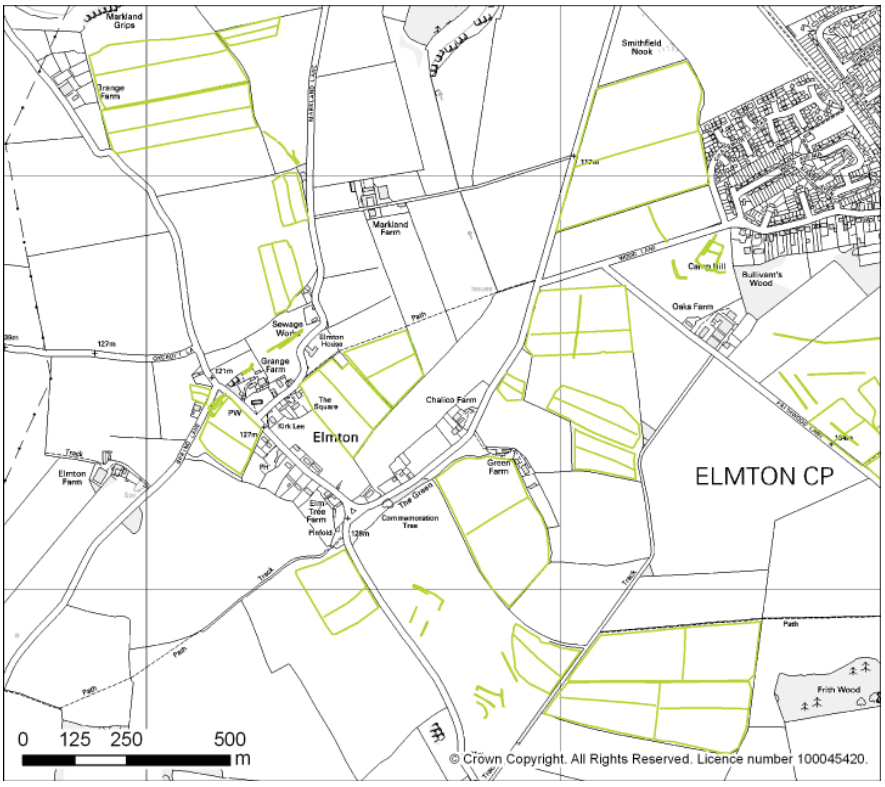

Figure 4.2.4 Ridge and furrow field systems to the west of Elmton, though most of the ridge and furrow mapped from early aerial photography has been truncated by modern agriculture and development.

be expected when compared to the geologically similar Carboniferous Limestone, and it is likely that the post-medieval and later agriculture and industry has impacted upon the anticipated earlier remains.

The final notable archaeological associations gleaned from the aerial photograph transcription are the modern impacts, most notably the colliery and quarry sites around Creswell, and also the remains of the World War II era military camp on the southern outskirts of Creswell. The large-scale impacts illustrate one of the wider problems with attaching definite archaeological associations with the Magnesian Limestone landform. Modern agriculture and industry has impacted more heavily on the lower-lying Magnesian Limestone landscape than on the upland plateau of the Carboniferous Limestone, which is known to host a wide variety of important archaeological sites (see Chapter 4.1). It is not unreasonable to suggest that if the impact of modern industries had been less on the Magnesian Limestone, then a much higher density of archaeological sites could be expected.

4.2.2 Archaeological Associations (chronological)

The Magnesian Limestone is found only in the east of the county on the borders with South Yorkshire and Nottinghamshire, and accounts for 2.5% of the total study area (8232.56ha). The landform hosts 505 HER entries and 262 NMR entries of which 186 are duplicated giving a total number of known archaeological and historical sites of 562 within the combined lists. The breakdown of the sites within this combined list are presented in Table 4.2.1 below, where they are also subdivided by site type and characterised with a count per hectare and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. The Magnesian Limestone hosts a total site ratio of 7.06 sites per 100 ha. Whilst it is a crude statistical measure overall, the count of sites per hectare is nevertheless a useful 'at-a-glance' comparison between the landform elements (see Chapter 7).

	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**38**	**0.46**	**0.12**	**6.54**
Cave	5	0.06	0.0046	0.86
Findspot	14	0.17	0.0611	2.41
Flint Scatter	19	0.23	0.0456	3.27
Neolithic	**21**	**0.26**	**0.24**	**3.61**
Cave/burial	1	0.01	0.004	0.17
Findspot	15	0.18	0.1216	2.58
Flint Scatter	4	0.05	0.0173	0.69
Long Cairn	1	0.01	0.0094	0.17
Bronze Age	**17**	**0.21**	**0.4**	**2.93**
Barrow	2	0.02	0.3019	0.34
Cairn	1	0.01	0.3019	0.17
Findspot	12	0.15	0.1146	2.07
Flint Scatter	1	0.01	0.0027	0.17
Rock Shelter	1	0.01	0.0021	0.17
Iron Age	**3**	**0.04**	**0.05**	**0.52**
Enclosure/Settlement	1	0.01	0.0091	0.17
Findspot	1	0.01	0.021	0.17
Promontory Fort	1	0.01	0.0027	0.17
Roman	**56**	**0.68**	**0.43**	**9.64**
Artefact Scatter	3	0.04	0.0152	0.52
Cave	2	0.02	0.0049	0.34
Enclosure/Settlement	20	0.24	0.0565	3.44
Findspot	28	0.34	0.1572	4.82

Industrial Site	1	0.01	0.0049	0.17
Road	2	0.02	0.0945	0.34
Early Medieval	**1**	**0.01**	**0.08**	**0.17**
Settlement	1	0.01	0.0067	0.17
Medieval	**51**	**0.62**	**1.1**	**8.78**
Agriculture	6	0.07	0.3329	1.03
Burials	3	0.04	0.0009	0.52
Burgage Plot	1	0.01	0.3329	0.17
Castle	1	0.01	0.0055	0.17
Chapels	13	0.16	0.0897	2.24
Crosses	2	0.02	0.0377	0.34
Deer Parks	7	0.09	0.0423	1.2
DMVs	3	0.04	0.0353	0.52
Earthwork sites	2	0.02	0.3329	0.34
Findspots	3	0.04	0.0872	0.52
Grange	3	0.04	0.0897	0.52
Halls/Large Houses	1	0.01	0.0973	0.17
Hospital	1	0.01	0.0055	0.17
Industrial Sites	1	0.01	0.0255	0.17
SMVs	2	0.02	0.0219	0.34
Town	1	0.01	0.0082	0.17
Trackway	2	0.02	0.017	0.34
Post Medieval-Modern	**186**	**2.26**	**3.39**	**32.01**
Agricultural Buildings	16	0.19	0.3776	2.75
Baths	2	0.02	0.0009	0.34
Chapels	26	0.32	0.1541	4.48
Colliery and ass.buildings	14	0.17	0.3566	2.41
Deer Park	1	0.01	0.0684	0.17
Gardens	5	0.06	0.0684	0.86
Hospital	1	0.01	0.0024	0.17
Inhumations	2	0.02	0.0009	0.34
Manor Houses and ass.	17	0.21	0.08	2.93
Mills/Kilns/Industry etc	9	0.11	0.1839	1.55
Railway Sites	35	0.43	0.3049	6.02
Roadways	4	0.05	0.1918	0.69
Schools	8	0.1	0.0024	1.38
Shops	4	0.05	0.0082	0.69
Quarry site	1	0.01	0.3566	0.17
Water Supply	9	0.11	0.0295	1.55
Wells	1	0.01	0.0295	0.17
Workers Villages and ass.	24	0.29	0.0082	4.13
World War II Sites	7	0.09	0.0471	1.2
Multiperiod	**116**	**1.41**	**0.37**	**19.97**
Artefact Scatters	71	0.86	0.017	12.22
Cave/Rock Shelter	41	0.5	0.0012	7.06
Inhumation	1	0.01	0.0416	0.17
Mills	1	0.01	0.0003	0.17
Roads	2	0.02	0.007	0.34
Unknown	**92**	**1.12**	**0.47**	**15.83**
Agricultural Buildings	1	0.01	0.0049	0.17
Earthwork/Boundaries	2	0.02	0.0061	0.34

Enclosures/Field Systems	53	0.64	0.1523	9.12
Findspot	35	0.43	0.156	6.02
Prehistoric Occupation Site	1	0.01	0.0003	0.17
TOTAL	**581**	**7.06**	**6.54**	**100**

Table 4.2.1 Breakdown of all sites on the Magnesian Limestone by period and site type.

4.2.2.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000BC-3900BC)

The gorges of the Magnesian Limestone are home to the most notable early prehistoric site in the county, Creswell Crags, which is discussed in detail below. Alongside the caves of Creswell Crags, the Magnesian Limestone also contains the multi-period cave site of Ash Tree Cave, Whitwell which has yielded Palaeolithic bone material (Armstrong 1956; Hedges et al 1996), and Langwith Bassett Cave which was excavated in the early 1900s and contained Palaeolithic lithic material and human remains (Mullins 1913). For a full gazetteer of the cave sites of the region see Chamberlain and Williams (2001). There are also a few scattered finds of probable Palaeolithic origin noted in the HER identified through fieldwalking and chance finds. Although too broad in scope to fully summarise here, many of the known assemblages of early prehistoric material have were discussed in their context by Jenkinson (1984) and this volume provides an essential overview for the Palaeolithic particularly in and around the Creswell area.

The predominant indicators of Mesolithic activity in the Magnesian Limestone area are scatters of lithic material found as a result of fieldwalking surveys or chance finds. There are 12 locations of Mesolithic material noted in the HER with a probable Mesolithic component in a number of other assemblages which are classified as 'prehistoric'. Hart (1981, 26) lists the flint scatter sites of concentrated Mesolithic activity as: Bolsover, Steetley, Creswell, Scarcliffe Park, Scarcliffe and Whitwell.

The caves of the limestone gorges continued in use through the Mesolithic period. The caves at Creswell Crags

Figure 4.2.5 The limestone gorge defining Creswell Crags.

(Armstrong 1925) and Ash Tree and Whaley rock shelters (Armstrong 1938) all contained Mesolithic material among the multi-period remains.

The Palaeolithic and Mesolithic sites account for 6.54% of the sites noted in the HER and NMR lists, with a further 12.22% of the sites accounted for by multi-period lithic scatters, a great deal of which contain Mesolithic material. This is a substantial ratio, and it is evident that the cave sites of the Magnesian Limestone were a focus of early prehistoric settlement activity. This focus is also illustrated by the site density for Palaeolithic and Mesolithic sites and findspots of 0.46 sites per 100ha, which is nearly four times greater than the mean site density for this period across the study area (see also Research Agenda – Chapter 7).

4.2.2.2 Neolithic (3900BC-2200BC)

The use of cave sites continues into the Neolithic period, though the association seems to change to incorporate funerary practice as well as occupation. Crude cist burials are known from Ash Tree Cave at Whitwell (Armstrong 1956), and human remains were excavated from the nearby Bone Cave D at Markland Grips which was also excavated by Armstrong, though only recorded in notebook form (Hart 1981, 37). The Whaley Rock Shelter no. 2 produced both human remains and also a ceramic assemblage comprising Carinated Bowl, Impressed Ware and Grooved Ware, alongside Neolithic stone tool types such as leaf-shaped arrowheads (Radley 1967). The other major Neolithic monument of note on the Magnesian Limestone is the Whitwell Long Cairn, which contained human remains that returned very early radiocarbon dates of 4360-3990 cal. BC, 4310-3775 cal. BC and 4075-3720 cal. BC (Schulting 2000) though recent work on modelling the dates has shown that activity at the site is in the period after 3800 cal. BC rather than before, bringing the site into the same chronology as the four dated Scottish long cairns (Sheridan 2007). The early nature of the dates from demonstrably in situ material suggests that the style of funerary monument represented by the Whitwell cairn could be a part of the earliest expressions of the Neolithic (Schulting 2000). Any sites with the potential to inform on the earliest Neolithic is of great significance, especially in the light of the recent moves towards a reinterpretation of the transitional period based on the increasing number of well-dated sites including structures and funerary monuments (see Sheridan 2007; Waddington and Passmore in prep.) (see also Research Agenda – Chapter 7).

The remaining sites of Neolithic date noted in the HER are individual stone tool findspots and lithic scatters. There are 15 sites noted of which three are polished stone axes.

On the Magnesian Limestone, there is a density of Neolithic sites of 0.26 sites per 100 ha. As with the Bronze Age (0.21 sites per 100 ha), the count of known sites is relatively low and similar to the mean density for the study area as a whole, however extrapolating from known sites on the Magnesian Limestone in South and West Yorkshire and County Durham one would expect this to be much higher, and so this may represent a lack of discovery and recognition of these sites rather than a real pattern of settlement in the Neolithic and Bronze Age.

4.2.2.3 Bronze Age (2200-700BC)

The Bronze Age reveals a similar picture of activity as for the Neolithic. This is evidenced by the few scattered funerary monuments and the continued use of cave sites as convenient places for habitation. Fragments of Beaker are known from Whaley 2 Shelter (Radley 1967) and Pinhole Cave, Creswell Crags (Gilks 1974), whilst nearby the HER indicates two possible barrows and a third known Early Bronze Age barrow at Scarcliffe Park (Lane 1973), along with five or six possible barrows (Hart 1981).

Unpublished excavations by Stanley West at Ash Tree Cave, Whitwell showed that this cave was also used during the Bronze Age, as indicated by pottery sherds on the platform outside the cave entrance (Hart 1981, 56). Both the HER and Hart (1981) note that there are up to 12 possible sites of Beaker period and Early Bronze Age activity across the area of the Magnesian Limestone, identified by lithic scatters containing diagnostic pieces such as scrapers and barbed-and-tanged arrowheads.

4.2.2.4 Iron Age (700BC-AD43) - Romano-British (AD43-410)

The fort of Markland Grips sits on the narrow promontory between two limestone gorges 1km east of Clowne and 1km north-west of Creswell. The earthwork banks on the western side still stand and it is thought to be stone-revet-

ted with a counterscarp bank and single central entrance, though this may not be original (Preston 1954; Lane 1969). The inner rampart still survives to a reasonable height, though the evidence for the outer rampart has been much disfigured by construction of the 19th century railway. It was investigated by the Rev. J. Cox in the early 20th century, and though no dating evidence was recovered, on the basis of its form it probably belongs to the Iron Age, though it is possible it may date to the Late Bronze Age. Romano-British finds from the interior (Hart 1981, 96) and a possible associated field system indicate a continuation of use of the monument later than is supposed for comparable hillforts within the adjacent Peak District.

Finds of coins and pottery at Ash Tree Cave, Whitwell, and pottery and a Roman brooch at Robin Hood's Cave, Creswell Crags, illustrate the continued use of the natural limestone caves.

There are 20 settlement sites noted in the HER and NMR as dating to the Roman or Romano-British period in this area together with the course of a north-south Roman Road which runs across the Magnesian Limestone. Romano-British enclosures are known from Sherwood Lodge, Bolsover (Jones 1995), and Stubbin Wood, Langwith Junction, with possible cropmark sites identified at Barlborough, Roseland Wood and Camp Hill, Elmton. A large Romano-British settlement exists at Scarcliffe Park (Lane 1973) and the remaining sites identified in the HER are Old Bolsover, Whitwell, Ault Hucknall and Scarcliffe, which are known from fieldwalking evidence (Hart 1981, 96), along with at least two earthwork sites known from Whitwell Wood. The amount of known enclosures probably dating to this period is the primary reason for the overall site density to be noticeably higher than that for the study area overall for the Romano-British period.

The HER notes that of the 28 findspots of Roman period material, one is an axehead or mattock, nine are pottery, nine are individual coins and the remaining three are coin hoards from Deer's Plantation, Langwith, Stuffyn Wood, Shirebrook and Whitwell.

4.2.2.5 Early Medieval (AD410-1066)

The east of Derbyshire lying on the Magnesian Limestone is poorly served with remains dating to the Anglo-Scandi-

Figure 4.2.6 The heavily slighted and overgrown rampart of Markland Grips promontory fort looking from the fort interior.

navian periods with the best evidence being the settlements noted in the Domesday Book – Barlborough, Whitwell, Clowne, Elmton, Scarcliffe, Glapwell, Houghton and Bolsover, which may have had Early Medieval precursors to the Later Medieval town defences, as shown by a small developer-funded excavation carried out by Archaeological Research and Consultancy at the University of Sheffield (ARCUS) which found a probable early medieval ditch underlying the medieval walls (Davies 2000). Anglo-Scandinavian place names are evident in the '-by' ending of places such as Blingsby and Stainsby. There is one early medieval site noted in the NMR which is represented by a radiocarbon on a sample of waterlogged wood excavated from a ditch at Fox Meadow, Creswell. It is evident from earlier periods that the Magnesian Limestone is an attractive place for settlement, and there is no identifiable reason that this should not be the case for the Early Medieval period. The fact that many of the principal towns and villages pre-date the Norman Conquest show that there was settlement in this area. It would seem likely therefore that the paucity of Early Medieval archaeological remains does not represent a real lack of Early Medieval settlement, and it is possible that the development of the industrial landscape and the contemporary expansion of the settlements has destroyed much evidence of the Early Medieval landscape.

4.2.2.6 Medieval/Middle Ages (AD1066-c.AD1700)

The medieval remains of the Magnesian Limestone region are, as with much of the rest of Derbyshire, characterised by scattered structural remains (both ecclesiastical and secular), historic cores of modern settlements, deserted and shrunken villages, and agricultural landscapes. Religious buildings which preserve some Medieval elements are: Glapwell chapel, Heath, Bolsover, St. Lawrence's at Whitwell, St. Leonard's at Scarcliffe, St. John the Baptist which is a Saxo-Norman church at Ault Hucknall (Hart 1981), St. James's at Barlborough, St. John the Baptist at Clowne, Holy Cross Church at Upper Langwith and the site of four former chapels at Palterton, Rowthorne, Stainsby and Upper Langwith. Alongside these known sites there are the possible Augustinian granges at Scarcliffe and Upper Langwith. The Magnesian Limestone hosts three Deserted Medieval Villages (Blingsby, Steetley and Tunstall) and two Shrunken Medieval Villages (Elmton and Palterton). There are Medieval barns remaining at Whitwell, Barlborough and Harlesthorpe, as well as estates at Hardwick Old Hall near Ault Hucknall, including a deer park, and also the site of Bassett Hall near Upper Langwith. There is also another large deer park delineated by a clear ditch and bank at Scarcliffe Park, which should be considered alongside other potential medieval organised landscapes at Whitwell,

Figure 4.2.7 The well defined park pale (earthen ditch and bank) delineating the boundaries of Scarcliffe Park.

Pleasley, Shirebrook and Barlborough.

Although extensively redeveloped, Bolsover retains some of the core of the planned medieval fortified town including a hospital at Spital Green, the church of St Mary and St Lawrence, the castle (although the modern appearance owes more to later- and post-medieval rebuilds), and a number of cruck-beamed houses (see Hart 1977; 1981; 1988).

There are a number of traces of medieval field systems and ridge and furrow across the Magnesian Limestone and these are noted above during the case study on the aerial photographic transcription area. Interestingly, as with other landforms discussed, there is also evidence on the Magnesian Limestone for medieval industry, in this case remains of quarrying at Palterton (Hart pers. comm..).

4.2.2.7 Post-Medieval – Modern (c.AD1700-present day)

The archaeological and historic resource relating to the Post-Medieval period primarily consists of the industrial remains in the villages and towns which grew up around the limestone quarrying industry and the coal extraction industry, given that the coal measures abut the east side of the Magnesian Limestone and also dip beneath it. Of particular interest to this work are the quarries at Barlborough and the large limestone quarries at Whitwell and Bolsover Moor. Not only have they shaped the landscape around them in terms of the expansion of local villages to accommodate the industry, but also archaeological work in and around their vicinities has provided a more-detailed understanding of the types of archaeology on the Magnesian Limestone.

The industrial villages of particular note in terms of the preservation of their industrial period historic character include: Barlborough, Bolsover New Town, Whitwell, Clowne and perhaps most importantly Creswell with its model workers' village that includes a station, drill hall, public baths and more-modern cinema and Arts and Crafts style vicarage, alongside social centres and schools.

Of special note is the proliferation of Methodist chapels across the area relating to the different sub-denominations of Methodism. There are seven Primitive Methodist Chapels, three United Free Methodist Chapels, two Wesleyan Methodist Chapels and a Congregational Methodist Chapel.

With both the medieval and post-medieval to modern periods, despite the prevalence of industrial remains, the density of sites is lower than for the study area overall. For the post-medieval period, a major reason for this is the lower ratio of quarry sites by area. On the Magnesian Limestone, there is a density of 0.01 sites per 100ha in comparison to 0.36 for the study area as a whole.

4.2.3 Evaluation and Mitigation Implications on the Magnesian Limestone (see table 7.3 for summary)

The evaluation and mitigation implications on the Magnesian Limestone are similar to those for the Carboniferous Limestone (1a). Despite the fact that the densities of archaeological sites known are different, this can be largely explained through the differences of post-medieval and modern land usage masking or impacting upon previous remains on the Magnesian Limestone.

Where development has the potential to impact upon cave sites, or the limestone gorges which may contain cave networks then there is also the potential to impact upon multi-period remains including those dating to the Palaeolithic period and therefore of major significance. Where such impacts are suspected, a very specific archaeological approach will be required, and this should be devised on a site-by-site basis with the local authority archaeologists and would typically include topographic survey and excavation, which can be labour-intensive within cave environments and therefore an expensive form of mitigation (see also Research Agenda – Chapter 7).

The developed agricultural landscape of the Magnesian Limestone hosted a large amount of medieval and post-medieval ridge and furrow, though much of it may have been truncated by modern agriculture and development. The areas of extant ridge and furrow are important for a number of key reasons. First such remains are important in their own right for the information that can be gleaned relating to the medieval and post-medieval farming landscape and how the Magnesian Limestone landscape has formed an attractive and fertile setting for agriculture. Secondly,

there is a key importance relating to ridge and furrow remains in the impacts that they have on any earlier remains. There is a clear negative effect in some cases, where the furrows may truncate earlier features, but ridge and furrow can also mask and preserve earlier remains (see also Research Agenda – Chapter 7).

As with the Carboniferous Limestone, preservation of bone is likely to be quite good on this landform, and the potential preservation of remains on this alkali-base landform should be factored into a mitigation programme to allow for analysis which may not be possible at similar sites on a more acidic landform such as Millstone Grit.

4.3. Landform 1d – Lava, basaltic lava, agglomerates, microgabbro

Landform element category 1d comprises areas where lava, basaltic lava, agglomerates and microgabbro both extrude and are the parent bedrock type. Landform 1d accounts for only 1990.73ha, which equates to only 0.6% of the total study area.

This landform occurs as thin bands and some larger concentrations of basaltic lava bedrock within the Carboniferous Limestone (1a), especially in the Buxton and Taddington area, and in some places extrudes as distinctive rock outcrops or forms scarp edges in the area of Matlock Bath among others. There are very few specific archaeological associations which can be tied to landform 1d with any degree of certainty. The fact that the landform occurs in such narrow bands and is the parent landform to relatively small areas, coupled with the margin of error inherent in the HER and BGS underlying mapping at this scale, means that the picture of the archaeological resource gained from the HER and NMR lists is similar to the Carboniferous Limestone, a correlation which would not otherwise be expected. An obvious example of this is the large amount of lead mining remains which overlap onto landform 1d, despite the fact that the basaltic lava does not contain lead veins. The site densities below are included for the sake of completeness and to ensure consistency between all chapters. While the inherent errors in mapping noted above apply to all landforms, the effect is magnified when landforms form narrow bands, in some cases only metres across. Table 4.3.1 below illustrates the correlation between the two landforms; the spike in the multi-period entries is due to the large amount of multi-period funerary monuments and lithic scatters on the Carboniferous Limestone. The topographic setting of cairns is discussed in chapter 4.1.

Whilst not quarried for aggregates, landform 1d has nevertheless been quarried in the past as dimension stone in its own right. Future impacts upon this landform are likely to be from impacts upon the Carboniferous Limestone within which this landform is located.

There was no dedicated aerial photograph transcription targeted on this landform, though portions of aerial photograph Block 1 covered areas of landform 1d. Block 1 is discussed in Chapter 4.1. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

In a number of cases, the hard basaltic lava forms distinct edges and rises in the landscape, which could have formed natural boundaries; indeed in the areas around Grangemill and Bonsall, it is possible to see the edges of the igneous rock preserved in the lines of the field boundaries (Fig. 4.3.1). It is also common for landform 1d to occur as bands within the sides of some of the steep-sided limestone gorges and valleys such as above the River Wye in Monsal Dale.

One of the few clear archaeological associations with the basaltic lava is the potential for the existence of cave/rock shelter sites where the non-permeable igneous rock can create hard 'floors' above which the limestone can erode. While there are only two cave sites noted in the combined HER and NMR lists, at Hob's House in Monsal Dale and Ball Eye Mine near Cromford where Palaeolithic animal remains were recovered, this still means a density of cave sites on landform 1d of 0.1 per 100ha, in comparison to 0.02 per 100ha for the Carboniferous Limestone, 0.06 per 100ha for the Magnesian Limestone and 0.0046 for the study area as a whole. As noted in chapters 4.1 and 4.2 (Carboniferous and Magnesian Limestone respectively) the cave sites within the limestone geologies have a long currency of use with the potential to house remains from the Palaeolithic through to the Roman period. A good example of this is the limestone rock outcrop known as Hob's House sitting above a band of igneous rock on the north flank of Fin Cop, Monsal Dale which has yielded evidence for activity in the Bronze Age and the Roman periods including deposition of human remains (Storrs Fox 1911), though a number of other cave sites in the immediate vicinity also contained some evidence of Palaeolithic activity and this cannot be ruled out at Hob's House.

The second key point to note is that due to the differences between the highly permeable Carboniferous Limestone and the igneous rocks which are impermeable the junction of these different geologies provides the opportunity for hanging springs to occur, such as at Middlehills, Wormhill (Hart 1976), Gratton Moor or above Grangemill which could have made them attractive locales for early settlement. The potential for settlement, or perhaps light industrial activity, at or close to these springs should be considered when assessing development impacts on or close to such areas.

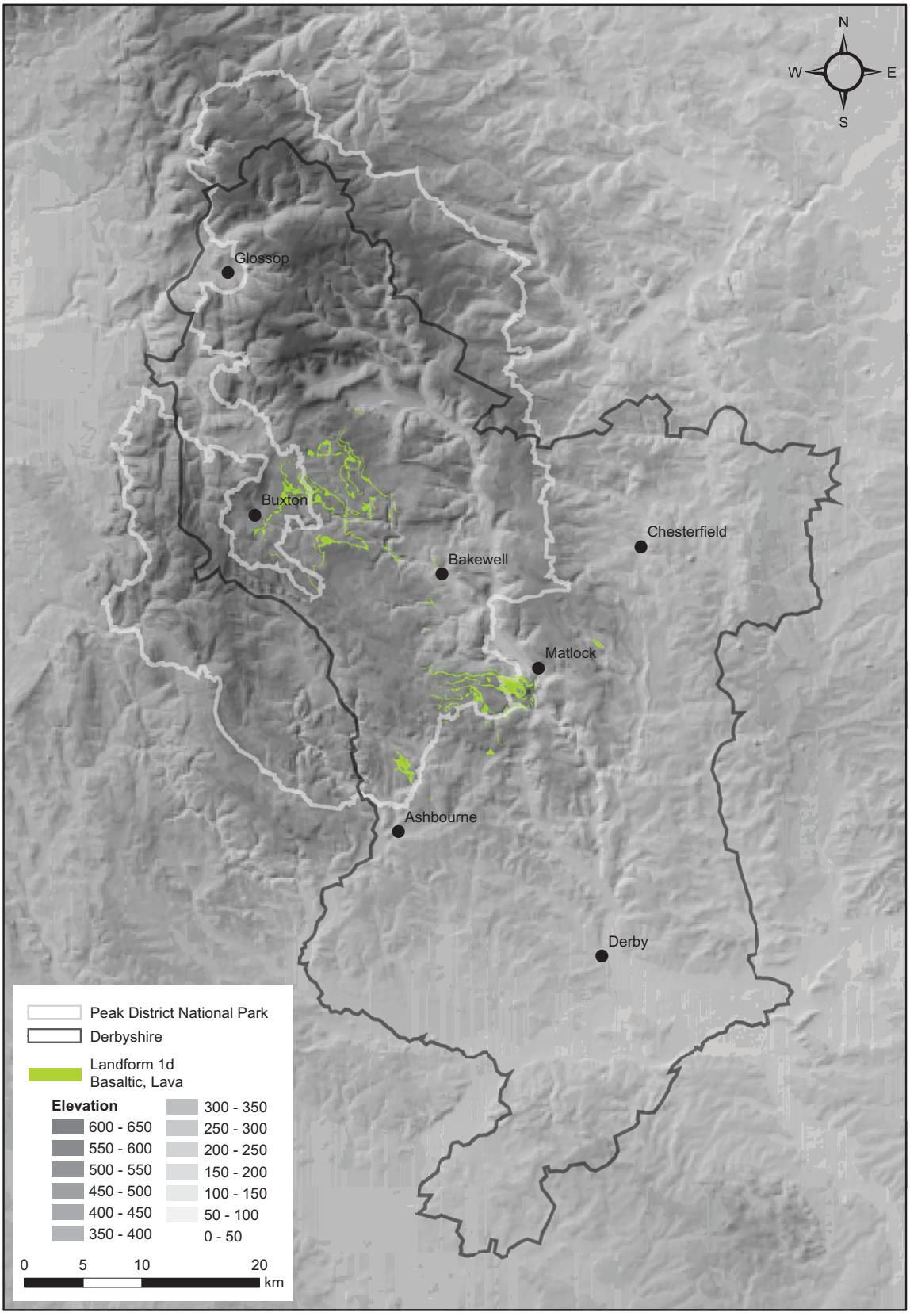

Figure 4.3.1 Extent of landform 1d – Lava, basaltic lava, agglomerates

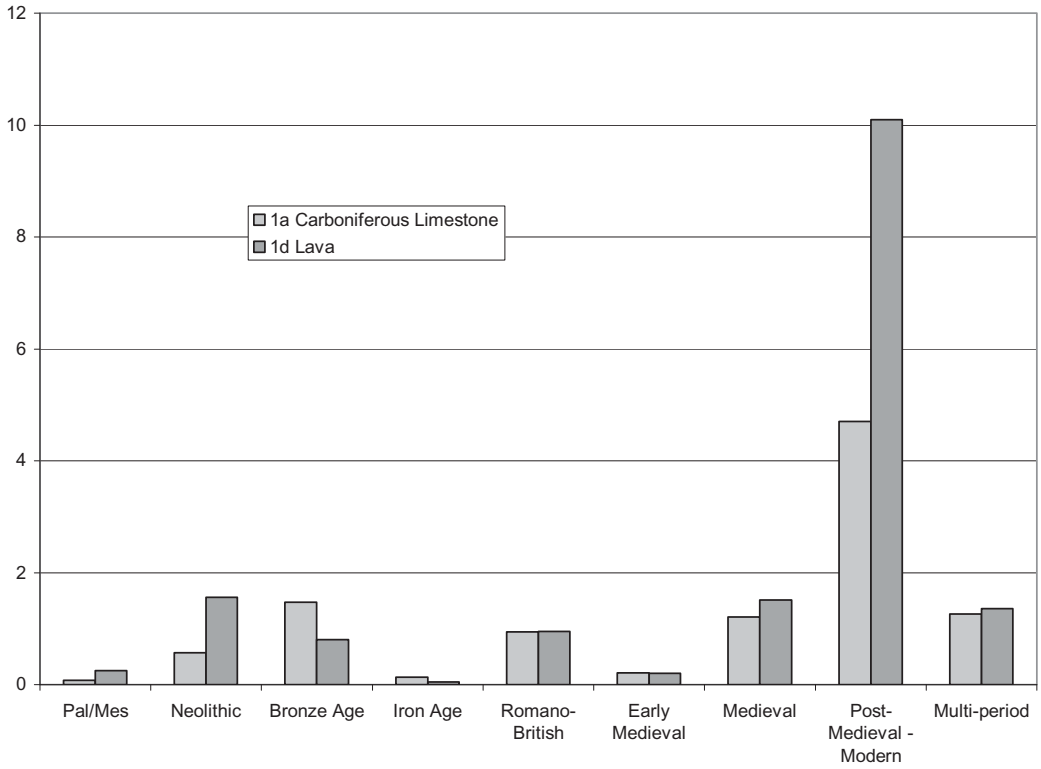

Figure 4.3.2 Relative densities of sites on landforms 1a and 1d expressed as number of sites per 100ha by period.

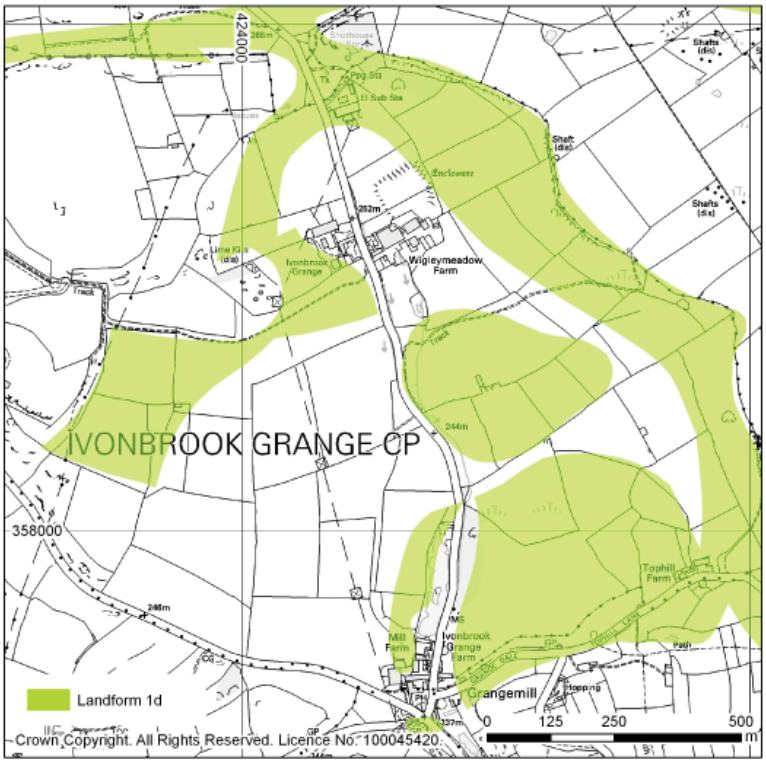

Figure 4.3.3 Field boundaries to the north of Grangemill which reflect the topography dictated by the bedrock.

The landform hosts 275 HER records and 103 NMR records of which 45 entries are duplicated giving a total number of known archaeological and historical sites of 333 within the combined lists. The breakdown of the sites within this combined list is presented in Table 4.3.1 below, where they are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 1d hosts a total site ratio of 16.73 sites per 100 hectares, though this may be artificially inflated by the amount of linear sites such as railways, toll roads and trackways which cross the landform. See chapter 7 for a discussion of the relative densities of sites on the various landforms. See table 7.4 for a summary of the information and management issues.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**5**	**0.3**	**0.12**	**1.502**
Cave	2	0.1	0.0046	0.3
Findspot	2	0.1	0.0611	0.601
Lithic Scatter	2	0.1	0.0456	0.601
Neolithic	**31**	**1.557**	**0.24**	**9.309**
Findspot	20	1.005	0.1216	6.006
Artefact Scatter	10	0.502	0.0173	3.003
Occupation Site	1	0.05	0.0027	0.3
Bronze Age	**16**	**0.804**	**0.4**	**4.805**
Barrows/Cairns/Burials	10	0.502	0.3019	3.003
Enclosure/Field System	1	0.05	0.021	0.3
Findspots	5	0.251	0.1146	1.502
Iron Age	**1**	**0.05**	**0.05**	**0.3**
Enclosure/Field System	1	0.05	0.0091	0.3
Romano British	**19**	**0.954**	**0.43**	**5.706**
Artefact Scatter (pottery)	1	0.05	0.0152	0.3
Enclosures/fields/settlements	7	0.352	0.0565	2.102
Findspots	1	0.05	0.1572	0.3
Roads and associated sites	10	0.502	0.0945	3.003
Early Medieval	**4**	**0.201**	**0.08**	**1.201**
Barrows/funerary monuments	1	0.05	0.0109	0.3
Earthworks/ditch	1	0.05	0.0033	0.3
Findspots	2	0.1	0.0219	0.601
Medieval	**30**	**1.507**	**1.1**	**9.009**
Boundaries/Linear Earthworks	4	0.201	0.0386	1.201
Church/Monastic Grange	2	0.1	0.0897	0.601
Cross/Sculpture	1	0.05	0.0377	0.3
Enclosures/Field Systems	18	0.904	0.3329	5.405
Halls/Farmstead	1	0.05	0.0973	0.3
Industrial Sites	4	0.201	0.0255	1.201
Roads	1	0.05	0.0143	0.3
SMVs	3	0.151	0.0219	0.901
Post Medieval	**201**	**10.097**	**3.39**	**60.36**
Aircraft crashsite	1	0.05	0.0103	0.3
Agricultural/Field Systems	33	1.658	0.3776	9.91
Enclosures	4	0.201	0.0295	1.201
Gardens/Lakes/Ponds	8	0.402	0.0684	2.402
Halls	5	0.251	0.08	1.502
Lead Mining	63	3.165	0.1985	18.919

Lime Working	4	0.201	0.0389	1.201
Mills and Associated Buildings	15	0.753	0.1839	4.505
Quarrying	39	1.959	0.3566	11.712
Railway Lines/Buildings	31	1.557	0.3049	9.309
Religious Buildings	8	0.402	0.1541	2.402
Roads/Tracks/Boundaries	11	0.553	0.1918	3.303
Other Buildings	15	0.753	0.4207	4.505
Multi-Period HER Entries	**27**	**1.356**	**0.37**	**8.108**
Agricultural Buildings	1	0.05	0.0006	0.3
Barrows/Funerary Monuments	1	0.05	0.0416	0.3
Boundaries/Field Systems	8	0.402	0.0073	2.402
Cave Sites	1	0.05	0.0012	0.3
Findspots	3	0.151	0.0046	0.901
Lithic Scatters	3	0.151	0.017	0.901
Religious Buildings	2	0.1	0.0116	0.601
Industrial Sites	8	0.1	0.0003	2.402
TOTAL SITES	**333**	**16.728**	**6.54**	**100**

4.4. Landform 1e – Sandstones

Landform 1e comprises what can be loosely termed the 'lowland sandstones'. The landform is predominantly found in the areas of southern Derbyshire where the Sherwood Sandstone is not overlain by substantial superficial deposits, along with larger bands of sandstone interbedded within the Mercia Mudstone and some pebble conglomerates in the Trent Valley. This landform also incorporates a small pocket of sandstone south of the Trent Valley in the area around Ticknall which, whilst a part of the Millstone Grit series, hosts a lowland, intensively-worked, agricultural landscape with archaeological associations similar to that of the Sherwood Sandstones. The sandstones of southern Derbyshire are generally a low-lying and rolling landscape cut by the major rivers of the county, which in this area of the county meander through wide open valleys in contrast to the deeply incised valleys of the uplands. To the south of the Trent, the side of the valley is defined by the sandstone bluff which serves as a focus for settlements overlooking the Trent valley to the north. The area of landform 1e encompasses 8227.45ha which represents 2.5 % of the total area of Derbyshire and the Peak District.

As with shales (1g) and mudstones (1k), the sandstones of landform 1e underlie superficial Late Pleistocene and Holocene deposits. Due to the scale of the geological mapping used, and inherent errors in some of the HER mapping, some larger sites may overlap onto the sandstone areas which are not specifically associated with this landform, for example, sites which are predominantly associated with till but also lie partially on sandstone with no significant superficial coverage. Where this is obviously the case this is either noted in the text or the site is removed from the data lists for this landform and discussed only in the corresponding superficial geology chapter.

The sandstones of landform 1e have seen reasonably extensive quarrying in the past, predominantly for dimension stone, though this is largely a niche market, and future extraction may well be limited on this landform.

4.4.1 Aerial Photograph Transcription Block 3

Block 3 of the aerial photograph transcription focused on the areas of the Sherwood Sandstone and the southern extremities of the Millstone Grit Series in two areas around Ashover and the Amber Valley, and Hulland Ward and Mercaston, with a third area examining the southern Carboniferous Limestone encompassing Ballidon, Aldwark and Bonsall, although the latter area is discussed in Chapter 4.1, and so from this point hence any reference to Block 3 in this chapter excludes this area.

Areas 1 and 2 of Block 3 encompass an area of 2600ha, of which 719.64ha (27.68 %) was landform 1e and 105.38ha (4.05 %) was landform 1f. The remaining areas within Block 3 were largely accounted for by Carboniferous Limestone (1a), Mudstones (1k), Shales (1g) as well as till (2a) and some undifferentiated drift deposits (2b).

On the Sherwood Sandstones themselves there is little clearly mapped archaeology, due in part to the large-scale quarrying which encompasses most of the area of landform 1e in the Block 3 window of detail. There are a few areas of medieval and post-medieval agriculture visible as boundary ditches and ridge and furrow that extend on to the sandstone from neighbouring landforms (principally 1k – mudstones and 1a – Carboniferous Limestone). The only substantial group of features visible from the aerial photograph transcription on the Sherwood Sandstones is the deserted medieval village of Mercaston which lies predominantly on the Mercia Mudstones (1k) but extends over narrow bands of interbedded sandstones (Fig. 4.4.3). Mercaston is visible due to the fact that it comprises upstanding earthwork remains. As ridge and furrow agricultural remains cloak much of the sandstone area and these areas are today given over mostly to grazing, the formation of cropmarks visible from the air is hindered on this landform. Therefore, there is little that can be confidently stated about the formation of cropmarks from the mapping of aerial photograph remains on the Sherwood Sandstone due to the bias created by subsequent landscape taphonomy and land-use practices.

Block 3 also incorporates a small portion of the Millstone Grit series around Ashover and the Amber Valley. Of the few features mapped on this landform, they all represent either post-medieval/modern quarrying or agriculture.

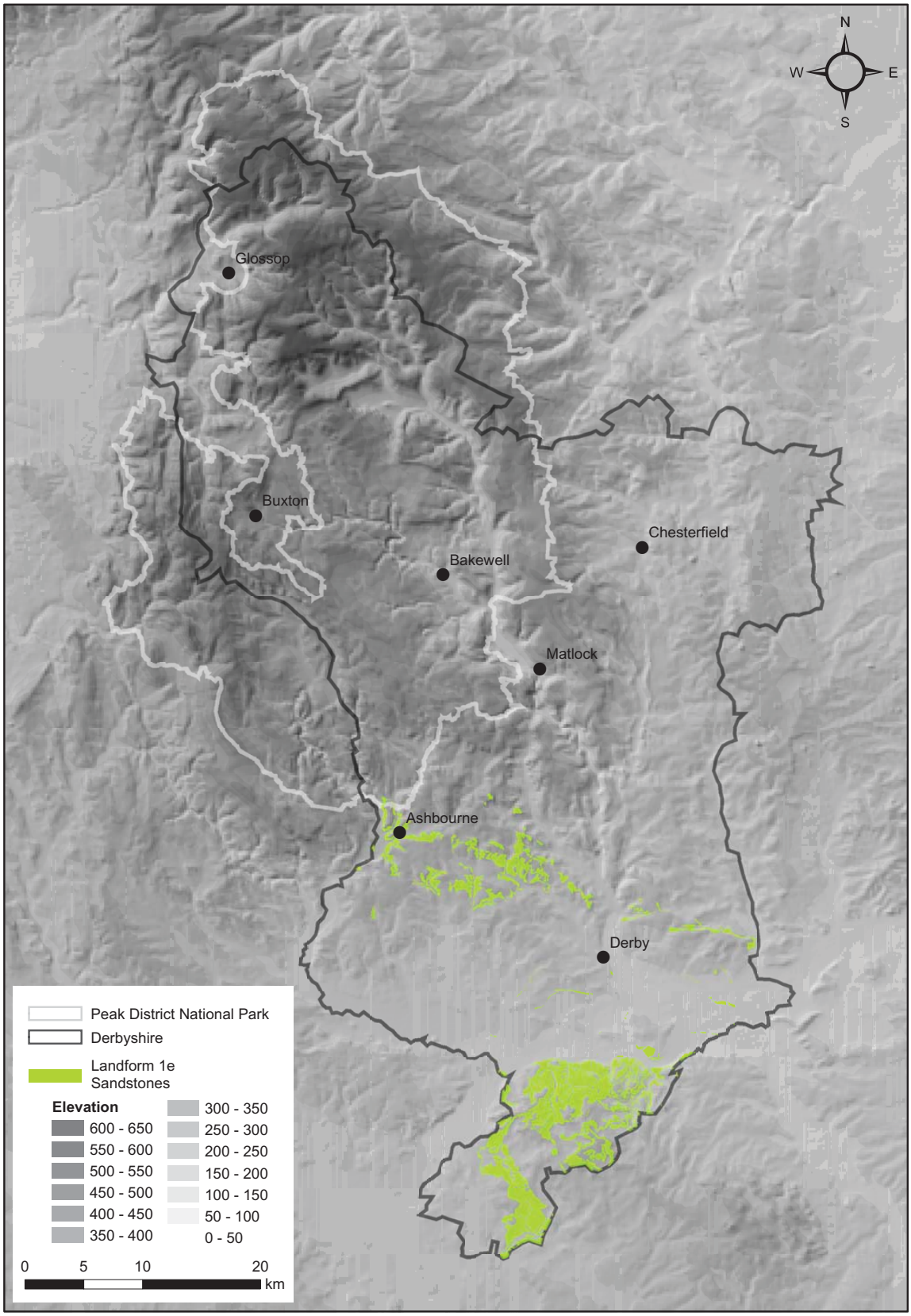

Figure 4.4.1 Extent of landform 1e – Sherwood and other low-lying sandstones.

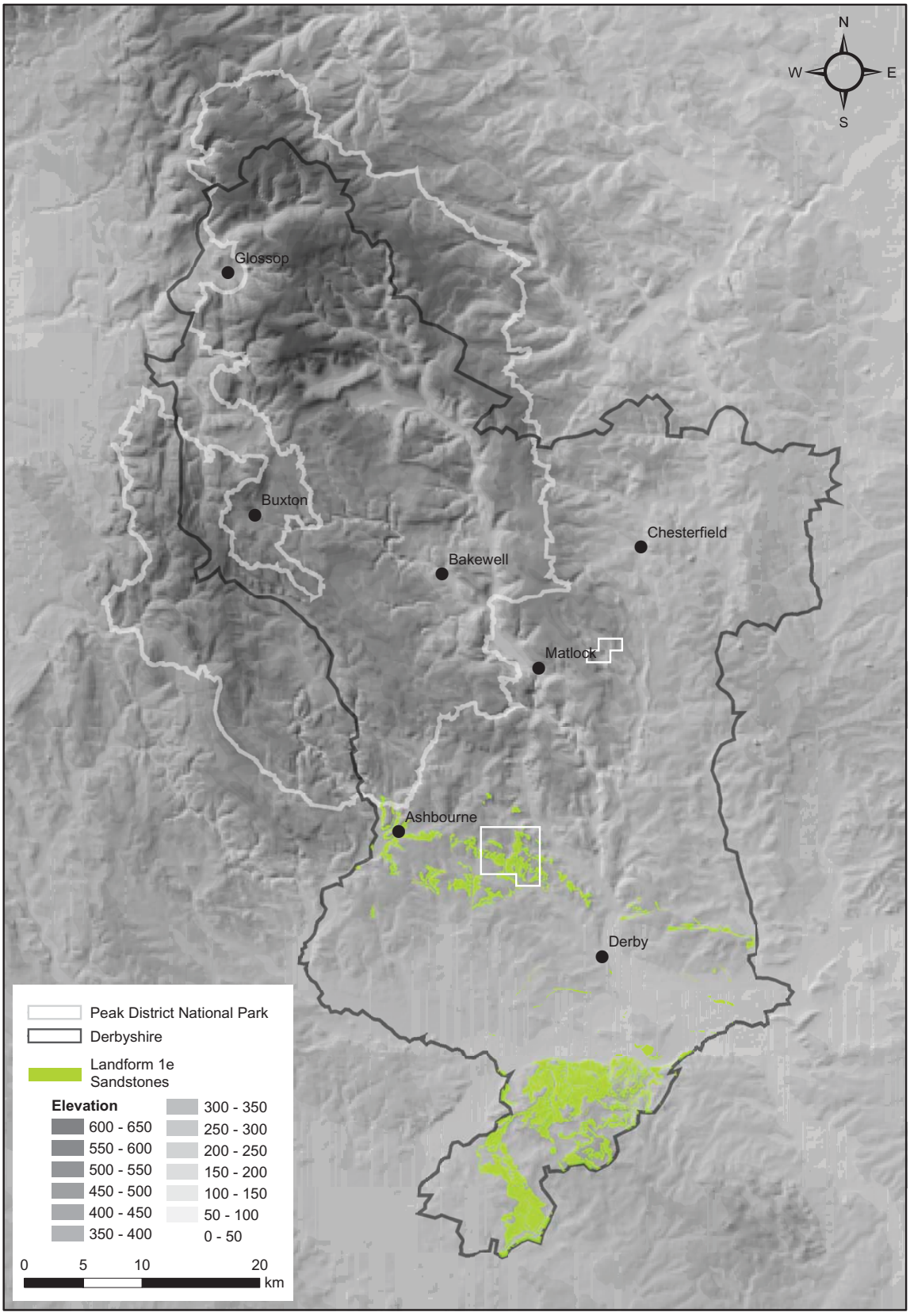

Figure 4.4.2 Extent of Landform 1e showing aerial photograph transcription block 3.

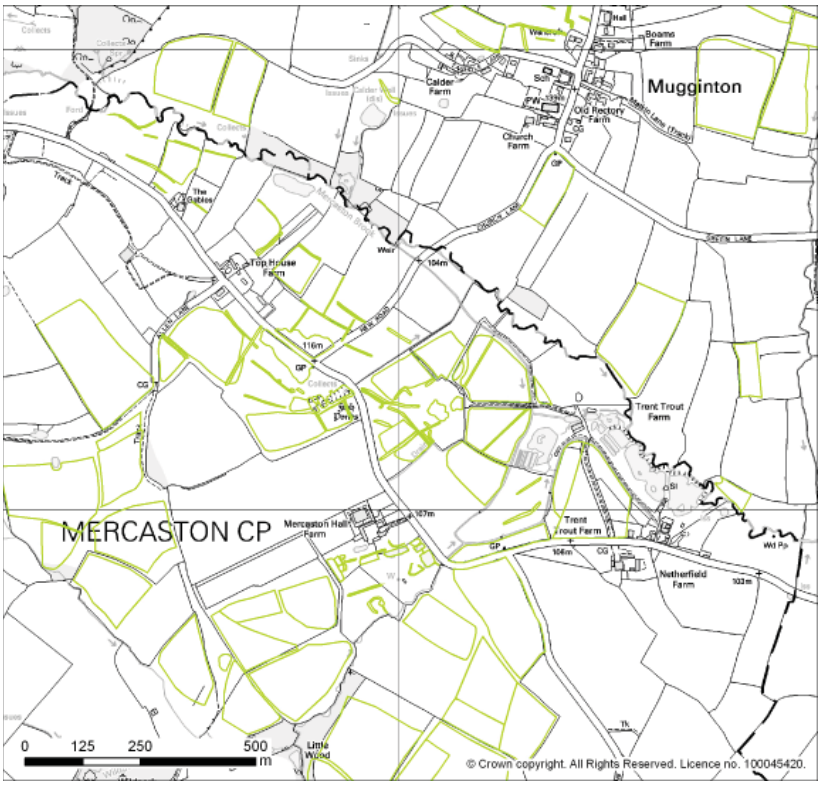

Figure 4.4.3 Upstanding remains and associated ridge and furrow field systems of the deserted medieval village of Mercaston.

4.4.2 Archaeological Associations (chronological)

The sandstones landform hosts 443 HER entries and 251 NMR entries of which 366 are duplicated giving a total number of known archaeological and historical sites of 328 within the combined lists. The breakdown of the sites within this combined list is presented in Table 4.4.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 1e hosts a total site ratio of 7.21 sites per 100 hectares, the second lowest ratio for a bedrock geology landform for which there is a reasonable volume of data. See chapter 8 for a discussion of the relative densities of sites on the various landforms.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
PalMes	**0**	**0**	**0.12**	**0**
Neolithic	**2**	**0.02**	**0.24**	**0.27**
Findspot	2	0.02	0.1216	0.27
Bronze Age	**8**	**0.09**	**0.4**	**1.09**
Findspots	3	0.03	0.1146	0.41
Round Barrows	5	0.05	0.3019	0.68
Iron Age	**5**	**0.05**	**0.05**	**0.68**
Findspot	1	0.01	0.021	0.14
Enclosures	1	0.01	0.0091	0.14
Pit Alignment	3	0.03	0.0106	0.41
Romano British	**18**	**0.19**	**0.43**	**2.45**
Artefact Scatter (pottery)	3	0.03	0.0152	0.41
Findspots	7	0.08	0.1572	0.95

Roads and associated sites	8	0.09	0.0945	1.09
Early Medieval	**14**	**0.15**	**0.08**	**1.91**
Burial	3	0.03	0.0109	0.41
Cemetery	2	0.02	0.0012	0.27
Church/Chapel	2	0.02	0.0024	0.27
Findspot	3	0.03	0.0219	0.41
Settlement/Enclosure	1	0.01	0.0067	0.14
Sculpture	3	0.03	0.0106	0.41
Medieval	**158**	**1.7**	**1.1**	**21.53**
Boundaries/Linear Earthworks	5	0.05	0.0386	0.68
Cave	1	0.01	0.0006	0.14
Church	16	0.17	0.0897	2.18
Cross/Sculpture	6	0.06	0.0377	0.82
Deer Parks/Parks	11	0.12	0.0423	1.5
DMV's	2	0.02	0.0353	0.27
Enclosures/Field Systems	61	0.66	0.3329	8.31
Findspots	4	0.04	0.0872	0.54
Fishponds	3	0.03	0.0097	0.41
Halls/Farmstead	23	0.25	0.0973	3.13
Industrial Sites	3	0.03	0.0255	0.41
Motte and Bailey	1	0.01	0.0055	0.14
Preceptory	1	0.01	0.0006	0.14
Quarrying Remains	9	0.1	0.0255	1.23
Roads/trackways	7	0.08	0.017	0.95
SMVs	4	0.04	0.0219	0.54
Well	1	0.01	0.0012	0.14
Post Medieval-Modern	**492**	**5.29**	**3.39**	**67.03**
Agricultural buildings /Field Systems	77	0.83	0.3776	10.49
Canals and associated buildings	6	0.06	0.0237	0.82
Findspot	3	0.03	0.0313	0.41
Gardens/Lakes/Ponds	36	0.39	0.0684	4.9
Halls/Large Houses	26	0.28	0.08	3.54
Industrial Sites	30	0.32	0.038	4.09
Military Sites	12	0.13	0.0471	1.63
Mills and Factories	37	0.4	0.1839	5.04
Quarrying/Stone Working	57	0.61	0.3566	7.77
Railway Lines/Buildings	36	0.39	0.3049	4.9
Religious Buildings	12	0.13	0.1541	1.63
Roads/Tracks/Boundaries	21	0.23	0.1918	2.86
Other Buildings	132	1.42	0.4207	17.98
Wells/Pumps	7	0.08	0.0295	0.95
Unknown Date	**37**	**0.4**	**0.47**	**5.04**
Enclosures/earthworks	27	0.29	0.1523	3.68
Pit Alignments	2	0.02	0.0006	0.27
Quarries	7	0.08	0.003	0.95
Trackways	1	0.01	0.007	0.14
TOTAL SITES	734	7.89	6.54	100

Table 4.4.1 Breakdown of all sites on the sandstones by period and site type.

4.4.2.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000BC-3900BC)

There are no known sites dating to the Palaeolithic or Mesolithic periods for the landform within the HER and NMR lists. Given the relative ubiquity of lithic tools as individual findspots and in scatters across most of the rest of Derbyshire and the Peak District, it is possible that this absence of data for the sandstones represents a real pattern of land use with the hunter-gatherers of early prehistory preferring to utilise other landforms and perhaps largely avoiding the lowland sandstone landscapes. Alternatively, these areas may have been used but, as there has been little opportunity for systematic collection of flints due to the extent of pasture, such sites remain elusive. The strategic position of the sandstone bluffs overlooking the wide flood plain of the Trent provide locales conducive to earlier hunter-gatherer settlement and it is worth noting in this regard the discovery of Late Upper Palaeoloithic sites at Farndon in Nottinghamshire near Newark (Garton and Jacobi 2010) (see also Research Agenda – Chapter 7).

4.4.2.2 Neolithic (3900BC-2200BC)

There are only two known Neolithic findspots on this landform, one of the lowest ratios of Neolithic finds across any of the landforms. Both finds are Neolithic stone axe heads; one found on the local watershed in the gently undulating landscape to the west of Dale Abbey, the second was found on the flanks of a localised high spot in the very south of the county overlooking the River Mease. There can be little inferred from two solitary Neolithic finds other than if other biases such as a lack of fieldwork or development can be ruled out, then this would suggest that, as with earlier prehistoric activity, the sandstones were perhaps not an attractive locale for Neolithic settlement (see also Research Agenda – Chapter 7).

4.4.2.3 Bronze Age (2200-700BC)

There is a slight increase in the amount of archaeological records for the Bronze Age in comparison to the earlier periods. A barbed-and-tanged arrowhead was recovered from a field just off the summit of a hill to the west of Melbourne, and a bronze socketed axehead was found by a metal-detectorist on a false crest of the large hill which is encompassed by Allestree Park to the north of Derby. This is a notable natural eminence and would be the type of location one might reasonably expect a Neolithic-Bronze Age funerary cairn, though no trace of such a monument has ever been recorded. There are five round barrows or cairns known, though the precise location of three of these is now lost somewhere on the saddle of high ground to the south-west of Fenny Bentley overlooking Dovedale. A further barrow is known from the visible high ridgeline to the west of Ashbourne. The final site is a ring ditch barrow known from aerial photography, situated in a natural hollow in the rolling landscape south of Litton in the very south of the county. Despite this slight increase in known sites for the Bronze Age in comparison to early prehistory, the density of sites on this landform is still over four times lower than the average for the study area as a whole.

4.4.2.4 Iron Age (700BC-AD43)

As with the other prehistoric periods, the remnants of the Iron Age are relatively sparse in the archaeological record for the sandstones, numbering one findspot, four possible enclosure/field system sites and a pit alignment. This scarcity of Iron Age archaeology is more in keeping with the other landforms, as there is a density on this landform of 0.06 sites per 100ha, very similar to the relative density on the mudstones (landform 1k) and close to the average for Derbyshire and the Peak District as a whole.

The single known findspot is a beehive quern from the churchyard of St. Giles' in Sandiacre. This is an interesting find as the churchyard occupies a bluff above a steep slope defined by the sandstone geology, dropping to the flat plain of the river Erewash to the east. The topographic setting has a number of similarities to the riverine lowland 'hillfort' of Borough Hill on the mudstones (1k, chapter 4.9), and with the churchyard and extensive modern development in the area, it is probable that had there been an Iron Age settlement on the site, any upstanding remains would have been lost.

The known cropmark sites are three pit alignments, similar to those known on the Trent Valley sands and gravels (2c) from sites such as Willington Quarry (Wheeler 1979) and Mercia Marina (Brightman and Waddington forthcoming), and a rectilinear enclosure. Two of the pit alignments and the rectilinear enclosure are clustered around the confluence of the River Mease and Hooborough Brook. While not occupying defensible positions per se, these three sites

again show a preference for localised high points overlooking watercourses. The final pit alignment, also identified through aerial photography, lies just off the summit of a local high point at Stanton's Wood, north of Ticknall. It is key to also note that there are a number of sites known from aerial photography which are classed as being of unknown date, including two pit alignments which are possibly of Iron Age date.

4.4.2.5 Romano-British (AD43-410)

With only 18 sites in the archaeological record dating to the Roman period, the sandstones could appear not to be a primary choice of location for settlement and industry following the apparent, though not necessarily real, pattern of prehistoric activity. Seven of the fourteen sites relate to various stretches of the Roman road network which cross the landform, and in the absence of more-detailed knowledge of the Roman period across the sandstones, there must be some merit ascribed to the course of the roads and their potential for other archaeological sites to cluster around them as well as to link nodes of early settlement. This has important implications for targeting future fieldwork.

The ten sites not represented by the road network are seven individual findspots and three scatters of pottery. One of the pottery scatters and three of the five findspots (coins) were all found within the vicinity of Melbourne, with the fourth, a votive statuette and coins, located c.7km further west on the outskirts of Repton. All these Roman finds were located on the flanks of hills or the summits of localised high points on the raised ground that defines the southern border of the Trent Valley. The remaining pottery scatter was collected from a ploughed field immediately east of Ticknall High Street. Much of the area around Ticknall has been impacted upon by the medieval and later pottery industry and also quarrying and extraction, and it is possible that earlier archaeological remains, such as the Roman pottery scatter noted here, have been destroyed or removed. The final findspot known on this landform, is a rotary quern found in the valley bottom of the Henmore Brook near Ashbourne School. Whilst this is recorded as a single find, it is possible that it could have come from nearby in-situ deposits, which illustrates the potential for water courses to be foci for settlement.

4.4.2.6 Early Medieval (AD410-1066)

There are 13 known sites on the sandstones dating to the early medieval period. The relative density of 0.15 sites per 100ha, is the second highest of any landform after the Carboniferous Limestone (due to the wealth of Anglo-Saxon barrow burials), and especially noteworthy in respect of the paucity of archaeological sites and finds known for earlier periods. This must be tempered however with the fact that the majority of these known sites are clustered around three locales, two of which are arguably the most important and best-known sites for the early medieval period in Derbyshire.

The first cluster of archaeological sites and finds is at Repton in the Trent Valley. Along much of the southern Trent Valley, the sandstones define a small yet noticeable rise in altitude above the alluvial valley floor and the flanking sand and gravel terraces and the site of Repton sits on the edge of this geological shelf. As well as two Anglo-Saxon coins found in Repton, the church of St. Wystan's, named after the murdered Mercian prince also known as Wigstan (Walker 2000, 39) is an Anglo-Saxon foundation and the original Anglo-Saxon crypt still exists below the medieval church making this a nationally important site. Repton was an important ecclesiastical centre of the Kingdom of Mercia, and the extant St. Wystan's was only a small part of the original Anglo-Saxon monastic foundation (Walker 2000, 190). The most extensive remains at Repton relate to the over-wintering of the Viking Great Army in 873-4. Remains are known of a large 'D'-shaped enclosure, a number of small graves, and an exceptionally rare mass grave which contained the remains of at least 249 individuals (Biddle and Kjølbye-Biddle 1992). The full extent of early medieval remains at Repton is yet to be established although it is likely that much of the modern settlement, including Repton School, overlies important archaeological remains.

The second group of early medieval sites is around Heath Wood, Ingleby. The Heath Wood site itself is on rising ground south of the Trent, again defined by the end of the superficial valley deposits with the sandstone forming a clear valley side. Heath Wood was the first known Viking cremation cemetery in Britain, and originally comprised at least 59 barrows. It has been suggested that this site may have been the final resting place of some of the war dead from the Great Army of 873-8, noted above (Richards 2004).

The final group of known early medieval remains is around King's Newton. A fragment of Anglo-Saxon stone

sculpture is known from the town and the early medieval cremation cemetery discussed in chapter 4.9 (Mudstones) is only one kilometre to the east. Since the location of the cemetery is now lost it is possible that it lies on this landform rather than the mudstones, though this remains speculative.

The remaining early medieval sites are St. Michael's church at Stanton by Bridge near to Repton, which contains early medieval fabric, and an inhumation known from Brizlingcote which was accompanied by an Anglo-Saxon cruciform brooch. It is also worth noting that in the area of the Trent Valley, there are a number of examples of place-names with a Scandinavian component, for example 'Ingleby'and 'Bretby', but it is telling that Scandinavian components are incredibly rare within the northern uplands of Derbyshire and the Peak District, though the occurrence of Anglo-Scandinavian sculpture in the Peak District must be noted, as discussed in Chapters 3 and 4.1.

4.4.2.7 Medieval/Middle Ages (AD1066-c.AD1700)

As has been noted for other landforms, most notably the mudstones which share a number of similarities with the sandstones, there is a dramatic increase in known archaeological sites and finds dating to the medieval period when compared to earlier periods.

There is a single motte and bailey site known on the sandstones at Castle Hill, Castle Gresley, at the very southern extent of Derbyshire. The site stands on a shallow hillside above a small brook (now also the route of the railway line) and is overlooked from the north by a local highpoint. The situation of the motte is not a 'classic' defendable position such as Tutbury Castle which stands on a steep-sided hill inside a river bend (see chapter 4.9 Mudstones). No other finds are recorded in the immediate area though the name of the modern village of 'Castle Gresley' would lend support to this site being a genuine motte and bailey site.

Enclosures and field systems, principally identifiable as ridge and furrow cultivation remains, are widespread across this landform and reflect the widespread extent of agriculture during the medieval period. The survival of such remains alongside the known deserted and shrunken medieval villages, also illustrates the periods of depopulation during the Middle Ages. On the sandstones, the known deserted medieval villages are Weston, which sits close to the modern settlement of Weston-on-Trent in the Trent Valley, and Mercaston noted above in the discussion of the Block 3 aerial photograph transcription.

There are seven separate entries of quarrying remains in the HER and NMR for the medieval period, all of which are now disused. It would seem reasonable to suggest that some of the larger post-medieval and modern quarries on the landform began in the medieval period, though all trace of the earliest workings are now lost. The few medieval sites known may represent small-scale activity which for some reason was discontinued and never revived, possibly an archaeological expression of the same depopulation trends which created the deserted villages. The sandstone is heavily quarried across south Derbyshire, and where there are remains of medieval or earlier quarrying identifiable then this is of considerable historical value in charting the emergence of this industry during the medieval or earlier periods.

As with many of the other landforms, deer parks and parks and gardens associated with large houses and halls account for a small but significant amount of the known medieval sites, in particular see the examination of Duffield Frith (Wiltshire et al. 2005) and the overall analysis of medieval parks by Wiltshire and Woore (2009). A key point to note with large landscape-scale sites such as parks, which may cover a large area, is that they have the potential to both preserve earlier remains in any areas of the park which have remained largely free of modern development, and also to preserve earlier boundaries and land divisions. As an example, the Ravensdale Deer Park sits directly to the north of the deserted village of Mercaston. Whilst much of the centre of what was the park has been removed by substantial quarrying, the surviving areas are free of any other post-medieval or modern development and therefore have the potential to contain archaeological remains associated with the deserted settlement or earlier periods.

4.4.2.8 Post-Medieval – Modern (c.AD1700-present day)

The dramatic increase in known sites for the post-medieval and modern periods is well noted across all landforms and the picture is broadly similar for the sandstones. There are, however, a few notable differences, principally the large number of known post-medieval quarrying and brick-making sites in relation to other types of site. As with the Carboniferous Limestone (1a) and also the Millstone Grit (1f), the Sherwood Sandstones have, historically, been

a focus for quarrying and a source for much building stone. As has been noted above in relation to the Block 3 aerial photograph transcription, the majority of the mapped sandstones area is accounted for by post-medieval and modern quarrying which will have undoubtedly impacted on the archaeological record for this landform by removing much of it. This type of industrial activity is perhaps another reason why the volume of known sites on this landform appears on first inspection to be low.

The other major categories of site represented in the archaeological record for the post-medieval period include agricultural buildings and field systems, gardens and parks, the railway system and also other forms of built heritage. The density of agricultural sites on this landform is 0.83 per 100ha in comparison to the density of quarry sites of 0.61 per 100ha, which illustrates the closer parity between the two types of site and probably therefore the two types of activity, than on many other landforms. As a comparison, the shales and siltstones (Chapter 4.7) have a density for agricultural sites of 1.44 per 100ha and a density for quarry sites of 0.13 per 100ha displaying the importance of agriculture on a landform where mineral resources are sparse and difficult to win.

4.4.3 Evaluation and Mitigation Implications on the Sandstones (see table 7.5 for summary)

The Sherwood Sandstones are inextricably associated with the quarrying of this rock type, which has been undertaken at many locations across this landform on a large scale since the medieval period, and very probably on a smaller scale in earlier periods. It has to be acknowledged that the scarcity of archaeological sites and findspots on the sandstone may be in some part a product of the landscape-scale impacts which quarrying has had, however the almost total absence of known finds for the earlier periods of prehistory in comparison with other landforms is suggestive of a genuine pattern (see also Research Agenda – Chapter 7). In comparison to the sandstones, the Carboniferous Limestone (1a) is also very heavily quarried and mined, yet over 20% of the known sites and finds on the landform belong to the Palaeolithic through to the Bronze Age as opposed to 1.5% of known sites and finds on the sandstones. Absence of evidence can never be unequivocal evidence of absence however, and the pre-Iron Age archaeology of the sandstones must be a research focus, as the current picture shows it to be markedly different to most of the other landforms within Derbyshire and the Peak District, and more data is required for this to be fully understood. On other landforms, fieldwalking has been responsible for much of the known archaeology relating to the earlier periods of prehistory, and a lack of such fieldwork on this landform may have hindered the recognition of lithic scatters for example. The use of fieldwalking as a rapid and accurate prospection and evaluation technique has been proven to be effective on other landforms, and if applied to the sandstones this would provide a means of testing the apparent lack of early prehistoric archaeology (see also Research Agenda – Chapter 7).

Whilst the aerial photographic transcription of Block 3 has yielded very little, this is predominantly due to the large-scale quarrying noted above and the effects of fossilized ridge and furrow agricultural systems that serve to mask earlier remains from aerial detection.. There are a number of enclosures, field systems and other sites, including a potential Bronze Age ring ditch monument near Litton in south Derbyshire which have been located through aerial photography. It would seem reasonable to suggest that where the sandstone landscape has not been impacted upon by development and quarrying, and the ground is regularly ploughed for agriculture, the potential for cropmark formation is good and examination of aerial photographs should form a part of site evaluation (see also Research Agenda – Chapter 7).

The known Iron Age findspot on the river bluff at Sandiacre illustrates the potential importance of archaeological work in topographic settings similar to the Borough Hill 'hillfort'. If there is a tradition of lowland 'hillforts' along the major river routes, then this would open a new avenue of research for a period which, for Derbyshire and the Peak District, is poorly understood at best (see also Research Agenda – Chapter 7).

Due to the relative lack of known Roman archaeology on the sandstones, a high level of importance must be ascribed to the road network. It can be the case that the Roman roads attract ancillary settlement and any extraction or development impacting upon a suspected road line must involve archaeological work to sample the wider area. Mitigation for development which impacts upon the suspected route of a Roman road might include the following: fieldwalking if the conditions are suitable, geophysical survey to test for the presence of structures associated with the road line and also the course of the road line itself, limited evaluation trenches to test geophysical results with regard to the position of the road if this is deemed necessary, and targeted excavation based upon the results of the

prospection techniques employed.

The sandstone 'ridge' which forms the southern edge of the Trent Valley appears to be an attractive setting for settlement, still evident today in the position of modern villages along the 'ridge' or bluff line looking northwards across the wide expanse of the river valley. During the Roman period, the known findspots gather along this 'ridge', and into the early medieval period, the southern side of the mid-Trent Valley appears to maintain this importance. The Anglo-Saxon settlement site of Willington Quarry (Wheeler 1979) and predominantly funerary site at Swarkestone Lowes (Elliott and Knight 1999) both lie on the sands and gravels, but the key centres of Viking activity in Derbyshire cluster on the southern sandstone rise south of the Trent, at Repton and Ingleby. There is little need to flag up the importance of these individual sites as they are perhaps the best known early medieval sites in Derbyshire, along with the Benty Grange burial, but this apparent pattern of activity of favouring the sandstone 'ridge' through the Roman and early medieval period should be given full consideration prior to development taking place in the area.

4.5. Landform 1f – Millstone Grit

Landform 1f encompasses all the Millstone Grit and also almost all sandstone which is interbedded within the Millstone Grit series. This can be generally summarised under the title 'upland gritstone and sandstone'. The Millstone Grit forms the 'horseshoe' of rocks surrounding the Carboniferous Limestone plateau and is often referred to as the 'Dark Peak' in contrast to the limestone 'White Peak'. The modern landscape of the Millstone Grit broadly comprises upland moorland with large swathes of unimproved yet enclosed pasture, in contrast to the more agricultural landscapes associated with many of the other landforms. It would be greatly misleading to define the Millstone Grit as a fringe landscape however, as during many periods of prehistory and historic times there has been much settlement and activity, including both farming and industry which has utilised the Millstone Grit moorlands. Indeed it hosts some of the most spectacular archaeology of the region and has contributed much to regional and national archaeological narratives. Many of the most famous features of the Millstone Grit occur where this hard rock forms distinctive edges and tors, and as can be seen below these have formed foci of activity over many periods of human activity.

Certain portions of the Millstone Grit continue to see active extraction for dimension stone, predominantly in the area around Stanton Moor. Whilst, under current policy, future new permissions are unlikely within the Peak District, there are a number of active permissions on the Millstone Grit.

The area of landform 1f encompasses 64,372.94ha which represents 19.57% of the total area of Derbyshire and the Peak District.

There was no dedicated aerial photograph transcription targeted on this landform, though a substantial portion of aerial photograph Block 3 covered areas of landform 1f. Block 3 is discussed in Chapter 4.4. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

Figure 4.5.1 Distinctive Millstone Grit landscape of the northern 'Dark Peak' looking towards Dovestones Reservoir in Saddleworth.

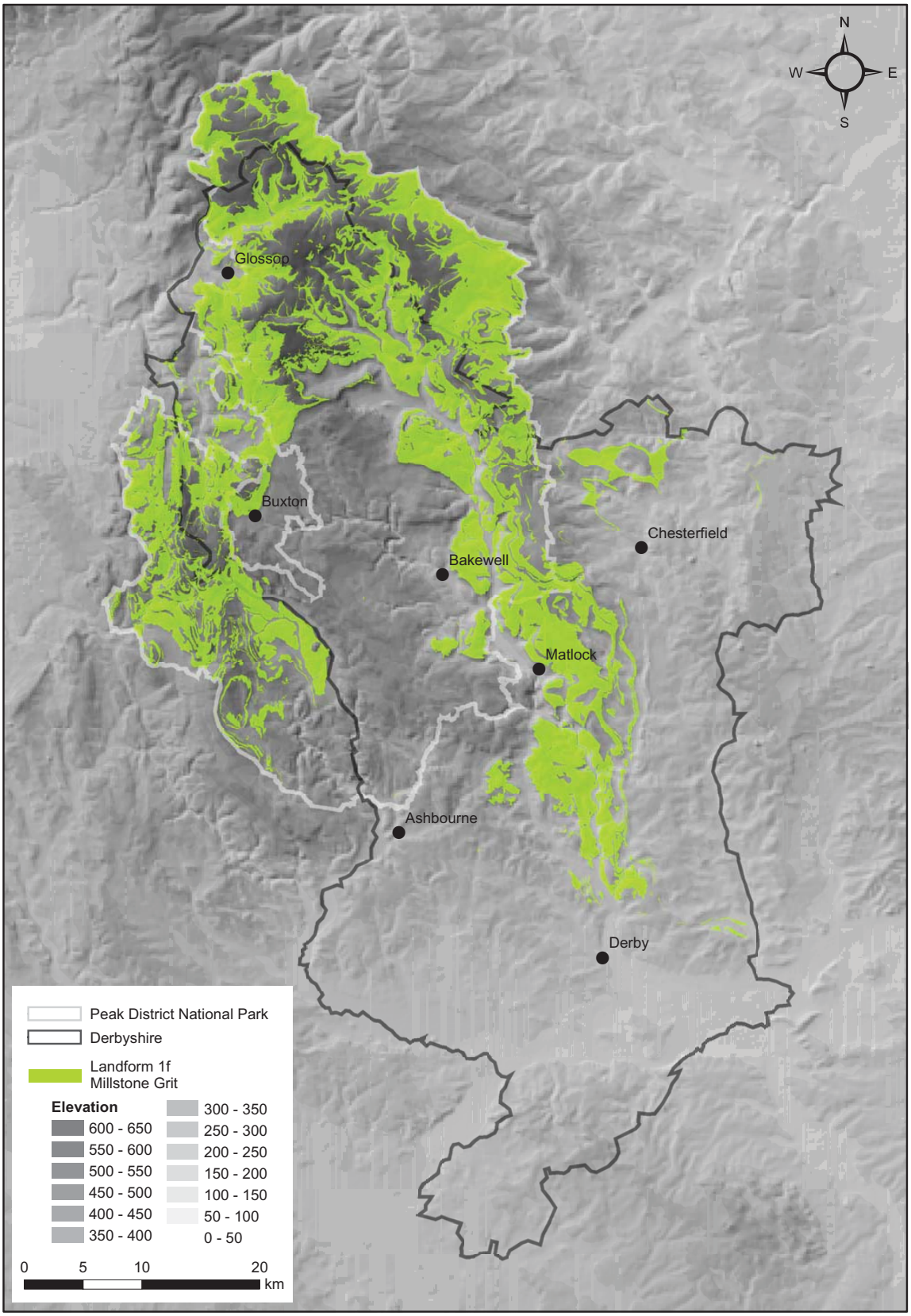

Figure 4.5.2 Extent of landform 1f – Millstone Grit.

4.5.1 Archaeological Associations (chronological)

The gritstone landform hosts 3482 HER entries and 1429 NMR entries of which 2858 are duplicated giving a total number of known archaeological and historical sites of 2053 within the combined lists. The breakdown of the sites within this combined list is presented in Table 4.5.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 1f hosts a total site ratio of 3.17 sites per 100 hectares, which is the lowest overall ratio of sites for any landform, representative of the reasonably sparse settlement and activity over the highest and most 'marginal' areas of this landform. However, given the lack of modern development, settlement and exposed ground on the gritstone, and its shrouding in thick heather over much of its area, the visibility and detection of archaeological remains is restricted more here than on any other landform. It is a combination of the above factors that account for the apparent low density of known archaeological remains on this landform. See chapter 7 for a discussion of the relative densities of sites on the various landforms. The potential for this landform to host remains is amply demonstrated by the densities for the Mesolithic and Bronze Age periods. In very rough terms, the density for these two periods is twice as much as the overall mean, but for all other periods up until the early medieval the density is half that of the mean, and from the early medieval period onwards, it is a third or quarter of the average for Derbyshire and the Peak District as a whole.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**135**	**0.21**	**0.12**	**6.58**
Findspot	69	0.11	0.0611	3.36
Lithic Scatter	64	0.1	0.0456	3.12
Rock Shelter	2	0	0.0046	0.1
Neolithic	**72**	**0.11**	**0.24**	**3.51**
Artefact Scatter	6	0.01	0.0173	0.29
Chambered Cairn	1	0	0.0094	0.05
Findspot	64	0.1	0.1216	3.12
Long Cairn	1	0	0.0094	0.05
Bronze Age	**483**	**0.75**	**0.4**	**23.53**
Artefact Scatter	4	0.01	0.0027	0.19
Barrows/Cairns	216	0.34	0.3019	10.52
Cairnfields	55	0.09	0.0255	2.68
Cremation Cemetery	3	0	0.0021	0.15
Enclosure/Field System	48	0.07	0.021	2.34
Findspots	97	0.15	0.1146	4.72
House Platforms/Structures	20	0.03	0.0109	0.97
Rock Art	9	0.01	0.004	0.44
Standing Stone/Stone Circle	31	0.05	0.0155	1.51
Iron Age	**17**	**0.03**	**0.05**	**0.83**
Findspot	9	0.01	0.021	0.44
Field Systems	3	0	0.0091	0.15
Hillfort/Enclosures	5	0.01	0.0027	0.24
Romano British	**154**	**0.24**	**0.43**	**7.5**
Artefact Scatter (pottery)	8	0.01	0.0152	0.39
Camp/Fortlet	5	0.01	0.0027	0.24
Cave/Rock Shelter	2	0	0.0049	0.1
Cremations	1	0	0.0067	0.05
Enclosures/fields/settlements	26	0.04	0.0565	1.27
Findspots	68	0.11	0.1572	3.31
Iron Smelting Site	2	0	0.0049	0.1
Pottery Kilns	3	0	0.0049	0.15
Roads and associated sites	38	0.06	0.0945	1.85

Sculpture	1	0	0.0003	0.05
Early Medieval	**13**	**0.02**	**0.08**	**0.63**
Burial	1	0	0.0109	0.05
Findspot	4	0.01	0.0219	0.19
Industrial Site	1	0	0.0006	0.05
Sculpture	3	0	0.0106	0.15
Towns/settlements	3	0	0.0067	0.15
Trackway/Boundaries	1	0	0.003	0.05
Medieval	**246**	**0.38**	**1.1**	**11.98**
Boundaries/Linear Earthworks	8	0.01	0.0386	0.39
Castle/Ringwork	3	0	0.0055	0.15
Cave	1	0	0.0006	0.05
Church/Religious Buildings	19	0.03	0.0897	0.93
Sculpture/Wayside crosses etc	29	0.05	0.0377	1.41
Deer Parks/Parks	17	0.03	0.0423	0.83
DMVs	10	0.02	0.0353	0.49
Enclosures/Field Systems	17	0.03	0.3329	0.83
Findspots	14	0.02	0.0872	0.68
Granges	3	0	0.0897	0.15
Halls/Farmstead	31	0.05	0.0973	1.51
Houses	5	0.01	0.0033	0.24
Industrial Sites	16	0.02	0.0255	0.78
Quarrying/Mining Remains	40	0.06	0.0255	1.95
Roads/Tracks	19	0.03	0.017	0.93
Settlements	8	0.01	0.0082	0.39
SMVs	5	0.01	0.0219	0.24
Town	1	0	0.0082	0.05
Post Medieval-Modern	**675**	**1.05**	**3.39**	**32.88**
Aircraft crashsite	26	0.04	0.0103	1.27
Agricultural buildings /Field Systems	201	0.31	0.3776	9.79
Enclosures	2	0	0.0295	0.1
Findspots	7	0.01	0.0313	0.34
Gardens/Lakes/Ponds	5	0.01	0.0684	0.24
Golf Course	3	0	0.0055	0.15
Halls/Large Houses	30	0.05	0.08	1.46
Lead Working	8	0.01	0.1985	0.39
Lime Working	11	0.02	0.0389	0.54
Military Sites	28	0.04	0.0471	1.36
Mills and Factories	29	0.05	0.1839	1.41
Quarrying/Mining	48	0.07	0.3566	2.34
Racecourse	1	0	0.0003	0.05
Railway Lines/Buildings	11	0.02	0.3049	0.54
Religious Buildings	34	0.05	0.1541	1.66
Reservoirs and associated	8	0.01	0.0058	0.39
Roads/Tracks/Boundaries	69	0.11	0.1918	3.36
Sculpture/Memorials/Crosses	5	0.01	0.0067	0.24
Other Buildings	136	0.21	0.4207	6.62
Wells/Pumps/Fountains	13	0.02	0.0295	0.63
Multiperiod Remains	**22**	**0.03**	**0.37**	**1.07**
Earthworks	1	0	0.0012	0.05
Findspots	5	0.01	0.0046	0.24

Rock Carving	3	0	0.0012	0.15
Artefact Scatters	13	0.02	0.017	0.63
Unknown Date	**236**	**0.37**	**0.47**	**11.5**
Cave	4	0.01	0.038	0.19
Earthworks/poss. Barrows	59	0.09	0.0061	2.87
Enclosures	18	0.03	0.1523	0.88
Findspots	146	0.23	0.156	7.11
Standing Stone	9	0.01	0.0064	0.44
TOTAL SITES	**2053**	**3.19**	**6.54**	**100**

Table 45.1 Breakdown of all sites on the Millstone Grit by period and site type.

4.5.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000BC-3900BC)

Of the 135 sites and findspots given in the HER and NMR lists as Palaeolithic or Mesolithic, there is only one findspot which is attributed to the Palaeolithic period, a handaxe found on the deeply-incised slopes of the Dane Valley near Wincle. The well-known Mesolithic archaeology associated with this landform does not just comprise artefact scatters and lithic findspots, but through the work of local researchers, such as Jeffrey Radley, evidence for structures at sites such as Broomhead (Radley et al 1974) or Deepcar (Radley and Mellars 1964).Mesolithic material is known all across the prominent gritstone uplands from Totley Moor in the east to Rainow Moor in the west and from Bleaklow in the north to the outlying Millstone Grit of defining the gorges around Belper in the south. Whilst the Mesolithic material already accounts for over 6.5% of all known archaeological sites and finds on the Millstone Grit, it must also be noted that there are a further 13 multi-period lithic scatters, most of which contain some Mesolithic material, and also a further 146 undated findspots. Many of these findspots represent single lithic finds, and it is probable that were this material to be reassessed, it is likely, given the amount of known Mesolithic flint, that some of this also belongs to this period. The relative ubiquity of Mesolithic flint continues across the landscape outside of the county and National Park boundaries merging with other well known southern Pennine Mesolithic gritstone sites such as Deepcar (Radley and Mellars 1964), Warcock Hill (Buckley 1924), Lominot (ibid) and March Hill (Spikins 2002).

The importance of the south Pennine uplands during the Mesolithic period is well-attested by investigations on a number of sites. The Deepcar site (Radley and Mellars 1964), on the gritstone just outside the Peak District boundary, is situated above the scarp edge of a small spur of land overlooking the confluence of the Rivers Don and the Ewden Beck through a constricted steep-sided valley setting. This echoes the river bluff location of many lowland lithic scatters (see chapters 4.4 and 5.3), but is in some ways more strategic as it occupies a site with much greater vistas and directly overlooks a naturally 'pinched' routeway that constricts opportunities for movement of people and animals. The site is notable for the presence of some form of structure that utilised large stone blocks, and also for the distinctive microlith forms that have made it the type site for 'Deepcar' style microliths – a particular suite of Early Mesolithic microlith forms dating to c.12000 – 10000 years ago. Other similar sites nearby, but still outside the area defined by this project include the Dunford Bridge and Broomhead Moor sites (Radley et al 1974). The other group of key sites for the Mesolithic lie in the area west and north-west of Marsden, West Yorkshire. The Warcock Hill sites (Buckley 1924) lie within the boundaries of this project and should be considered alongside nearby sites such as March Hill (Buckley 1924; Spikins 2002), Lominot and Windy Hill. A re-evaluation of the lithic material from these sites illustrated the variety of stone technologies in the area of the south Pennines, with the Deepcar, Warcock Hill, Lominot and Windy Hill sites all representing a characteristic non-geometric form of microlith in contrast to the late Mesolithic March Hill site and many of the other collected flint assemblages (Radley and Mellars 1964). At Warcock Hill South, Buckley (1924) also noted the possible outlines of up to four structures, which would greatly increase the importance of this site as true structures are exceptionally rare for the Mesolithic period. These known sites all illustrate the potential for the Millstone Grit uplands to host important Mesolithic remains, especially in light of the quantity of known findspots and the lack of later disturbance over much of this landform.

With the individual findspots and scatters noted in the archaeological resource, there is a preference towards the edges of plateaus and close to water courses, though this should be tempered by the fact that the erosion which normally reveals Mesolithic material may be closer to the edges and accentuate this pattern. For distribution of Meso-

lithic artefacts associated with the peat cover of the gritstone uplands, see chapter 6.2.

The large-scale collection of flint from the moors by dedicated groups and individuals, from antiquarians (e.g. Buckley 1924) through to the present day is also well known. This enthusiasm may have resulted in an artificial inflation of the archaeological resource for this period in the uplands, but this is unlikely given that Mesolithic flintwork is continually exposed in the mineral soil at the base of the moorlands peats and is regularly reported by walkers, runners and cyclists who use the moors.

4.5.1.2 Neolithic (3900BC-2200BC)

The vast majority of known Neolithic archaeology on the gritstone is represented by single findspots and artefact scatters of Neolithic lithic material. Of the lithic material, 24 of the 64 findspots are polished stone axe heads. These are normally viewed as high-status items, and chance discard of such objects at first seems unlikely. Unfortunately there is little information in the records regarding whether the items are used or in pristine condition as this may well allow more-detailed conclusions to be drawn. The abundance of stone axe heads in comparison to other stone tools is noteworthy and is suggestive of the opening up clearings in what are usually considered to have been wooded uplands, but it must be tempered by the fact that polished stone axe heads are more recognisable than smaller or rougher items and the finding of a 'prestige' item such as this may be more likely to be recorded than a single piece of flint. The notion that readily identifiable stone tools are most likely to appear in the HER and NMR is supported by the fact that of the remaining 40 Neolithic findspots for this landform, 19 are arrowheads, clearly identifiable and often items of great aesthetic beauty. The distribution of the stone axe heads on this landform shows a clear preference for local high spots and scarp edges, most overlooking watercourses. For example axe heads are known from on the high watershed above Eyam Edge near Bretton which is just 3km from the pits containing Neolithic pottery discovered at the Gliding Club car park on Burr Torr (McGuire 2004), as well as from the tip of a spur of high ground at Beeley Hill, south of Chatsworth, from the highest point of the ridgeline to the north of Little Eaton and from the highest point of Ughill Moors. It is just possible that such finds could be associated with, as yet, undetected Neolithic scarp-edge or hilltop enclosures that form an equivalent to the more easily recognised 'causewayed enclosures' that are common on softer geologies and sediments to the south. The distribution of arrowhead finds also shows a preference for high spots and scarp edges, for example those from the ridgeline of Rushup Edge between Mam Tor and Lord's Seat, or Derwent and Stanage Edges. There are also some arrowhead finds known from the gullies and cloughs which incise the moorland, for example the two leaf-shaped arrowheads known from Shittern Clough below Cock Hill to the east of Glossop.

There are two very tentative entries in the archaeological record relating to a possible chambered cairn and long cairn. The chambered cairn is now destroyed but originally stood at Hirst Stones on the summit of Riber Hill, though it is noted in the HER that it is unknown whether this was a genuine monument or a natural feature. Riber Hill is a natural eminence on the east side of the Derwent and has the high levels of visibility that could be expected from the site of a chambered cairn, though it is not visible from any of the other known Derbyshire chambered cairns, which is pertinent as the intervisibility is a key feature of these monuments in this area. The possible long cairn is at Wet Withens on the point of a spur of high ground on Eyam Moor looking north towards Hathersage. Whilst the data is poor for early-mid Neolithic funerary monuments, any evidence to confirm this tradition would be important as it would provide an important parallel to similar traditions evident on the Carboniferous Limestone plateau.

A likely candidate for a Neolithic enclosure is the scarp-edge enclosure defined by boulders linking natural outcrops at Cratcliffe Rocks, although apart from initial observations and a plan in Hart (1981,77) and the recent survey by Makepeace (1999) this site has never been investigated. Being completely overgrown with thick heather and dwarf oak and rowan trees, this site remains both intriguing and enchanting. Backed by a huge and precipitous rock cliff and possibly forming part of the Nine Stone Close, Robin Hood's Stride and cup and ring marked rock complex, this little known site could yet form a very well-preserved Neolithic-Bronze Age monument form not yet recognised in the region.

As a Bronze Age date can no longer be sustained for much of the British rock art repertoire (see Bradley 1997; Waddington 1998; 2007; 2007a) and there are secure Neolithic dates for much of the art, the Bronze Age attribution for rock art in the HER has been dismissed as most of this material is more likely of Neolithic date. The rock-art takes the form of both simple cup motifs and also more complex designs incorporating single, multiple and penannular

Figure 4.5.3 Robin Hood's Stride from Nine Stone Close.

rings as well as some irregular bands around multiple cup marks (Barnatt and Robinson 2003, 10). The few examples of earthfast boulders with rock-art are located near scarp edges though not always on them, as at Gardom's Edge (Barnatt et al. 2005), though it has been pointed out that where rock-art occurs in its original context, it is difficult to discern any specific associated monuments (Barnatt and Robinson 2003, 17). This reflects the wider pattern of rock art in outcrop settings across most other parts of Britain. However, in keeping with other parts of Britain some of the rock art appears to be associated with, and perhaps references, prominent natural features. The most visible examples of this in the Peak District is the cup and ring marked rock located between the stone circle known as Nine Stone Close and the imposing gritstone outcrop of Robin Hood's Stride with its two pillars of rock. At midsummer the moon can be seen to be framed between the two rock pillars as it moves between them if the viewer is stood in the stone circle with the cup and ring mark rock between. There is also possible rock art on Robin Hood's Stride itself but this rock tor has been so badly defaced by quarrying, grafitti and natural erosion that it is virtually impossible to be sure whether such apparent markings are genuine. Elsewhere, another gritstone tor, Rowter Rocks at Birchover, has certain evidence for having been inscribed with rock art. Another key rock art site on the gritstone is known at Ashover School. This cup-and-ring marked rock was buried and therefore illustrates the potential for such remains to be preserved within the ground as well as visible on outcropping rock or earthfast boulders (Barnatt and Robinson 2003).

Portable rock-art is known from a variety of locations and sites, normally incorporated within later monuments, predominantly cairns, but cup-marked stones were also found in the ditch at Ball Cross hillfort, a presumably Iron Age monument, above Bakewell (Stanley 1954). The coincidence of rock-art with sedimentary rocks including the Millstone Grit is well-attested across Britain (Waddington 2007, 58), and with new examples of rock-art being discovered (e.g. Barnatt and Robinson 2003; Guilbert et al. 2006) on the gritstone landform, it is almost certain that there are many further unknown sites. However, because so much of the exposed Millstone grit has been quarried for millstones, and the rock itself has a large grain size and is relatively easily degraded by wind erosion and freeze-thaw action, there a few 'prehistoric' surfaces left on these rocks and so much of the original rock art has undoubtedly disappeared and this would account for the lower density of known rock art in this region compared to other areas further north, such as the Fellsandstone of Northumberland, which is a finer-grained rock and occurs at a lower elevation and is therefore not wind-sculpted or prone to freeze-thaw action as the Millstone Grits. The coincidence of a cultural phenomenon such as rock art with a distinctive rock type illustrates that the different geological zones, and therefore landforms, were being used in different ways at this time (see also Research Agenda – Chapter 7).

Figure 4.5.4 The cup and ring marked rock at Rowter Rocks.

4.5.1.3 Bronze Age (2200-700BC)

The archaeological record for the Bronze Age on the Millstone Grit is vast in comparison to all other periods with the exception of the post-medieval and modern. Bronze Age sites and artefacts account for 23.53% of all known sites on the landform with a density per 100ha of 0.75 sites compared to only 0.4 for Derbyshire and the Peak District as a whole. The majority of known sites for this period are represented by known and possible cairns or barrows, alongside cairnfields which perhaps contain up to hundreds of small cairns. As with the Carboniferous Limestone, it must be noted that many of the barrows are recorded as belonging to the Late Neolithic – Early Bronze Age as the explosion of this tradition appears to occur during this period of transition, but all are included within this section for the purposes of discussion. Within the archaeological record formed from the combined HER and NMR lists, there are 400 possible cairn or barrow sites listed, though a corpus of all known sites (Barnatt 1996) gives the high figure for barrows, more rightly 'cairns', on the Millstone Grit as 216, and this is the figure followed for this analysis.

The relative lack of modern agriculture and development on the Millstone Grit landscapes has resulted in the preservation of many upstanding remains, particularly relating to the Bronze Age landscape. There is a substantial amount of not only barrows, as noted above, but also field systems and cairnfields, enclosures and house remains, as well as standing stones and stone circles, although some of the latter could well be earlier. The principal area of known Bronze Age activity is along the gritstone East Moors, where there is extensive dispersed settlement represented by fields and cairnfields which generally occur close to the western edges overlooking the Derwent Valley. This is a generalisation, however and there are also extensive remains on the moors of Big Moor and Gibbet Moor which lie further to the east (see Hart 1981 for overview). The known remains appear to indicate a substantial population based on sedentary agriculture during this period. The intricate arrangement of the field systems on Big Moor in particular suggests modification over a substantial period of time, and this is supported by pollen analysis which shows periods of clearance and cereal cultivation over many centuries (Barnatt 1999, 31). The contemporaneity of the settlement and agricultural remains along with both the funerary cairns and also standing stones and ringcairns has been suggested to indicate a cultural shift towards 'family' groupings and away from the possible 'tribal' focus indicated by the large communal monuments, such as the chambered tombs, cursus' and henges, of the Neolithic (Barnatt 1999).

The sort of Bronze Age landscape described above can also be seen on the dome of Stanton Moor, which is part of a large area of Millstone Grit on the west side of the Derwent and surrounded by Carboniferous Limestone. The similarity between the Stanton Moor remains and the East Moor sites suggests that the Bronze Age archaeology of the Millstone Grit landform is, at least in part, defined by the geology. It must be noted however, that the large scale of medieval agriculture and post-medieval enclosure on the Carboniferous Limestone has had a marked effect on earlier remains and with the large numbers of Bronze Age barrows known on the limestone, it is far too simplistic to draw a definite line between the two geologies. In general terms, the Stanton Moor Bronze Age landscape comprises a greater proportion of funerary and 'ritual' monuments, with the cairnfields also containing a number of cremations (e.g. see Storrs Fox 1927). There are substantial field systems dating to this period also observable on Stanton Moor however (see Hart 1985a), and the complexity of this landscape demonstrates neatly the overall complexity and sensitivity of Bronze Age remains in some areas of the gritstone moors.

When considering the Bronze Age single finds, there are a less overall patterns in distribution than is the case with the field systems and settlements which tend towards the shelves above the 'staircase' of gritstone edges. Early Bronze Age flint and stone tools are reasonably evenly distributed across all areas of the Millstone Grit. The majority are known from highly visible and prominent positions such as scarp edges or summits where one could also anticipate burial monuments, with examples including a discoidal flint knife from Eyam Edge, a barbed-and-tanged arrowhead from Curbar Edge and a flint scatter from a local highpoint to the west of Dronfield Woodhouse. There are also a few Bronze Age lithic finds from valley bottom settings along the course of the Derwent, with examples known from Hathersage, Belper and near the earthworks of Horsley Castle east of Duffield.

Early Bronze Age flat axes are only known from the gritstone moors and edges to the east of the limestone plateau, specifically from the flanks of Smelting Hill near Abney, from the steep scarp edge above Beeley, from the summit of the Gritstone tor at Crossgreen south of Darley Bridge, and from within the Bronze Age ceremonial landscape of Stanton Moor. A final flat axe is recorded as being found in the area now flooded by Ladybower Reservoir in the Upper Derwent Valley. This is of particular interest as immediately to the south, around the summit of Win Hill, there are records of two Bronze Age flint findspots and also two further bronze axes, though it is not stated what type of axes these are. Further examples of unspecified bronze 'axes' are recorded from the steep slopes to the west of Higger Tor, from the moor directly above Curbar Edge and also from the Stancliffe quarries on the eastern flanks of the Derwent Valley opposite Stanton Moor and there are Late Bronze Age socketed axe heads known from the hut circles in the interior of Mam Tor hillfort (Coombs and Thompson 1979). The chronologically later Bronze Age metalwork is represented by a looped-and-socketed axe from immediately west of the Stanton Moor Scheduled Monument, and also two Middle Bronze Age bronze palstaves from the Derwent Valley close to Chatsworth House and from close to the earthwork remains of Horsley Castle on a gritstone summit east of Duffield. The final known piece of bronze metalwork on the Millstone Grit is a 'chisel' found on the scarp edge above Hartington Bridge looking into the Dove Valley. The Bronze Age metalwork on this landform is suggestive of a greater level of activity on the Eastern Moors with only the bronze 'chisel' known from the gritstone to the west of the Carboniferous Limestone plateau, supporting the overall picture of the archaeological record for this period.

4.5.1.4 Iron Age (700BC – AD43)

Due to the scarcity of known Iron Age sites in the archaeological record for the Peak District generally, the story of this period for the Millstone Grit by necessity has currently focused on the hillfort and other hilltop enclosure sites. The hillforts of the gritstone suffer from the same lack of clear understanding as other similar sites in the region, with varied levels of investigation and excavation across the different monuments.

The scarp edge enclosure at Gardom's Edge is a multi-period site with one of the principal phases of activity on the site most probably dating to the late Bronze Age or Early Iron Age (Barnatt 2008; Barnatt pers. comm.). The site is also notable as it is one of the few 'hillforts' or enclosures to have been subjected to the scrutiny of dedicated modern excavation (Barnatt et al. 2005). The earlier phases of activity at Gardom's Edge are characterised by extensive late prehistoric field systems and house remains. A substantial amount of pottery was also recovered which is very similar in form to that recovered from Mam Tor (Coombs and Thompson 1979) and Fin Cop (Beswick in Waddington 2010). Organic residues on the pottery from Fin Cop have been radiocarbon dated to around the 8th century cal. BC (2560±35 bp, SUERC-26420; 2600±35, SUERC-26421). If some of the field systems noted at Gardom's Edge are contemporary with the Late Bronze Age to Early Iron Age occupation, then this may be indicative of arable

agriculture as some are positioned to take advantage of localised pockets of sandy soil that avoid clay-heavy areas (Barnatt et al. 2005, 53). Besides Gardom's Edge, the only other hillfort on the Millstone Grit to have undergone any archaeological excavation on a reasonable scale is that at Ball Cross. Ball Cross sits on the corner of a gritstone promontory above Bakewell and the valley of the River Wye. The fort, which is delineated by a single ditch and bank with counterscarp, was investigated in the early 1950s (Stanley 1954) revealing evidence that the fort bank was possibly slighted and cast into the ditch at some point before a later period of reoccupation. Pottery fragments similar to those noted above were also found.

The final 'hillfort' which has been subjected to any invasive archaeological work, is the enclosure which stands on the gritstone tor of Carl Wark on Hathersage Moor. The enclosure sits above the Burbage Brook and is defined by a wall of gritstone boulders along the steep edge of the gritstone outcrop with an impressive stone-faced earthen rampart surviving today over 3m high cutting off the approach from the west together with a well-preserved inturned entrance. Limited investigations by F.G. Simpson illustrated the construction method of the stone-faced earthen rampart (Piggott 1951) but no dating material was recovered. Carl Wark is included in this section as it is most likely thought to date to a broadly similar period to the other Late Bronze Age and Early Iron Age enclosures of the Peak District, though it has also been suggested that it may have a Neolithic or Early Medieval origin (Preston 1954), although no evidence has ever been produced to substantiate such a view.

In addition to the hillfort sites noted above there are three further uninvestigated sites. Castle Ring (Hart 1981, 77) and the postulated enclosure at Cratcliff Rocks (Hart 1981; Makepeace 1999) both sit on the Millstone Grit of Harthill Moor. Castle Ring is on a localised high point which looks north towards Youlgreave down the clough formed by Bleakley Dike. It is a small enclosure encompassing 0.5ha and is defined by a single ditch and bank and encloses a natural highpoint rather than taking the scarp-edge enclosure form which is typical of many of the other Peak District hillfort sites. The potential enclosure on Cratcliff Rocks (Hart 1981; Makepeace 1999) is defined by a 'wall' of gritstone boulders around the steep edge of a natural gritstone tor although the author/s of this report think this is more likely to be of Neolithic origin. The final hillfort site is the promontory fort of Castle Naze at Coomb's Moss looking north and west over the Meveril Brook and the modern Coomb's Reservoir. While the landscape setting is different, the form of Castle Naze is similar to that of the Markland Grips hillfort on the Magnesian Limestone, with a narrow promontory defined by steep edges, and the flatter undefended access cut by a double

Figure 4.5.5 The earthwork remains of the hillfort at Ball Cross above Bakewell. (NMR 20493_011 09-NOV-2005. © English Heritage. NMR).

Figure 4.5.6 The distinctive rock outcrop at Carl Wark.
(NMR 20492_030 09-NOV-2005. © English Heritage. NMR).

Figure 4.5.7 The stone-faced wall of Carl Wark.

bank, though at Castle Naze there is a drystone wall facing a double inner rampart (Hart pers. comm.). Romano-British period finds are also known from both Castle Naze and Markland Grips suggesting the possibility of an extended or different period of occupation for these monuments than for those in the core of the Peak District uplands.

The remaining Iron Age sites on the landform are represented by three possible enclosures or field systems which are likely to date to the end of the Iron Age, and may fall into the Romano-British period, together with ten finds-pots. Of the postulated enclosures, the site of Royd Edge near Meltham is of key interest. Investigations of the upstanding remains of a rectilinear enclosure have demonstrated that under the conditions encountered on this site, gradiometry is a viable geophysical technique for prospecting for archaeological in-filled features on the Millstone Grit (WYAS 2000). While this is a tentative conclusion based on limited data, the implications for the application of this technique on the gritstone landform are important.

4.5.1.5 Roman (AD43-410)

The general picture of the known Roman period archaeology on the Millstone Grit is broadly similar to that for other landforms, in as much as it represents the infrastructure of the Roman occupation, but whereas the larger settlements and forts are in the lowlands and valleys, the largely upland landscape of the Millstone Grit is populated with smaller farming settlements, camps or fortlets and roads.

We now have a more thorough knowledge of the Romano-British rural settlement remains in the Peak District due to a dedicated study undertaken in 1998-2000 by the Peak District National Park Authority on behalf of the Derbyshire Archaeology Advisory Committee (Bevan 2005). The gritstone landform hosts many fewer recognisable farming settlements than the Carboniferous Limestone plateau, with known sites almost entirely absent from the East Moors, in sharp contrast to the extensive prehistoric, and particularly Bronze Age, settlement and farming known in the same setting. It is probable that one of the major factors in this apparent disparity is a deterioration in the climate during the late prehistoric period suggested by pollen cores from nearby mosses (Long et al. 1989), though the impact of intense prehistoric farming on the upland landscape is no doubt a contributory factor. In this way the East Moors compare closely with other high upland areas in northern Britain where upstanding relict landscapes of

Figure 4.5.8 The hillfort site at Castle Naze in its landscape context illustrating the commanding views from the natural promontory. (NMR 20625_016 03-NOV-2006. © English Heritage. NMR).

Figure 4.5.9. The hillfort site at Castle Naze. A naturally defendable site protected by a double ditch with outer bank. (NMR 20625_017 03-NOV-2006. © English Heritage. NMR).

the Bronze Age survive above the later ploughing limit and, due to soil exhaustion and climatic deterioration, have never since supported intensive upland agriculture and settlement to such high altitudes and in this regard the gritstone moorlands can be compared directly with other areas such as the Cheviot Hills of Northumberland (Burgess 1984; Frodsham 2004; Passmore and Waddington in press), the Scottish Borders (Cowley et al 2009) and Dartmoor in Devon (Fleming 1988). It must be noted however, that as suggeseted by Long et al. (1989), the lack of intensive agriculture does not necessarily indicate an abandonment of the uplands, more a change of subsistence models to les intensive farming which has left no archaeological trace.

The specific landscape settings of the Romano-British farming settlements are variable and encompass a number of upland sites, though there are general trends towards sites with a south-facing aspect and also proximity to water sources, though Bevan believes this should not be viewed as the determinating factor (Bevan 2005). Rather than fear the label of 'environmental determinism' the case for utilising natural resources where they occur should be acknowledged by archaeologists as there can be no doubt that the availability of nearby freshwater has been an important contributing factor in the location of human settlement in all periods. Whilst the extent of these farming settlements is now better understood there is still a need to understand them, both on an individual site basis and also as a monument type. In particular a clear chronology is required as the majority of upland rural farming settlements are dated on morphological grounds, and it cannot be stated with any degree of certainty whether these sites represent a continuation of Iron Age settlement, 'native' Romano-British settlements, the imposition of a controlled system of farming by the Romans, or a combination of all three.

Thirty-eight of the one hundred and fifty-four known Roman period sites are represented by portions of the Roman road networks which cross the county. Where the Roman roads occur on the Millstone Grit they illustrate the routeways which were taken from the heartlands of the Peak District to the surrounding areas of the Roman province. The main Roman roads follow routes which probably follow or at least echo previous trackways, many of which are still the main roads in use today. The main known Roman roads link the three principal Peak District sites of Buxton (Aquae Arnemetiae), Brough-on-Noe (Navio) and Melandra Castle, Glossop (Ardotalia), along with sites to the east such as Chesterfield. There is also a route known which links the forts at Navio and Templeborough near Rotherham, crossing the high point of the gritstone moors at Stanedge Pole. As with all other landforms, the routes of the Roman roads provide a clear focus for targeted fieldwork and the potential for locating ancillary sites and structures.

Houndkirk Road which runs from Fox House to Ringinglow and provides an important and direct route over from the Derwent Valley to the Sheaf Valley and the Don basin (occupied by modern Sheffield) has been called 'the Roman Road' for generations and, although this is most likely the route of the abandoned 1759 Sheffield to Sparrowpit Turnpike, it may have Roman or earlier origins as a routeway.

There are four possible Roman camps or fortlets known on the Millstone Grit, which have never been investigated archaeologically and are only noted within the HER and NMR lists. The sites at Camp Wood, Little Eaton and an unnamed site south of Buxton both lie on the line of Roman roads. The earthwork site at Highstones on the north flanks of Longdendale near Tintwistle (see Hart 1981 for plan) appears to be away from the main centres of Roman activity, but it lies north of the earthwork site of Torrside Castle which, whilst popularly thought to be a Roman camp or fortlet, is most likely a natural formation. It is possible that the associations of folk memory preserve some tradition of a Roman routeway in the area of Longdendale and the Woodhead Pass, still an important east-west routeway across the southern Pennine uplands and it may be that this was the route of a now-lost Roman Road between Manchester and Templeborough. The area around Bradfield, and also to the north around the Broomhead Reservoir, has a small cluster of Roman period sites including a number of pottery scatters and also an iron-smelting site whose exact location is now unknown.

The exception of the Broomhead iron-smelting site, the Roman industrial sites on the gritstone are all accounted for by the pottery production sites around the Hazelwood and Lumb Brook area near Belper discussed in chapter 4.7 (shales and siltstones). The picture gleaned from the archaeological record is that the Roman industrial sites of the Millstone Grit deal with the processing and manufacture rather than the winning of raw materials that is supposed on other landforms, though the later manufacture of millstones which gave the Millstone Grit its name, may well have formed a part of the Roman occupation of this upland landscape. This should not preclude the likelihood that there was quarrying of the gritstone during the Roman period however, as there is a general acceptance that there was exploitation of most other natural resources in the Derbyshire and Peak District uplands from the Roman period onwards.

With the lack of large-scale settlements and the relative paucity of rural settlements on the gritstone in comparison to the Carboniferous Limestone indicates that the gritstone moors are a peripheral zone during the Roman period. The relatively good survival of upstanding monuments on the Millstone Grit, and our reasonably reliable knowledge of the major Roman roads should provide the basis for investigating and understanding these monuments and where they fit into the increasingly complex picture of this period.

4.5.1.6 Early Medieval (AD410-1066)

As with almost all the landforms within Derbyshire and the Peak District, there are few known sites for the early medieval period on the Millstone Grit. Only 13 sites and findspots are known, accounting for only 0.63% of all sites on the landform. The overall density of early medieval sites on this landform is 0.02 per 100ha, with only the Magnesian Limestone having a lower density, suggesting that this may represent a genuine pattern of a lack of activity or settlement during this period on the gritstone moors. This suggestion is supported by the conspicuous lack of early medieval re-use of Bronze Age barrows, a well-attested tradition on the Carboniferous Limestone.

There are two known stretches of linear embankment known on the gritstone which may date to the early medieval period. Grey Ditch is a post-Roman boundary cutting the Roman road of Batham Gate (O'Neil 1945; Guilbert and Taylor 1992), and is discussed in Chapter 4.7 (shales and siltstones) as the majority of the monument lies in the shale valley between the Millstone Grit and Carboniferous Limestone uplands. The second site is the scheduled Bar Dyke which cuts the natural routeway across the saddle of land between Bradfield and Broomhead Moor. The dating of the monument is uncertain as it has never been excavated, and it is possible that it relates to prehistoric use of the landscape. It is more likely that it belongs to the post-Roman period and is part of the same delineation of the landscape as Grey Ditch, perhaps relating to a British polity or the early Anglo-Saxon petty kingdom of the Pecseatan, or it may date to a slightly later time when the north-east of the Peak District was the border between the Anglo-Saxon kingdoms of Northumbria and Mercia.

Two tentative early medieval settlement sites are noted in the HER on the Millstone Grit. At Sheffield Plantation on the shelf above Nether Padley, a circular stone banked enclosure which the HER notes as being of potential early medieval date, though no archaeological investigation has been undertaken on the site. The second site is the hamlet

of Sheen west of Hartington, whose name is derived from the Saxon word sceon or settlement, though again no archaeological investigation has been undertaken to support this. There are many other settlements on the gritstones with Anglo-Saxon placenames which no doubt refer to early medieval phases of occupation at or around these sites, such as those at Shatton, Chatsworth, Baslow, Nether Padley, Ashopton and so forth.

4.5.1.7 Medieval (AD1066 – c.AD1700)

By the medieval period, the layout of the modern landscape starts to take form, but with the Millstone Grit, the relative lack of large-scale upland farming which defined later prehistory, is a key difference between this and other landforms.

There are two known castles and a substantial medieval ringwork on the Millstone Grit. Bailey Hill at Bradfield and Horsley Castle east of Duffield are both earthwork remains of motte and bailey castles and therefore represent likely foci for other medieval settlement and activity. The village of Bradfield contains not only the Bailey Hill castle, but also the medieval church of St. Nicholas (which has produced Anglo-Saxon cross fragments) and the earthwork site of Castle Hill, which may relate to the motte and bailey, though no fieldwork has been undertaken to test this, and the HER also ascribes a possible Roman date to the monument. Horsley Castle is one of only seven in Derbyshire and the Peak District which developed from the early ringworks and mottes and baileys into substantial stone constructions, and the only one on the Millstone Grit (Barrett 2006). The Camp Green ringwork stands on the gently sloping ground to the north of Hathersage and is the largest ringwork in north Derbyshire measuring 80m in diameter and defined by a deep ditch (Hodges 1980).

The relative extent of medieval settlement can be crudely determined by the known medieval churches, whether modified, ruinous or in some cases completely removed by later industry. In general the known religious buildings are in the lower-lying reaches of the landform such as the monastic hermitages near Edensor and Dale Abbey, the latter of which developed into a Premonstratensian Abbey. Medieval churches predating more recent structures are also known from Brockholes in Longdendale and Lea, south of Tansley, which all support the general picture of nucleated settlement towards the lower-lying altitudes of the gritstone that fringe the main river valleys. The picture

Figure 4.5.10 The church of St. Nicholas at Bradfield.

Figure 4.5.11 The imposing motte at Bradfield.

of religious and ecclesiastical buildings and landscapes is completed by the known monastic granges which are reasonably prevalent across the Peak District uplands. There are only three granges listed in the HER and NMR for the Millstone Grit which stands in stark contrast to the Carboniferous Limestone where the granges utilised swathes of the fertile arable land. The granges known on the Millstone Grit are generally in lower-lying locations such as Horsley Grange near Horsley Castle, and Harewood Grange near the East Moors at Holymoorside, where the better land can be found, though it is probable that the granges on the gritstone represented the pastoral traditions of monastic agriculture.

There are a number of gritstone quarries which are noted as having medieval origins as well as millstone working sites. It may be assumed that there was exploitation of the natural resources of the Millstone Grit in earlier periods, especially given the utilisation of natural gritstone edges and boulders for the creation of prehistoric enclosures. There are also significant amounts of industrial processing sites with a probable medieval origin, predominantly lead processing sites such as those at Beeley Edge. This picture of the Millstone Grit as a landscape where raw materials won from other landforms are processed is reinforced by pottery production sites known from the low-lying Lumb Brook area, near the Roman pottery sites, and also Duffield and Wigwell. This is an important point as, stretching into the post-medieval period, many similar sites are known and this becomes a key archaeological association with this landform. Alongside the previously recognised industrial sites, it should also be noted that there are recent surveys which have recorded extensive examples of gritstone querns from Lea southwards down the Derwent Valley (Hart pers. comm.).

There are 17 entries within the HER and NMR relating to medieval deer parks, or other enclosed parkland from this period, with the full extent of five major examples still known. Lyme Park in Cheshire and the closely related Postern Park and Champion Park near Windley all encompass a great deal of improved agricultural land which must post-date the original use of the deer park and therefore have potentially impacted on medieval and earlier remains. In Champion Park there are the earthwork remains of a moated site in the southern portion which is still relatively densely wooded. The preservation of earlier remains afforded by a medieval deer park which has not been redeveloped is of key significance when looking at landscape-scale archaeological remains. Holmesfield Park, west of Dronfield is a medieval deer park which is largely wooded and also contains the earthwork remains of a moated site. The possible preservation of remains within an undeveloped deer park here is paralleled by the multi-period earth-

work remains of Scarcliffe Park, a few miles to the east on the Magnesian Limestone (see chapter 4.2). The Shottle Park deer park also extends onto the Millstone Grit landform and within the boundaries of this deer park there are the preserved earthwork remains of Roman sites and pottery kilns in the Hazelwood and Lumb Brook area, fully discussed in Chapter 4.7 (shales and siltstones).

As with other landforms, the number and position of known deserted and shrunken medieval villages illustrates not only the depopulation of the landscape during this period, but also the principal areas of settlement during the medieval period. For the Millstone Grit, all known DMVs and SMVs lie in the area of the Eastern Moors (Hart 1981, 128), which while not as conducive to agriculture as the shale valleys, or any of the limestone geologies, is a more fruitful natural landscape than that of the high moors of the northern gritstone, where no DMVs are known. This reaffirms the late prehistoric evidence which shows that during the periods where the Millstone Grit sees extensive settlement, the preference is for the southerly reaches of the lower Eastern Moors.

4.5.1.8 Post-medieval to Modern (c.AD1700 – present day)

Representing 9.79% of all known sites on the Millstone Grit landform, field systems and associated agricultural buildings and paraphernalia make up a significant amount of the visible archaeological heritage on this landform. These are by-and-large not the agricultural field systems of the Carboniferous Limestone or the lower-lying landforms in the south of Derbyshire which are mainly identifiable by the ridge and furrow remains of arable agriculture unsuited to the gritstone. Below the tops of the moors, the gritstone landscape is enclosed pasture land but the lack of arable agriculture has prevented the impact that post-medieval land use has had on many of the other landforms.

The built heritage of the Millstone Grit can be roughly divided into three categories, industrial sites, religious buildings and other buildings (principally residential).

The industrial sites can be further divided between the sites which deal with the raw materials of the Millstone Grit, and those which process raw materials won from other landforms. Quarrying sites account for 2.34% of all known sites on this landform, and it is clear that it is during the post-medieval period in particular that the utilisation of this natural resource became a major industry, with the scale of millstone production in particular becoming such a major association that it even gave its name to the geological formation which hosted it and it is the image of the millstone that was chosen as the symbol for what became the first National Park. The processing of other raw materials, as noted for earlier periods, has left an imprint on the landscapes of the Millstone Grit. Industrial sites tend to cluster toward the lower lying reaches of the landform such as the plethora of limekilns and lime processing sites known from the western Millstone Grit near the Carboniferous Limestone plateau at Longnor. The western side of the Millstone Grit as it drains to the Cheshire Plain also houses no less than seven well-preserved mill sites such as the Brookehouseclough Silk Mill utilising the water of the Gulshaw Hollow south of Rainow. Other industrial sites include brick kilns, iron foundries and also extensive charcoal burning sites, typified by the extensive remains in the area of Alderwasley and in the Upper Derwent. Religious buildings noted within the HER and NMR lists are almost entirely represented by renovations made to earlier churches, or the explosion of chapel building in the wake of the rise of Methodism.

A major use of the gritstone moors during the post-medieval period can be traced through the hundreds of hollow ways which cross the moors, many of which were originally the important packhorse routes allowing the trade of millstones, lead and other products between the Peak District uplands and the main markets in Sheffield and Manchester. Along with these routeways there is a whole suite of associated features such as stone bridges, signposts and way stones which are an important component of the archaeological resource on this landform. Many of the hollow ways in use in the post-medieval period originated in the Middle Ages at the latest and were also used as trans-Peak routes, bringing agricultural and other produce from Cheshire and Staffordshire both to and across the Peak District, as well as taking material from within the Peak District.

The harnessing of water power on the gritstones during this period is not restricted to the mills and industry noted above. Some of the most spectacular and visible sites dating to this period are the dams and reservoirs which lie within and alongside the Millstone Grit moors. Many of the dams are themselves of historical and architectural interest, not least the stunning series of dams on the Derwent (Ladybower, Derwent and Howden) and to the north there are Damflask, Agden, Broomhead, Moor Hall, Underbank, Midhope, Langsett, Woodhead, Torside, Rhodeswood, Valehouse, Bottoms and Arnfield reservoirs amongst others that supply water to a huge swathe of England including

Sheffield, Derby, Manchester and much of Derbyshire.

One of the most interesting and unusual archaeological sites in the Peak District is the temporary town of Birchinlee built for the navvies and their families who built the Derwent Dams and affectionately known as 'Tin Town'. A recent survey of the upstanding earthwork remains of house platforms, street platforms and the railway has been carried out by the PDNPA (Bevan 2006) although intrusive excavation has not yet taken place. The town was home to up to 900 people who lived in temporary buildings made from timber, corrugated iron and other such materials.

The gritstone moors are penetrated by many railway tunnels, in many ways the succcessors of the packhorse routes and roads which allowed access into the central Peak District from the emerging industrial centres around Sheffield, Leeds and Manchester. The most-crucial are the two large cross-Pennine tunnels that opened up the peak district and gave birth to the considerable tourist industry that now supports much of the Peak District economy. These railway lines include the Hope Valley line and the remarkably long 'Totley Tunnel' that runs directly from Totley to Padley and passes through the Millstone grit escarpment before continuing along the Upper Derwent Valley before entering the Cowburn tunnel. Further north the Woodhead line passes through the gritstone escarpment at the Woodhead Tunnels starting at Dunford Bridge in the east and emerging at Ironbower Moss further south-west. These tunnels however have surface features associated with them, most notably the air shafts that can be seen as circular brick structures rising from the gritstone moorlands and which belched out smoke when steam trains passed along the line below. Other features can be noted associated with the air shafts including works huts, particularly the extensive 'navvy' settlement above the Woodhead Tunnel, spoil heaps and so forth.

A final key association with the moors of the Millstone Grit are the many military and aircraft crash sites known. Because of the proximity of the gritstone moors to the metropolitan centres of Sheffield and Manchester, they have been heavily utilised by the military, and known sites include gun emplacements, listening posts, training trenches as well as a large number of decoy lights intended to divert bombers from Sheffield. The bombing raids and use of the Peak District and its high ground as a landscape for training airmen has also led to a substantial number of aircraft crash sites, though many of the crashes were the result of flying in poor weather and /or the fault of the primitive navigational equipment in use at the time. In particular, several crash sites are known on the high plateau of Kinder Scout whilst other wreck sites are known at Doctor's Gate near Glossop and Mill Hill near Hayfield (Collier and

Figure 4.5.12 The Howden dam and reservoir.

Wilkinson 1999)

Perhaps the most famous military association with the gritstones was the use of the Derwent Dams for training by 633 squadron who practised on them before embarking on the famous 'Dambuster' raids on the Mohne, Sorpe and Eder dams in Germany. The inventor of the 'bouncing bomb', Barnes-Wallace and the RAF crews were billeted in RAF buildings at Brough on the outskirts of Bradwell just below the gritstone moors.

4.5.1.9 Unknown Date

The archaeological sites and finds which are ascribed an unknown date in the HER and NMR databases represent a substantial portion of all known sites (11.5%) which is larger than for other landforms, and should be given consideration as part of any overall assessment.

Of the 146 findspots of unknown date, the vast majority are non-diagnostic prehistoric lithics which largely cluster to the east and north-east of the landform.

There are a further 59 earthworks of unknown date or origin which largely comprise sites noted as being possible 'barrows' or cairns and, if real, would add to the picture of a large Bronze Age population across the Eastern Moors of the Peak District. It is also possible however, that a number of these sites represent medieval or post-medieval industrial sites.

Where existing enclosures on the gritstone moors are classed as being of unknown date, they generally take forms typical of prehistoric enclosure yet remain uninvestigated and are therefore of some considerable importance where they are impacted upon by any new development or quarrying.

4.5.2 Evaluation and Mitigation Implications on the Millstone Grit (see table 7.6 for summary)

As a general point it must be stressed that the Millstone Grit landscapes are predominantly unimproved upland and there is broadly a better chance of upstanding remains being preserved here than in the more-intensively settled and farmed landscapes of the lowlands or indeed the Carboniferous Limestone plateau. The lack of cultivation-based agriculture can also be ascribed to the acidic nature of many of soils derived from the gritstone and the extensive areas of blanket peat.

Unimproved landscape does not mean a lack of activity however, or indeed a lack of agriculture, though the economies of periods from the Roman period onwards on this landform are likely to have focussed on pastoral rather than arable agriculture, with hunting also forming a major use of this landform through many periods of prehistory and history. On this landform, the lack of agriculture also provides an opportunity to study landscapes and settings rather than sites in isolation, and a preliminary assessment of the landscape environs of a site should be considered as part of the evaluation of any site (see also Research Agenda – Chapter 7).

Where upstanding remains exist it is important that detailed earthwork or structural survey is used as part of the initial recording of such monuments. In cases where the monument itself will not be adversely impacted upon, this may be the only fieldwork required to provide an accurate record, while also adding valuable information on form and the constructional sequence of such sites. Where an earthwork monument will be impacted upon by extraction or development, the detailed earthwork survey will provide the initial baseline record to inform further work (see also Research Agenda – Chapter 7).

While the lack of arable agriculture and the extensive areas of heather mean that the Millstone Grit is not conducive to cropmark formation, upstanding remains can be highly visible from aerial photography when vegetation is low and light conditions are favourable. However, as mentioned earlier in the chapter, the true number of archaeological sites is undoubtedly depressed by the current vegetation cover, land use and taphonomic history of this distinctive highland landform (see also Research Agenda – Chapter 7).

The northern and eastern moors of the Millstone Grit are clearly a favoured locale for Mesolithic activity, although

such activity is evidenced across most of this landform and the current pattern may reflect the areas where archaeologists have been most active. In advance of development in these areas, the initial survey of a site should seek to take into account the areas of known prehistoric lithics as well as, where possible, providing for further systematic location and collection of material. This would then allow for a research-led strategy targeting any sites of high potential. The stratigraphic relationship between lithic finds and the sediment or soil layers in which they occur should be carefully recorded so that such sites can be considered in relation to potential dating samples from the surrounding peat/soil matrix and also so that such occupation can be linked to palaeoenvironmental samples that may shed light on the environment contemporary with, preceding or succeeding the human occupation of these sites. High resolution spatial recording is now possible with the advent of survey-grade GPS and this will allow for greater accuracy over much of the featureless moorlands than has ever been possible before. The use of survey grade GPS to locate sites and finds is essential if; a) accurate survey and recording is to take place, and b) the sites are to be returned to and re-identified and, if necessary protected, in the future.

Towards the end of the Neolithic period and through the Bronze Age, it is clear that there is a significant cultural shift which results in the expansion of known archaeological remains both on the Millstone Grit landform and also paralleled on the Carboniferous Limestone. The upstanding Bronze Age remains, particularly those of the East Moors and Stanton Moor have been a focus of archaeological investigation for many years and their importance in the overall story of the region cannot be overstated. Any development on the Millstone Grit of the East Moors may well impact upon known or unknown archaeological remains of this period, and in this case, a preliminary survey should be followed with targeted investigation where a site would otherwise be impacted upon adversely. Evaluation strategies that could be usefully employed on the gritstones includes close-spaced geophysical survey, evaluation trenching, test pits and potentially ground penetrating radar depending on the type and scale of a proposed development. The potential application of LiDAR must also be noted here as, if it can penetrate the heather cover over much of the landform, then it can provide a valuable rapid prospection and survey tool.

The Millstone Grit landform again illustrates the importance of medieval and post-medieval deer parks and parkland where such landscape-scale enclosures have the potential to preserve both contemporary and earlier remains away from modern industry and development. Such areas provide a rare opportunity to undertake landscape and earthwork surveys as well as targeted excavation while tying such fieldwork into larger research questions. Any development with a potential impact on such areas must address this opportunity to examine a fossilised landscape as part of any mitigation strategy (see also Research Agenda – Chapter 7).

4.6. Landform 1g – Shales and Siltstones

Landform 1g encompasses the soft shales, along with some siltstones such as the Morridge Formation in the west of the Peak District, which form the valleys at the interface between the Carboniferous Limestone and the hard gritstone edges. The most notable of these is the Wye Valley, one of the principal routeways allowing penetration into the fertile uplands of the Peak District. Both the shales and siltstones are similar geological landforms which exist in similar topographic settings at the valley interfaces noted above. Whilst mudstone is also a similar geological formation, the Mercia Mudstone in south Derbyshire has a different topographic setting and markedly different archaeological associations, and so is discussed as a separate landform (see chapter 4.9)

Shales and siltstones are not exploited in the same way as many of the other landforms assessed in this project. There are only two existing shale extraction sites in Derbyshire but there is the continuing potential for extraction.

There was no dedicated aerial photograph transcription targeted on this landform, though some small portions of aerial photograph Blocks 1 and 3 covered areas of landform 1d. Block 1 is discussed in Chapter 4.1 and Block 3 is discussed in Chapter 4.4. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

The area of landform 1g encompasses 19242.02ha which represents 5.85% of the total study area.

Normally river valleys represent the major routeways of the past as they provide low altitude and gradient routeways as well as travel by track or water craft, and can therefore be foci for archaeological remains of many periods (e.g. the great sand and gravel expanses of the Thames and Trent valleys – see chapter 5.3). The story of the shale-dominated valleys of the Derbyshire uplands is more complex however. The shales and siltstones sit between the fertile Carboniferous Limestone plateau, a focus of prehistoric and later settlement, subsistence and religious activity, and the gritstone moors – although largely unimproved land, still heavily utilised through prehistory. It has been suggested that the deep valleys typical of landform 1g remained heavily wooded later than the high ground which brackets them (Barnatt and Smith 2004, 14), suggesting a lack of clearance and settlement on the shales, at least through the early to mid-Holocene. This picture does not seem to be replicated in the archaeological resource as defined by the combined HER and NMR lists. Findspots and funerary monuments of Neolithic and Bronze Age date account for 6.6% of all known sites indicating that the shale landscapes were being utilised at this time, and not just in a transitory way, as shown by the construction of cairns/barrows, commonly seen as a way of imposing some form of territoriality and 'tenure' over the landscape. There is a need for high resolution pollen analysis to test this assumption and studies should therefore feature in development on this landform where opportunity allows.

4.6.1 Archaeological Associations (Chronological)

The shales and siltstones landform hosts 1127 HER entries and 476 NMR entries of which 243 are duplicated giving a total number of known archaeological and historical sites of 1360 within the combined lists. The breakdown of the sites within this combined list are presented in Table 4.6.1 below, where they are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 1g hosts a total site ratio of 7.07 sites per 100 hectares. An interesting point to note in relation to the site densities by period for this landform, is that the shales best represent the mean densities for Derbyshire and the Peak District as a whole. The only real discrepancies are a paucity of Mesolithic and Neolithic activity, and a substantially larger portion of post-medieval agricultural remains and field systems.

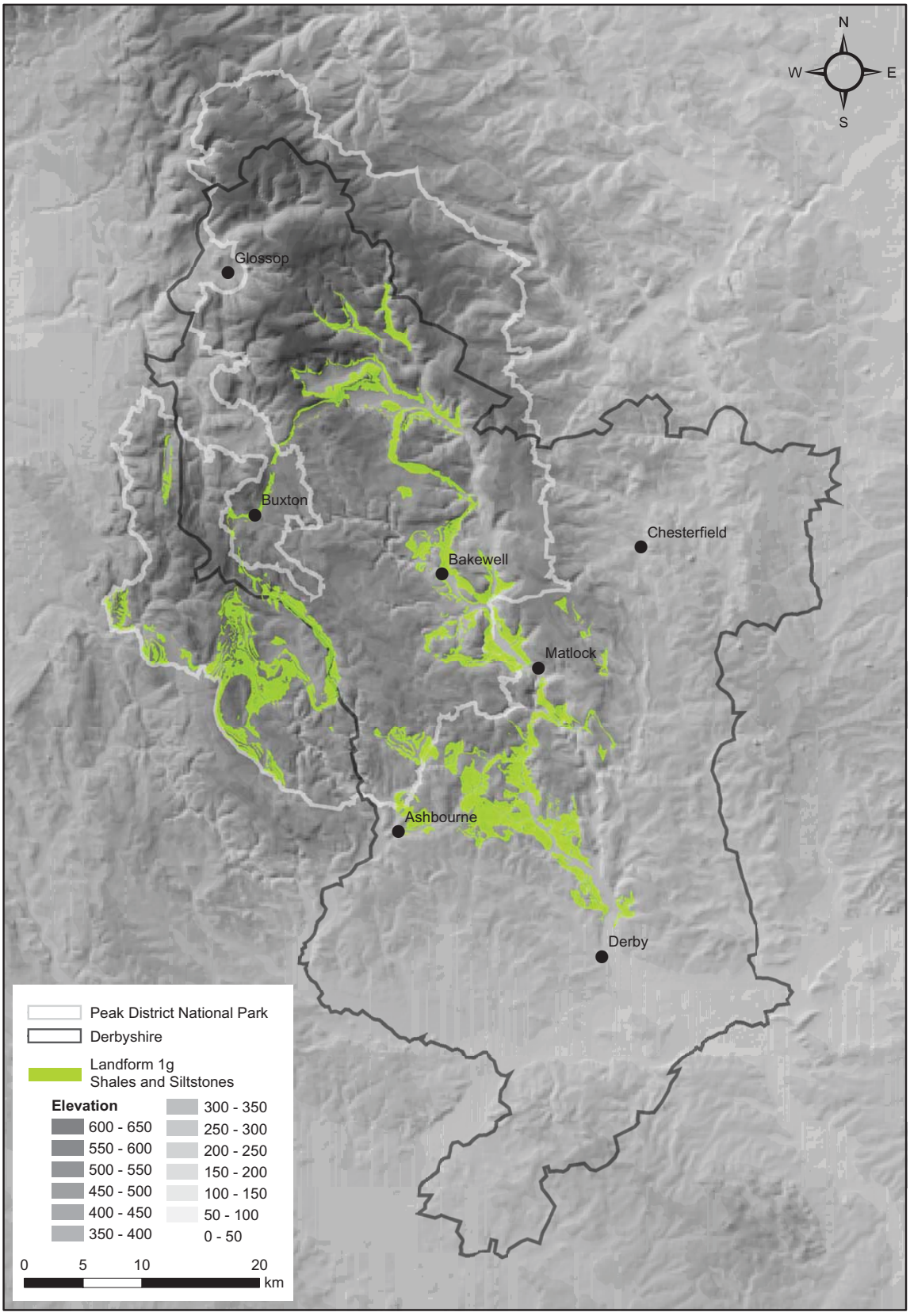

Figure 4.6.1 Extent of landform 1g – Shales and siltstones

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**2**	**0.01**	**0.12**	**0.15**
Findspot	1	0.01	0.0611	0.07
Lithic Scatter	1	0.01	0.0456	0.07
Neolithic	**29**	**0.15**	**0.24**	**2.13**
Findspot	26	0.14	0.1216	1.91
Occupation Site	2	0.01	0.0027	0.15
Possible Long Cairn	1	0.01	0.0094	0.07
Bronze Age	**63**	**0.33**	**0.4**	**4.63**
Barrows/Cairns/Burials	41	0.21	0.3019	3.01
Cave Site	1	0.01	0.0021	0.07
Findspots	18	0.09	0.1146	1.32
Rock Art	2	0.01	0.004	0.15
Standing Stone	1	0.01	0.0155	0.07
Iron Age	**2**	**0.01**	**0.05**	**0.15**
Artefact Scatter (pottery)	1	0.01	0.0006	0.07
Hillfort	1	0.01	0.0027	0.07
Romano British	**83**	**0.43**	**0.43**	**6.1**
Artefact Scatter (pottery)	13	0.07	0.0152	0.96
Possible baths	1	0.01	0.0009	0.07
Enclosures/fields/settlements	13	0.07	0.0565	0.96
Findspots	22	0.11	0.1572	1.62
Fort and vicus	1	0.01	0.0021	0.07
Industrial Sites	3	0.02	0.0049	0.22
Roads and associated sites	30	0.16	0.0945	2.21
Early Medieval	**17**	**0.09**	**0.08**	**1.25**
Churches/chapels	1	0.01	0.0024	0.07
Earthworks/ditch	5	0.03	0.0033	0.37
Findspots	4	0.02	0.0219	0.29
Sculpture (crosses)	5	0.03	0.0106	0.37
Towns/settlements	2	0.01	0.0067	0.15
Medieval	**157**	**0.82**	**1.1**	**11.54**
Artefact Scatters	1	0.01	0.0018	0.07
Boundaries/Linear Earthworks	17	0.09	0.0386	1.25
Castle	1	0.01	0.0055	0.07
Church/Monastic Grange	14	0.07	0.0897	1.03
Cross/Sculpture	6	0.03	0.0377	0.44
Deer Parks	4	0.02	0.0423	0.29
DMVs	11	0.06	0.0353	0.81
Enclosures/Field Systems	54	0.28	0.3329	3.97
Findspots	6	0.03	0.0872	0.44
Halls/Farmstead	17	0.09	0.0973	1.25
Industrial Sites	6	0.03	0.0255	0.44
Roads	13	0.07	0.0143	0.96
Settlements	3	0.02	0.0082	0.22
SMVs	4	0.02	0.0219	0.29
Post Medieval-Modern	**922**	**4.79**	**3.39**	**67.79**
Aircraft crashsite	1	0.01	0.0103	0.07
Agricultural/Field Systems	211	1.1	0.3776	15.51
Canals and associated	20	0.1	0.0237	1.47
Enclosures	33	0.17	0.0295	2.43

Findspot	4	0.02	0.0313	0.29
Gardens/Lakes/Ponds	19	0.1	0.0684	1.4
Golf Course	3	0.02	0.0055	0.22
Halls	41	0.21	0.08	3.01
Industrial Remains (kilns)	2	0.01	0.038	0.15
Lead Mining/Working	99	0.51	0.1985	7.28
Military Sites	4	0.02	0.0471	0.29
Mills and Associated Buildings	43	0.22	0.1839	3.16
Quarrying/Stone Working	19	0.1	0.3566	1.4
Railway Lines/Buildings	110	0.57	0.3049	8.09
Religious Buildings	54	0.28	0.1541	3.97
Roads/Tracks/Boundaries	74	0.38	0.1918	5.44
Settlement	7	0.04	0.0021	0.51
Other Buildings	178	0.93	0.4207	13.09
Multiperiod Remains	**19**	**0.1**	**0.37**	**1.4**
Agricultural Buildings	2	0.01	0.0006	0.15
Boundaries/Field Systems	4	0.02	0.0073	0.29
Findspots	10	0.05	0.0046	0.74
Lithic Scatters	2	0.01	0.017	0.15
Industrial Sites	1	0.01	0.0003	0.07
Unknown Date	**68**	**0.35**	**0.47**	**5**
Enclosures/earthworks	38	0.2	0.0061	2.79
Findspots	22	0.11	0.156	1.62
Inhumation	1	0.01	0.0006	0.07
Quarrying	2	0.01	0.003	0.15
Rock Shelter/Cave	2	0.01	0.038	0.15
Sculpture	1	0.01	0.0003	0.07
Standing Stones	2	0.01	0.0064	0.15
Trackways/Roads	9	0.05	0.007	0.66
TOTAL SITES	**1360**	**7.07**	**6.54**	**100**

Table 4.6.1 Breakdown of all sites on the shales and siltstones by period and site type.

4.6.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

There are only two entries in the combined lists dating to the Mesolithic with no entries for the Palaeolithic period. Of the two Mesolithic entries, one is for a single flint findspot found below the steep gritstone edges above Derwent Reservoir, and the second is for the Mesolithic and Neolithic site at Lismore Fields, Buxton (Garton 1991). Lismore Fields extends across a number of different landform units and this positioning may well be deliberate in order to exploit the different geological conditions of the varying landforms. The full discussion of the Lismore Fields site relating to both the Mesolithic and Neolithic remains is within chapter 5.1 as the parent landform of the site is primarily the till which overlies this portion of the shales.

The lack of known early prehistoric finds, and also the relatively meagre quantity of Mesolithic lithic scatter material compared to other landforms suggests that this landform was not as heavily utilised by the hunter-gatherer population that evidently roamed the wider area, although this could also be a result of the relative intensity of fieldwalking that has taken place on this landform. Recent fieldwalking has taken place to test across the geological zones of the Peak District to illuminate this very problem and the results are awaited with interest (J. Barnatt pers. comm.). The shales are a relatively well-developed agricultural landscape from the medieval and possibly the Romano-British periods onwards which could have led to the destruction of earlier sites, though artefact scatters are known dating to the Neolithic and Romano-British period suggesting the lack of earlier material may not be a product of a lack of fieldwork or unsuitable conditions. Where Palaeolithic or Mesolithic artefacts are recovered from the shale valleys, these should be accorded a high level of significance due to their relative rarity as they would no doubt indicate the attractions of resource-rich valley floor and riparian environments.

4.6.1.2 Neolithic (3900 – 2200BC)

As noted above the Early Neolithic settlement site of Lismore Fields (Garton 1991) lies partially on the shales. Whilst the main discussion of this important site is within chapter 5.1, it is key to mention here as the shale bedrock borders both the Carboniferous Limestone and Millstone Grit as well as underlying several types of superficial geology. If the junction of different landforms is a place attractive to prehistoric settlement, as indicated by Lismore Fields, then the shales should form a focus of study due to their liminal nature and close coincidence with the major watercourses that surround and bisect the Carboniferous Limestone plateau. By positioning a settlement on a shale area, the residents would be best able to exploit a setting with ready access to the widest range of resources.

There is a potential Neolithic long cairn noted in the NMR positioned on a shallow south-facing slope overlooking the Lismore Fields site, though the site of the cairn is now beneath a housing estate. This would be a slightly unusual position for a long cairn as they are normally, though not exclusively, more visible, utilising false crests or summits and on valley sides (see Barnatt 1996), though the proximity to an Early Neolithic permanent settlement site would lend credence to the existence of such a monument, and it is possible that the position of Neolithic burial monuments may indicate the proximity of Neolithic settlement activity.

A single Neolithic pit was excavated beneath the Big Lane barrow at Hognaston in advance of the creation of the Carsington Water reservoir (Collis 1996). The pit contained a number of sherds of Early Neolithic pottery and appears similar to the kind of 'midden pits' indicative of settlement activity at sites such as at Hill Farm, Willington (Hughes and Jones 1995), Mercia Marina, Willington (Brightman and Waddington forthcoming), Willington Quarry (Wheeler 1979; Beamish 2009) though all these sites are on the sand and gravel terraces of the Trent Valley. Whilst the evidence is limited, three of the stone axe heads noted in the HER and NMR were also found within the area of Hognaston near Carsington Water and though their exact provenances are unknown, it is possible that the area may be a focus for Neolithic activity.

Individual findspots account for 26 of the 29 known Neolithic entries in the HER and NMR, and of these, 18 of the 26 are Neolithic stone axeheads. The presence of a substantial ratio of nominally high-status artefacts such as polished stone axe heads on the landform have a number of possible interpretations (e.g. evidence of the use of the shale valleys as routeways for exchange networks; evidence for forest clearance during the Neolithic period), however without more detailed evidence of exact locations and contexts or analysis of rock type these must remain speculative. The most basic point that can be made concerning the amount of Neolithic artefacts on this landform is that it indicates the presence of Neolithic peoples in the upland valleys of the Peak District, and therefore, more archaeological remains of this period are likely to exist where they have not been truncated by later agriculture or industry. This implies that from the Early Neolithic onwards pioneer farming groups spread via river valleys and colonised the dry areas close to the main water courses before spreading out on to the higher valley sides and uplands. This pattern of settlement appears to have given rise to valley-based communities, which is a basic characteristic of much of upland and northern Britain that has persisted through to the present day. There is little clear overall patterning to the location of the individual findspots.

4.6.1.3 Bronze Age (2200 – 700BC)

There are 41 known cairn or 'barrow' sites known on the shales and siltstones. As discussed in chapter 4.1 (Carboniferous Limestone), the tradition of barrow burial has a long currency in Derbyshire with a particular focus on the Carboniferous Limestone plateau and gritstone moors and it is clear that this tradition extends onto the shale landforms between.

The positioning of the barrows in the landscape follows that of the Carboniferous Limestone, with the majority of sites positioned to be easily visible on false crests above valleys at around the 250m contour. A few are sited on local highpoints but these are generally overlooked by other hills. Four known barrows and a further possible example are positioned in valley bottoms, two are on localised highpoints on the valley side but are still at a very low elevation compared to many known funerary monuments on other landforms, whilst the remaining three are now submerged beneath the Howden Reservoir. This patterning raises the intriguing question of the existence of valley-based and therefore less-visible funerary monuments. If such monuments had been more widespread, it is likely that they would have been subject to a greater level of destruction due to the medieval and later agriculture in the valleys. It

is necessary to note therefore that barrows in the Peak District are not restricted to the landscape settings described for other landforms where such monuments are more prevalent, and there is the potential to find these monuments, albeit truncated, in valley settings in a similar fashion to the ring ditch barrows known from cropmark evidence and excavation in the Trent Valley. Where conditions are conducive, such as in those areas where the ground has been ploughed, there is no reason why such monuments would not be visible on aerial photographs as cropmarks or soilmarks, even where there is no remaining surface expression.

Of the 18 Bronze Age findspots noted, six are metalwork in the form of two socketed chisels, a later Bronze Age socketed axe, two other Bronze 'axes' of uncertain provenance and form and a Late Bronze Age sword. Most of this material is later in date, though the dataset is too small to infer a meaningful pattern of settlement. While there is no clear patterning in their distribution, they are all in the vicinity of watercourses. This may be coincidental but it is worth noting as, in the Trent Valley sands and gravels as elsewhere in the country, there is a longstanding association of Bronze Age metalwork with votive deposition in or near water (Bradley 1990).

4.6.1.4 Iron Age (700BC – AD43)

The hillfort of Mam Tor, one of the best known prehistoric monuments in Derbyshire, lies interbedded strata which include shales, though at the level of mapping used for this project, it lies on this landform. The geological context of the hillfort has added to its character as it is known as the 'shivering mountain' due to the unstable nature of portions of its strata and the landslips which define a portion of its profile. Mam Tor straddles a summit at the western end of a high ridge which defines the boundary between the Hope Valley and the Vale of Edale, commanding wide views in all directions. Mam Tor is one of the partially-excavated hillforts within the Peak District, having been subjected to fieldwork over five seasons by the University of Manchester (Coombs and Thompson 1979). Excavations revealed multi-phased defences, with the earth and stone rampart possibly preceded by a timber breastwork. Though no dating evidence was found for the rampart construction, radiocarbon dates were obtained on unidentified charcoal from the floors of the interior hut structures. Using the calibration programme OxCal 4.1 and the INTCAL09 calibration curve, the two radiocarbon dates are given as 1730-1020 cal. BC (3130±132 bp, Birm-202) and 1610-1020 cal. BC (3080±115 bp, Birm-192) both at 95.4% confidence. These Mid-Late Bronze Age dates suggest a consider-

Figure 4.6.2 The spectacular hillfort of Mam Tor looking east towards Castleton in the valley beyond. As well as the formidable defences, the scooped huts and storage pits are readily visible, pockmarking the interior of the monument. (NMR 20492_039 09-NOV-2005 © English Heritage. NMR.)

able time-depth for activity on the hilltop and the possibility of an early date for the enclosure itself, a possibility made more tenable given the similar dates now recorded for the Gardom's Edge enclosure (J. Barnatt pers. comm.). This is an important point for predicting the location of archaeological remains on many of the landforms, as it suggests that certain sites may be a focus for activity and settlement over long time periods, especially where these are situated to take advantage of natural resources or significant topographic features.

4.6.1.5 Romano-British (AD43 – 410)

It is during the Romano-British period, that the archaeological record indicates land use intensification in the shale valleys, though it is possible that the amount of later agriculture and industry has destroyed or masked earlier remains.

The principal Roman site on the shales is the fort and vicus of Navio (Brough-on-Noe) which sits at the confluence of the Peaks Water and River Noe in a strategically important point in the landscape controlling access into the Hope Valley and Vale of Edale and appearing to stand in contrast and opposition to the hillfort of Mam Tor at the opposite end of the valley. The fort and vicus have been systematically investigated in too distinct phases of work by the University of Manchester (Jones et al. 1966; Jones and Wild 1968; 1970) and the University of Sheffield (Dearne 1993), and it is clear that despite periods when the fort was abandoned and reoccupied, it would have remained a focus for activity. It has been suggested that the vicus at Navio remained intimately connected to the fort and did not represent a sprawling civilian settlement in its own right (Dearne 1991), possibly due to the proximity of the spa town of Buxton (Aquae Arnemetiae) serving as a large civilian centre in the Peak District.

The network of forts and roads in and around the Peak District was predominantly constructed in order to control the exploitation of the natural wealth of the uplands, principally lead, but also coal, clays, the quarrying of stone and probably the semi-precious minerals that can be found. In the shale valleys, these natural resources do not occur (with the exception of localised pockets of sandstone and other rocks suitable for quarrying) and it is possible that the Roman period archaeology on this landform is more related to the strategic control of communication routes and waterways and the agricultural underpinning of the occupation than is the case on other landforms. An excep-

Figure 4.6.3 The platform of the Roman fort of Navio at Brough-on-Noe with some of the building outlines visible in the interior. (NMR SK1882-15 NMR 17200-17 16-NOV-1998 © Crown copyright. NMR).

tion to this may be the possible use of the rivers for panning for any precious metals though there is no archaeological evidence to support this. It has been suggested that agriculture was in itself a key function of the Roman occupation of the uplands as many of the known sites on the fertile Carboniferous Limestone plateau (1a) are not near the ore-rich locations (Barnatt and Smith 2004, 52), though this observed pattern could be a product of the industrial activity in and around the ore fields obliterating the upstanding evidence for Roman and earlier settlement in these areas. This view remains to be demonstrated and not assumed.

The distribution of Roman period finds is fairly well spread across the landform. Some of the findspots cluster around the known Roman settlements of Brough-on-Noe and Buxton and also along the lines of the known Roman roads, as would be expected. There are also two other noticeable groupings of findspots on the shale landform. The first is to the north-west of Matlock near Wensley where coins and a lead pig have been found in the valley bottom and on the low valley sides, and also a beehive quern was discovered on the scarp edge between Wensley and Winster. The second significant cluster is around the village of Hazelwood, west of Belper and south of the known Roman industrial sites at Lumb Brook (Brassington and Webster 1988) and Shottle Hall (Kay and Hughes 1963). The findspots include five pottery scatters, a stray coin find and a piece of roof tile, suggesting that there is a settlement of some kind in the immediate area. The area in which these findspots are located sits on a wide spur of high ground between the confluences of the rivers Derwent and Ecclesbourne also looking northwards down to the Lumb Brook. This is a naturally attractive place for settlement and the amount of known scatters and single finds in this area illustrates the effectiveness of fieldwalking as a rapid prospection technique on arable land not only for prehistoric sites, but also for the Roman period and later. Interestingly the name of the River Ecclesbourne is an entirely Brittonic name which indicates the presence of a British Christian monastic community prior to Anglo-Saxon settlement, possibly indicative of a continuity of late Roman settlement in the area.

4.6.1.6 Early Medieval (AD410 – 1066)

As is the case with many of the landforms in the northern upland areas of Derbyshire and the Peak District, the early medieval period is poorly represented in the currently known archaeological record. In the shale valleys the early medieval remains account for only 1.25% of all known sites.

The earthwork boundaries noted in the HER and NMR are almost all sections of the Grey Ditch, a possible defensive earthwork which cuts the line of the Roman road of Batham Gate runs from the fort of Navio in the north up onto the Carboniferous Limestone plateau to Buxton (O'Neil 1945). Recent excavations showed that the bank associated with Grey Ditch was built over a relict ploughsoil containing Roman artefacts, suggesting that this is an early medieval boundary feature cutting off access to the limestone plateau from the lowland valleys (Guilbert and Taylor 1992) and therefore representative of a rearrangement of the landscape following the Roman withdrawal. The single entry for a linear earthwork not relating to Grey Ditch refers to a linear earthwork below the eastern flanks of Mam Tor in the Hope Valley, which was identified in the 18th century but recent fieldwork has failed to locate the feature.

The majority of evidence for early medieval activity, as with other upland landforms, is a small amount of sculpture, predominantly crosses and cross fragments. The locations of the cross sculptures are split between those which are still in their primary location associated with churches, and those which have been removed from their original location and have been re-used in some way. For a fuller discussion of the traditions of early medieval stone sculpture in the Peak District, see chapter 4.1 (Carboniferous Limestone).

4.6.1.7 Medieval (AD1066 – c.AD1700)

Within the HER and NMR, the archaeological record for the medieval period is dominated by sites which can be broadly grouped into the heading of enclosures and field systems. Fifty-four of the known medieval sites (3.97% of all known archaeological sites on the landform) are accounted for by the remains of medieval agriculture, the preservation of which may be partially due to the heavy soils in the shale valleys. In contrast to the limestone plateau, there are less-complete fossilised medieval field systems due largely to the amount of post-medieval impact on the land, but also to the fact that many of the field systems have more moveable hedge boundaries (Barnatt and Smith 2004, 73). The agricultural landscapes are identifiable through both ground observation and aerial photography and form an important part of understanding the land use of this period and also the creation of the landscape which has developed into that visible today.

Figure 4.6.4 The line of Grey Ditch running from the top left of the image along a line of trees, crossing the modern road which sits on the line of Roman Batham Gate, and continuing as a visible ditch and bank earthwork running onto the side of the valley. (RAF_F21_58_1094_0446. © Crown copyright. NMR).

At various points throughout the medieval period there was significant depopulation across the country as a whole and this is reflected in Derbyshire and the Peak District in the known deserted and shrunken villages. Deserted villages tend to occur near present settlements which may have formed or expanded as a result of the desertion of nearby smaller hamlets. They can be found positioned in the valley bottom near to the main rivers, as with the settlement of Derwent Village now submerged beneath the Ladybower Reservoir, or on natural shelves on the valley side such as the deserted settlement of Ludwell near Hartington. Deserted medieval villages, where well preserved away from more modern agriculture and industry, provide an opportunity to garner a huge quantity of information about this period, as illustrated most famously by the excavations at Wharram Percy on the chalk wolds of east Yorkshire (Wrathmell 1996; Oswald 2004).

Deer parks and other large partitioned hunting Forests are prevalent across the Peak District during the medieval period. On this landform they tend to be located in the valley bottoms or associated with great houses such as the grounds which once surrounded Haddon Hall near Bakewell. Parks on the shale landform also tend to be of smaller size than the hunting estates and deer parks known on the limestone plateau, with the notable exception of the cluster of deer parks around Shottle Park near Hazelwood.

Many of the churches and chapels across Derbyshire and the Peak District have medieval origins, and often surviving medieval fabric, however, as noted below for the post-medieval and modern built heritage, it will be rare that aggregate extraction and development will impact on known church sites. There is one known monastic grange site on the landform, Abbey Grange which is now submerged beneath Derwent Reservoir. The uplands of Derbyshire and the Peak District host many monastic and non-monastic granges, and the excavations at Roystone Grange (see chapter 4.1, Carboniferous Limestone) have shown the value that can be gained from survey and excavation of these sites and their surrounding landscapes. It is anticipated that across the Derbyshire uplands, more grange sites are yet to be identified (C.R. Hart pers. comm.).

4.6.1.8 Post-medieval to Modern (c.AD1700 – present day)

The majority of known archaeological sites in the HER and NMR fall into the period of post-medieval through to the modern day. This pattern is to be expected as not only is the archaeological record for more-recent times dominated by the built heritage, but industrialisation and the increasing mechanisation of agriculture has had a widespread and robust impact on the landscape which can still be seen today. Within the valley settings this can be directly related to the use of waterways for energy production and industry, including water wheels and steam engines, and for transport, including the construction of the canal network. Despite this, the percentage of sites belonging to the post-medieval and modern periods on landform 1g is higher than that of any other landform, and the relative ratio of sites of this period stands at 4.79 per 100ha, in comparison to a density of 3.39 for Derbyshire and the Peak District as a whole. These statistics back up the picture gleaned from the archaeological record, of a landscape which has been more heavily settled and heavily-farmed during recent times than other landforms within Derbyshire and the Peak District. It is probable that the shale valleys have attracted this use due to the combination of their relatively-broad river valley topography creating natural access routes and areas for arable farmland, and the proximity of the natural resources which have been a key driver to the settlement patterns of the Peak District and north Derbyshire for millennia.

Fourteen percent of all known sites in the combined lists for this landform are the remains of post-medieval agriculture and field systems. Whilst all landforms show a substantial increase in known sites during the post-medieval period, the percentage is higher for landform 1g suggesting that the valleys where this landform occurs became foci for agriculture and industry that was perhaps located elsewhere on a smaller scale, or possibly entirely absent, in pre-medieval periods.

Just under a quarter of the post-medieval and modern sites (representing 15 % of all sites on the landform) are related to the railway, road and canal systems which formed an integral part of the post-medieval and modern economy in this area. With the notable exception of the Cromford and High Peak Railway (see chapter 4.1 Carboniferous Limestone), the majority of the railways utilised the natural routeways presented by the shale valleys, indeed the modern railway line linking Sheffield to Manchester still runs north-west from Grindleford, following the Derwent, and into the Vale of Edale. The subsidiary buildings and mechanisms associated with the transport network are an important archaeological association with this landform and they can be reasonably anticipated to be situated along the corridors either side of old routes, be they disused railways, tracks or canals, or indeed modern routes built over the remains of earlier.

It has been noted in previous sections that the natural resources of the Derbyshire and Peak District uplands have had a major effect on the patterns of much historical settlement and activity as well as a significant impact on the landscape itself; this is perhaps most true of the post-medieval and modern periods where the demand for raw materials from the industrial revolution onwards necessitated a boom in the extractive industries. Where old workings are impacted upon by modern development, there will only be a remote chance that any early archaeological deposits have remained undisturbed by the previous groundworks; the primary historic significance of such sites will usually lie in the early quarry or extraction remains themselves. On landform 1g, the principal sites which may be impacted upon are small localised quarry workings or the remains of extensive lead workings which impinge onto the shales from the neighbouring Carboniferous Limestone. When dealing with upstanding remains of any period, the first phase of archaeological work should always include earthwork survey and/or standing structure survey to establish the extent and nature of above-ground remains and this holds true for post-medieval quarry or mining remains (see also Research Agenda – Chapter 7).

4.6.1.9 Unknown and multi-period

Undiagnostic lithic and pottery finds and artefact scatters occur across the shale landscape. There appears to be little patterning in the locations of these findspots, though the sample is small and any attempt to define a genuine pattern would be speculative at best.

4.6.2 Evaluation and Mitigation Implications (see table 7.7 for summary)

As a relatively well-developed agricultural landscape, the shales may well present good opportunities for fieldwalking which are absent from other less-improved landforms such as the Millstone Grit (1f). Nearly ten percent of all the

known sites on the landform are single finds or artefact scatters, which suggests that fieldwalking would be a fruitful technique for prospecting for archaeological remains in the form of artefact scatters which may suggest discrete sites, as well as compiling a record of artefacts within the ploughzone which may otherwise go unrecorded (see also Research Agenda – Chapter 7).

The network of Roman roads across the Peak District is reasonably well-attested and tends to take advantage of the natural routeways provided by the shale valleys. Where modern development will impact on a potential line of Roman road it is important that the opportunity is taken to refine our knowledge of the location, direction and construction of these monuments. Large linear features such as roads and trackways are well-suited to prospection using linear evaluation trenches. These can be used to pinpoint the location of the road with contingency trenching incorporated to excavate a small area once the feature has been identified (see also Research Agenda – Chapter 7).

There are a number of deer parks and other medieval enclosures known on this landform, and whilst they are of historic significance in themselves, especially relating to the associated structures and boundary features of the parks, they also provide the opportunity to investigate parcels of land which have remained largely undisturbed by other medieval and in some cases post-medieval land use. These fossilised landscapes have the potential to preserve earlier remains as they have never been subjected to the impacts of agriculture and industry, such as the Roman settlement and kilns known within the boundaries of the Shottle Park deer park noted above (see also Research Agenda – Chapter 7).

The ubiquity of post-medieval agricultural remains on this landform suggests that any development of significant size will impact on archaeological remains of this type. Post-medieval field systems have some significance in their own right as historical monuments, but a key point to make is that with ridge and furrow cultivation, this has the potential to mask and also preserve earlier remains beneath. A suite of archaeological techniques involving recording extant ridge and furrow, recording finds within the ploughzone and then a strip, map and sample approach to investigate masked remains would provide a comprehensive mitigation strategy and also add important new data to our knowledge concerning the impact of medieval and post-medieval agriculture on the remains of earlier periods (see also Research Agenda – Chapter 7).

The amount of known earthworks and enclosures illustrates again the potential to discover these sites by aerial photography on this landform. Previously uninvestigated enclosures and earthworks should be prioritised in a programme of archaeological evaluation and mitigation with a question-led approach to establish form, function and date, and to develop morphological classifications for these sites. Where such earthwork sites can be identified, it is important that traditional ground-based survey also be employed as detailed surveys can generally provide a key initial record on which further work can be based (see also Research Agenda – Chapter 7).

4.7. Landform 1i – Coal Measures

Landform 1i encompasses the various geological units and members which form the Pennine Coal Measures. The Coal Measures sit 'outside the horseshoe' of Millstone Grit when viewed in plan. For Derbyshire and the Peak District, the landform extends over much of the eastern fringes of the county up to the Magnesian Limestone in the area around Creswell, with small amounts also present as the dominant landform in the eastern fringes of the Peak District include the coal seams interleaved within the gritstone, and in the far south of Derbyshire in the area around Swadlincote. The landscape varies, from the interface with the Millstone Grit uplands where the landforms are almost indistinguishable from each other, down to the lower-lying rolling landscape to the south and east, which is now pock-marked with the remains of post-medieval and modern industry. Great tracts of the Coal Measures landscape are the product of the rich natural resources contained in this geology, coal, clay and ironstone, coupled with the network of rivers that provided the early water power and transport for the industrial revolution.

A key point to note about the Coal Measures is that as they are geologically similar to the Millstone Grit, interbedded sedimentary, conglomerate rocks and coal beds, theoretically many of the basic drivers of settlement such as the basic acidity of the rock, should produce similar archaeological associations between the two landforms. As is discussed below, where the topographic settings are similar, on the interface between the two landforms, then this holds true, but in the lower-lying areas to the south and east, the associations are more individual to this landform and relate more to the natural resources prevalent within the Coal Measures and their exploitation.

The exploitation of the Coal Measures is more historic than current, and this is discussed below in the assessment of the post-medieval and modern periods. There are, however, 160,000 tonnes of permitted extraction with two active sites relating to the future extraction (source: Derbyshire Minerals Core Strategy consultation strategy), and so there is the strong likelihood that impacts upon the historic environment will need to be addressed. The second potential source of minerals extraction on this landform is in the secondary extraction of historic colliery waste for low-grade aggregate. There was no dedicated aerial photograph transcription targeted on this landform.

The area of landform 1i encompasses 59,464.24ha which represents 18.08% of the total area of Derbyshire and the Peak District.

4.7.1 Archaeological Associations (chronological)

The Coal Measures landform hosts 2286 HER entries and 781 NMR entries of which 623 are duplicated giving a total number of known archaeological and historical sites of 2434 within the combined lists. The breakdown of the sites within this combined list is presented in Table 4.7.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 1i hosts a total site ratio of 4.11 sites per 100 hectares, the second lowest ratio for a bedrock geology landform for which there is a reasonable volume of data. See chapter 7 for a discussion of the relative densities of sites on the various landforms.

The Coal Measures landform stretches across two reasonably distinct topographic zones and the factors affecting preservation in these two areas may well account for the differences in existing archaeology between the two. The 'upland' area of the Coal Measures is, in essence, very similar to the Millstone Grit. With the lack of modern development in this area, there is a good chance that preservation of remains is good and that the amount of known sites listed in the HER and NMR represent only a small portion of the genuine archaeological resource. Tempering this however is the fact that much of the uplands has heavy heather and, in places, peat cover which masks archaeological remains and makes their detection difficult. It is possible in areas of extensive vegetation that LiDAR may be a useful tool in prospecting rapidly at a landscape scale. In the lowland zone of the Coal Measures, the single biggest factor in the masking and truncation of known archaeological remains is the large scale of the post-medieval and modern exploitation of the natural resources. A substantial amount of the Coal Measures landscape has been exploited for the coal, sandstone and clay whether this be in extraction sites, processing plants, or the infrastructure to support the industrial revolution. It is worth stressing that much of the modern coal extraction in the east of the county is represented by large-scale open casting, and this will have removed any indication of archaeological remains in these areas.

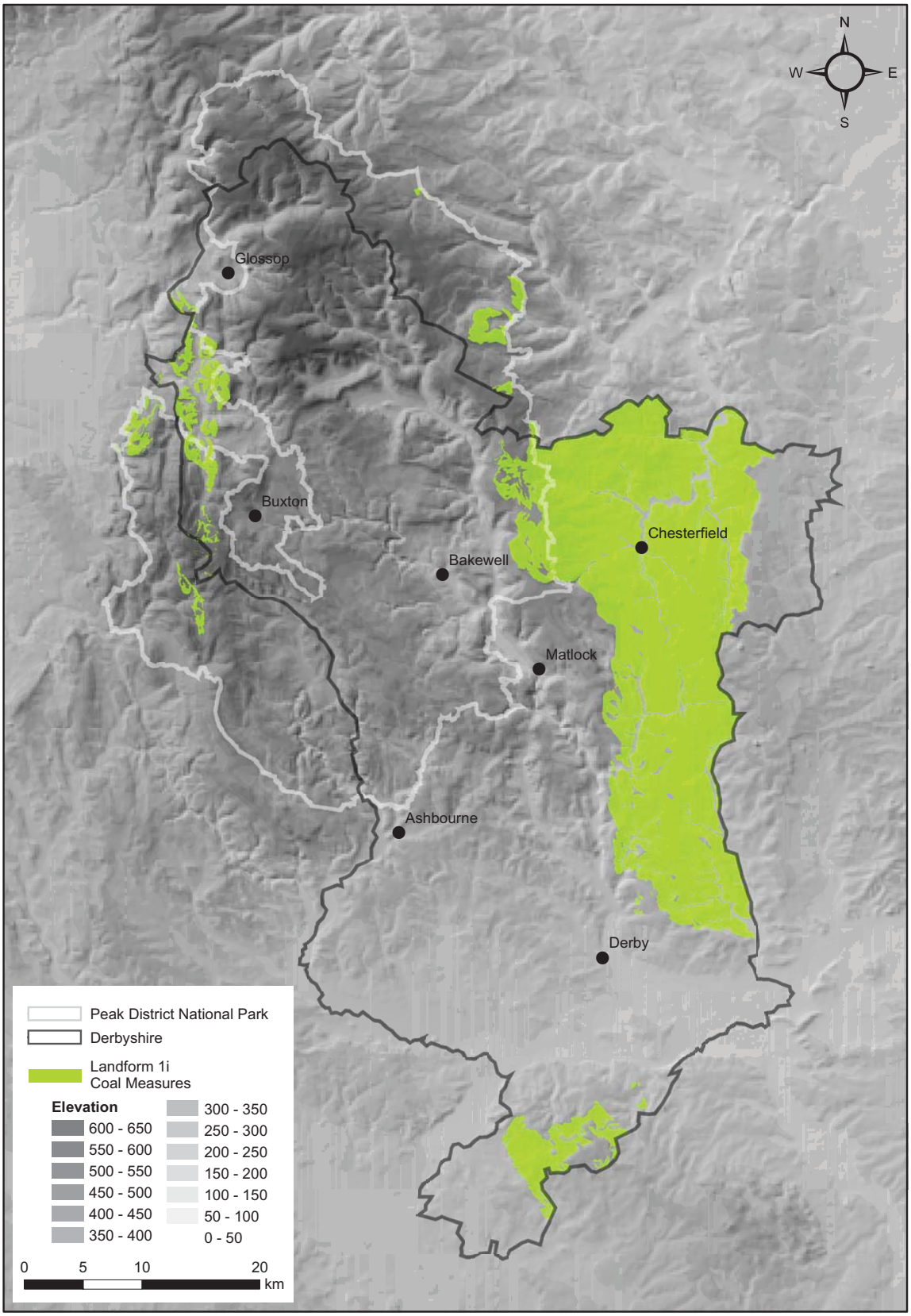

Figure 4.7.1 Location of landform 1i within Derbyshire and the Peak District.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**29**	**0.05**	**0.12**	**1.19**
Findspot	11	0.02	0.0611	0.45
Lithic Scatter	18	0.03	0.0456	0.74
Neolithic	**29**	**0.05**	**0.24**	**1.19**
Artefact Scatter	1	0	0.0173	0.04
Findspot	28	0.05	0.1216	1.15
Bronze Age	**170**	**0.29**	**0.4**	**6.96**
Artefact Scatter	3	0.01	0.0027	0.12
Barrows/Cairns	73	0.12	0.3019	2.99
Burnt Mounds	1	0	0.0003	0.04
Cairnfields	20	0.03	0.0255	0.82
Cremation Cemetery	2	0	0.0021	0.08
Enclosure/Field System	9	0.02	0.021	0.37
Findspots	34	0.06	0.1146	1.39
House Platforms/Structures	16	0.03	0.0109	0.65
Rock Art	1	0	0.004	0.04
Standing Stone/Stone Circle	11	0.02	0.0155	0.45
Iron Age	**13**	**0.02**	**0.05**	**0.53**
Findspot	6	0.01	0.021	0.25
Ditch/Boundary	1	0	0.0009	0.04
Enclosures	6	0.01	0.0091	0.25
Romano British	**28**	**0.05**	**0.43**	**1.15**
Artefact Scatter (pottery)	4	0.01	0.0152	0.16
Camp/Fortlet	2	0	0.0027	0.08
Enclosures/fields/settlements	2	0	0.0565	0.08
Findspots	15	0.03	0.1572	0.61
Pottery Kiln Site	1	0	0.0049	0.04
Roads and associated sites	3	0.01	0.0945	0.12
Settlement	1	0	0.003	0.04
Early Medieval	**15**	**0.03**	**0.08**	**0.61**
Burial	1	0	0.0109	0.04
Church/Chapel	2	0	0.0024	0.08
Findspot	3	0.01	0.0219	0.12
Industrial Site	1	0	0.0006	0.04
Sculpture	4	0.01	0.0106	0.16
Towns/settlements	1	0	0.0067	0.04
Trackway/Boundaries	3	0.01	0.003	0.12
Medieval	**444**	**0.75**	**1.1**	**18.17**
Battlefield	1	0	0.0003	0.04
Boundaries/Linear Earthworks	11	0.02	0.0386	0.45
Castle/motte	3	0.01	0.0055	0.12
Church/Religious Buildings	83	0.14	0.0897	3.4
Sculpture/Wayside crosses etc	28	0.05	0.0377	1.15
Deer Parks/Parks	33	0.06	0.0423	1.35
DMVs	8	0.01	0.0353	0.33
Enclosures/Field Systems	50	0.08	0.3329	2.05
Findspots	17	0.03	0.0872	0.7
Fishponds	10	0.02	0.0097	0.41
Granges	6	0.01	0.0897	0.25
Manor House/Farmstead	113	0.19	0.0973	4.63

Hospital/Almshouse	8	0.01	0.0055	0.33
Houses	6	0.01	0.0033	0.25
Industrial Sites	39	0.07	0.0255	1.6
Quarrying/Mining Remains	11	0.02	0.0255	0.45
Roads/Tracks	9	0.02	0.0143	0.37
Settlements	2	0	0.0082	0.08
SMVs	5	0.01	0.0219	0.2
Town	1	0	0.0082	0.04
Post Medieval-Modern	**1556**	**2.62**	**3.39**	**63.69**
Agricultural buildings /Field Systems	155	0.26	0.3776	6.34
Aircraft Crash Site	1	0	0.0103	0.04
Brickworks/Pottery and clay working	96	0.16	0.0356	3.93
Canals and associated	25	0.04	0.0237	1.02
Enclosures	6	0.01	0.0295	0.25
Findspots	12	0.02	0.0313	0.49
Gardens/Parks//Lakes/Ponds	23	0.04	0.0684	0.94
Golf Course	8	0.01	0.0055	0.33
Halls/Large Houses	38	0.06	0.08	1.56
Industrial Sites	47	0.08	0.038	1.92
Iron/Steel Working Sites	48	0.08	0.0176	1.96
Military Sites	30	0.05	0.0471	1.23
Mills and Factories	142	0.24	0.1839	5.81
Quarrying/Mining	237	0.4	0.3566	9.7
Railway Lines/Buildings	187	0.31	0.3049	7.65
Religious Buildings	84	0.14	0.1541	3.44
Roads/Tracks/Boundaries	105	0.18	0.1918	4.3
Sculpture/Memorials/Crosses	8	0.01	0.0067	0.33
Sports Grounds/Courses	6	0.01	0.0033	0.25
Other Buildings	277	0.47	0.4207	11.34
Wells/Pumps/Fountains	21	0.04	0.0295	0.86
Multiperiod Remains	**21**	**0.04**	**0.37**	**0.86**
Earthworks	8	0.01	0.0012	0.33
Artefact Scatters	13	0.02	0.017	0.53
Unknown Date	**138**	**0.23**	**0.47**	**5.65**
Earthworks/poss. Barrows	20	0.03	0.0061	0.82
Enclosures	35	0.06	0.1523	1.43
Field Boundaries/Linear Features	6	0.01	0.0456	0.25
Findspots	58	0.1	0.156	2.37
Ring Ditch Cropmark	2	0	0.0416	0.08
Standing Stone/Circle	4	0.01	0.0064	0.16
Trackways	13	0.02	0.007	0.53
TOTAL SITES	**2443**	**4.11**	**6.54**	**100**

Table 4.7.1 Breakdown of all sites on the Coal Measures by period and site type.

4.7.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

All of the known pre-Neolithic sites on this landform are of Mesolithic date, with no Palaeolithic finds or sites known. Where Mesolithic sites are known, they show a clear preference for valley side locales commanding wide views and a significant number occur around the 110-120m contours. All the known Mesolithic sites on the Coal Measures occur in the east of Derbyshire and the Peak District, with none known from the western Coal Measures. There is a significant fieldwork bias in the data for this period, as many of the Mesolithic sites were located during widespread fieldwalking undertaken by the North Derbyshire Archaeological Trust (NDAT) in the late 1970s (Hart 1981, 25).

The most significant cluster of Mesolithic sites is around the flanks of the well-defined elevated ridge east of Dronfield which is now capped by the Coal Aston airfield (Fig. 4.7.2). Two lithic scatters are known south of the high ground sitting at the 120m contour on the flanks of the Drone valley. Slightly further to the east, three more flint scatters are known around Unstone Grange, again sitting at around the 120m contour overlooking the river valley to the south. A further eight discrete lithic scatters were identified through systematic fieldwalking by NDAT in 1977-78 with six along the gradually descending spur of land above the Drone between the 190m and 140m contours, and the remaining two were at a lower elevation of around 110-120m yet still raised above the valley floor proper (Hart 1981, 30). One of the Unstone flint scatters was excavated in 1977-78 as a part of this fieldwork by NDAT, and these investigations identified over 4000 lithics of both early and late Mesolithic type along with cut features indicating two separate phases of activity, though unfortunately the full details of these excavations remain unpublished (see Hart 1981, 30; Myers 2006a, 5). The final lithic scatter on the Coal Aston ridge is known from just below the highest point on a narrow plateau by the village of Apperknowle.

The only other excavated site dating to this period, and one of the few in Derbyshire and the Peak District as a whole, is at Lordsmill Street in the centre of Chesterfield. The site sat on a low spur of land at about the 80m contour with commanding views across the floodplain of the rivers Rother and Hipper and revealed a substantial later Mesolithic flint assemblage associated with a series of cut features (Myers 2006a, 9). It was noted in the post-excavation lithic assessment for the site (Myers 1999) that the assemblage was dominated by scrapers with relatively few

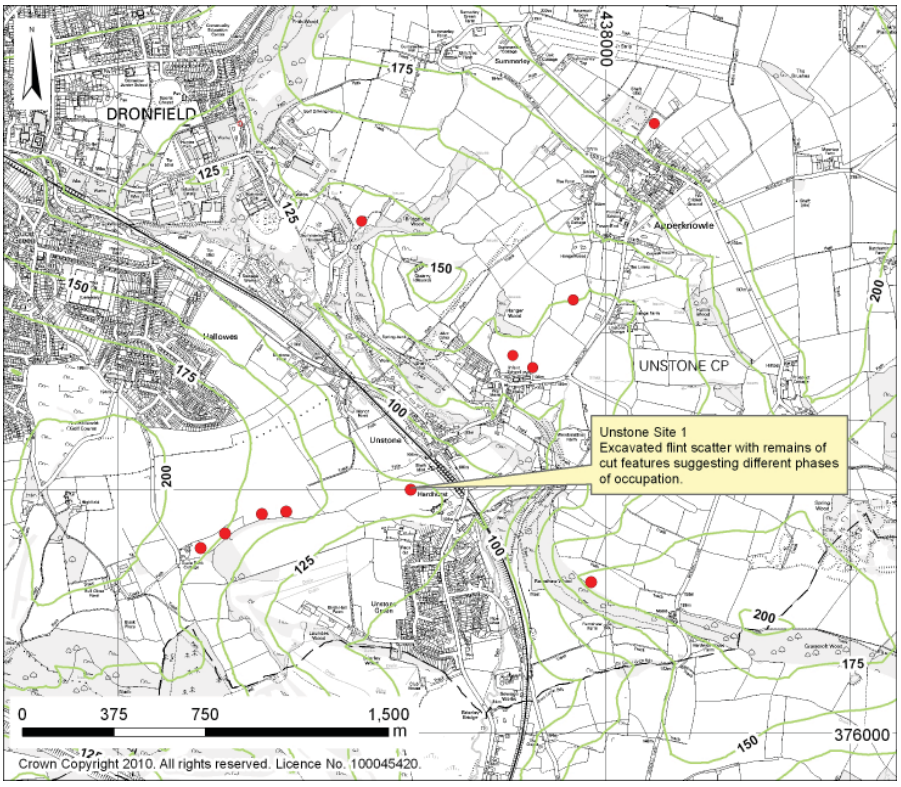

Figure 4.7.2 Known cluster of Mesolithic sites in the Unstone area.

microliths, a pattern also noted in the assemblages from Unstone (Hart 1981, 25), and that 75% of the assemblage comprised chert tools and debitage with very little evidence of primary flaking, suggesting that the primary reduction was taking place elsewhere (Myers 1999). This fits well with recent excavations from Fin Cop on the Carboniferous Limestone where a large assemblage of primary waste was uncovered at a chert extraction site, with relatively few tools (Waddington in press). These sites indicate the regional movements of hunter-gatherers with raw materials won and prepared at sites in the centre of the Peak District on the Limestone, and the creation of the tools at what may have been a seasonal camp on a local promontory on the Coal Measures to the east. Indeed the proliferation of scrapers within the Lordsmill Street assemblage perhaps indicates a hunting camp geared towards the preparation of animal carcasses. The investigation at Lordsmill Street was undertaken as a result of a planning condition in 1999 but unfortunately full results remain unpublished (Myers 2006a, 10) (see also Research Agenda – Chapter 7).

Of the remaining known Mesolithic findspots and lithic scatters, three are further to the south of Chesterfield, from above the Birdholme Brook north of Wingerworth, from just off the summit of a localised highpoint at Sutcliffe Wood to the south of Wingerworth, and overlooking the River Doe Lea south of Sutton Scarsdale. All these sites conform to the general pattern inasmuch as they all are from valley side settings which command wide vistas across river valleys, and all three sites sit between the 110m and 120m contours. The final known Mesolithic sites are a lithic scatter from the narrow bands of Coal Measure rocks at the interface with the Millstone Grit near Moscar Farm, Ughill Moors, and a few single lithic findspots also from the interface with the Millstone Grit, but in this case grouped around the Bar Brook and Totley Moss.

4.7.1.2 Neolithic (3900 – 2200BC)

The majority of the known Neolithic sites and findspots come from the western fringes of the eastern Coal Measures where the landscape and topography is very similar to the neighbouring Millstone Grit landform. Only 10 of the 29 Neolithic 'sites' noted in the HER and NMR are from the easterly, more low-lying Coal Measures. As has been noted in other chapters, the Neolithic period illustrates the potential bias of reporting 'high-status' finds against less-recognisable artefacts. Of the 28 single findspots known, 15 are stone axe heads, including three flint axes and a polished jadeite axe head. It seems unlikely that artefacts which are normally ascribed a high-status and sometimes 'ritual' function would make up over half of any representative assemblage.

Of those artefacts which are known from the upland areas around the interface of the Millstone Grit and Coal Measures, four are known from the western side of the Peak District, with a polished stone axe head and the polished jadeite axe head coming from within the medieval parkland of Lyme Park. On the eastern side of the Peak District, the known finds are generally from the moors, especially Gibbet Moor around Hob Hurst's House, Ramsley Moor near Gardom's Edge, and below White Edge Moor around the Bar Brook. Of particular note are a polished stone axe head and a flint axe head found from the steep gorge of the Oldhay Brook beneath Blacka Moor.

Many of the Neolithic finds identified further to the east and south on the lower-lying Coal Measures come from areas which are now built up and it is difficult to identify any key landscape associations. One potential pattern is that there are few finds, for example one of the three polished stone axe heads from Heanor, or the axe head from the Stanley Brook at Ilkeston, which sit in the valley bottom but still just above the level of the alluvial valley deposits. This would mirror the use of sand and gravel valley locations where Neolithic valley settlement activity tends to be located on the terraces above the floodplain (see also chapter 5.3). Overall, the Neolithic pattern of occupation shows the typical focus on river terrace locations together with upland locales, usually close to water courses and in partly sheltered locations off the highest points and edges in contrast to the Mesolithic flint scatters.

4.7.1.3 Bronze Age (2200 – 700BC)

As with the Neolithic period, the archaeological record for the Bronze Age on the Coal Measures is skewed towards the upland landscapes on the periphery of the Millstone Grit (Fig. 4.7.3) and this no doubt reflects a preservation bias as there has been less development than at lower altitudes and much of it has escaped the ravages of the medieval plough. The vast majority of sites for this period are from this topographic setting with a few key sites dominating the record, and displaying virtually identical archaeological associations for this period with the Millstone Grit landform.

The key clusters of Bronze Age activity on the edge of the Coal Measures are the monument complexes and field

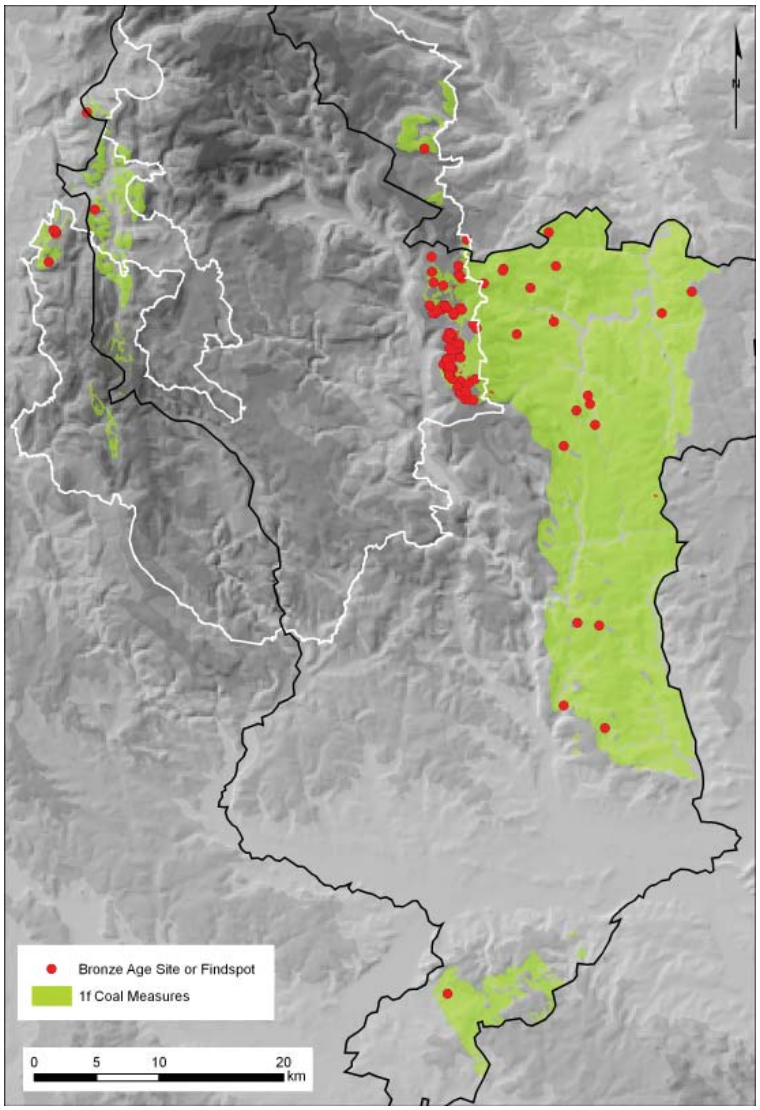

Figure 4.7.3 Distribution of Bronze Age sites and findspots plotted against the extent of the Coal Measures landform, illustrating the bias of data towards the interface with the Millstone Grit on the Eastern Moors.

systems of Gibbet Moor, Beeley Moor and around Leash Fen on the moors above Gardom's Edge. All these sites are on an upland sandstone member which is a part of the Coal Measures, but is indistinguishable from the interbedded gritstone and sandstone of the Millstone Grit. As with landform 1f, the uplands have seen a relatively low impact on upstanding remains in comparison to the lowlands and this means that the preservation of archaeology of this period is generally good. While the most numerous Bronze Age sites noted are the barrows or cairns, the upland landscapes also incorporate field systems, cairnfields, associated houses and house platforms and also standing stones and stone circles. For a full discussion of the Bronze Age settlement of this landscape, see chapter 4.6, Millstone Grit and the numerous publications by Barnatt (e.g. 1996; 1999; 2000). In addition to these landscapes on the interface between the two landforms there are a few sites further to the east which bear similarities to the settlement archaeology of the uplands. A site of some significance is known to the west of Dronfield at Hall Farm and Birchin Lee Farm. Evidence was recovered in the 1920s (Hart 1981, 56) for two cairn burials consisting of cremations in inverted Collared Urns, along with substantial amounts of lithic artefacts including polished shale tools, and also a Food Vessel. The site is on a well-defined plateau between 220-240m AOD which commands views in almost all directions. These remains may well represent a tradition of closely-linked settlement and ritual activity similar to that of the Eastern Gritstone Moors, but at this slightly lower altitude later agriculture and landscaping may have removed any associated earthwork remains.

The known Bronze Age remains from the lower-lying Coal Measures consist almost entirely of single findspots, along with a single flint scatter, a bronze hoard comprising six later Bronze Age palstaves, and a potential settle-

ment site at Tibshelf. A 1995 evaluation near the Tibshelf services on the M1 revealed a ditch terminal, the fill of which contained a saddle quern and rider, struck flint artefacts and 135 sherds of late Bronze Age pottery (Cotswold Archaeological Trust 1995). This site demonstrates the potential presence of Bronze Age enclosed sites on the lowlands of the Coal Measures. Such sites may be visible through aerial photography if there are associated ditches, but it is also possible that the Tibshelf site suggests the presence of the kind of dispersed cut features associated with Bronze Age sites in the Trent Valley such as Willington Quarry (Wheeler 1979) and Mercia Marina (Brightman and Waddington forthcoming).

The types of single finds known are reasonably evenly distributed between Late Neolithic – Early Bronze Age stone tools, including barbed-and-tanged arrowheads, perforated axe-hammers and scrapers, and Bronze finds including a flanged axe, a palstave and a number of spear heads. Of the finds where a reasonably accurate find location is known, they can be roughly divided into two categories. A few finds are known from elevated and visible locations such as a Middle – Late Bronze Age spearhead found on the ridgelines forming the local watershed west of Ripley or a flint scraper found near the summit of a localised high point at Wingerworth church. The second general location where these findspots occur is on the lower flanks or almost on the valley bottoms, whether in steep 'gully-like' valleys such as the socketed bronze axe recovered from Igmanthorpe Wood, or just above the level of valley bottom alluvium in broader valleys such as the barbed-and-tanged arrowhead and bronze axe known from the Rother Valley to the south of Chesterfield. A single scatter of Late Neolithic – Early Bronze Age flint is known from near King's Wood, Sheepthorpe on fields above the level of the alluvium by the confluence of the Barlow Brook and Sud Brook.

4.7.1.4 Iron Age (700BC – AD43)

Known archaeological sites for the Iron Age are scarce on the Coal Measures, with only ten definite sites known, and no sites within Derbyshire and the Peak District to compare with the hillforts of the Peak District uplands or Markland Grips on the Magnesian Limestone to the east, though to the immediate north-west of the Peak District, there is the multi-period site at Mellor, once within the historic boundaries of Derbyshire, which is centred on a promontory hillfort (UMAU 1998; 2000; 2002; 2005; 2006a; 2006b; 2007)

The most interesting feature of the Iron Age on the Coal Measures is that there are six enclosure sites known, though none have been tested by excavation and thus the attribution to the Iron Age or possibly Romano-British period is tentative and based only on form. Of the six known enclosures, five were located through aerial photography demonstrating the potential for good cropmark formation on the Coal Measures. Four of the enclosures are rectilinear and located in fields to the west of Bolsover. Due to the form, it is probable that these may fall into the Romano-British period rather than the Iron Age, as similar enclosures are known from further south near Ockbrook and Borrowash with the best known example being the excavated remains at Littlehay Grange (Myers 2006b, 9-10).

The remaining Iron Age archaeology of the Coal Measures is represented by two querns and two coin finds, though the exact find locations of all of these remain unknown. A ditch feature from the centre of Chesterfield is noted in the HER, following unpublished excavations by the University of Manchester Archaeology Unit (D. Barrett pers. comm.) which pre-dates the Roman constructions in the town, but little more is known about what this feature relates to.

4.7.1.5 Roman (AD43-410)

Despite the presence on the Coal Measures of the fort and settlement at Chesterfield, and also the major north-south route of Ryknield Street, there is relatively little known Roman-period archaeology on this landform, although this by no means implies that other significant Roman archaeological remains are absent. The relative density of Roman and Romano-British sites and findspots for the Coal Measures stands at 0.05 sites per 100ha, substantially the lowest Roman-period density of all the bedrock geology landforms, especially when it stands in contrast to the average for all landforms of 0.43 sites per 100ha. The principle areas of Roman activity in the county are often similar to those of medieval and later activity, for example the Roman forts and towns such as Little Chester and Buxton which developed into modern settlements, or the Roman roads whose routes are followed closely by later trackways along ridge lines and in the valley bottoms. It is probable that there was a much greater Roman presence on the Coal Measures than is suggested by the HER and NMR records, and as is probably the case with all pre-industrial sites, many have been lost due to the widespread impacts of the industrialisation of this landscape.

The principal Roman site on the Coal Measures is the fort at Chesterfield. The name of Chesterfield is derived in part from the Latin castra signifying a camp or fort. Beginning principally with the work of the Chesterfield Archaeological Research Committee (CARC) which later became the North Derbyshire Archaeological Trust (NDAT), there were a series of excavations from the early 1970s onwards investigating the fort and associated remains (see CARC 1973; Lane 1973a; Courtney 1975; Ellis 1989). The first fort on the site was constructed in the Flavian period and was associated with the initial advances northward during the Roman occupation (c. AD55), and this was then abandoned before being reoccupied by AD100. The site was only occupied by the military for some forty years before its final abandonment. Following this, the fort itself housed a number of metalworking sites and furnaces indicating the continued importance of the location on Ryknield Street even after the departure of the military (Courtney 1975; Ellis 1989), and the ready availability of the raw materials for metal production and working.

Castle Hill, Pentrich is a small camp just off the line of the Roman Road of Ryknield Street which follows a ridge in this section, and which was the subject of a small excavation in 1945 which retrieved Derbyshire Ware pottery, some metal nails and other small finds confirming the dating of the earthwork monument (Kay 1961). The Castle Hill site is especially interesting as it appears from aerial photography and field observation to be associated with two small rectilinear enclosures, which may represent the kind of post-military settlement known from Chesterfield. The final site other than those represented by cropmark or findspot evidence is the Holbrook pottery kiln (Kay 1962). The pottery kiln at Holbrook is one of a series of Roman pottery production sites clustered around the Belper and Duffield area of the Derwent Valley. The other known sites which have been more thoroughly investigated are at Hazelwood and Lumb Brook (Brassington and Webster 1988), though all sites are positioned to utilise the natural fine-grained clays of this part of the Derwent Valley. These sites, along with the later occupation of the Chesterfield fort, support the general notion of Derbyshire and the Peak District as a centre for both extraction and processing of natural resources, though this is a simplification based on a small dataset.

There are a few known cropmarks sites on the Coal Measures which have been ascribed a Roman date, principally due to form. On the lower ground west of Bolsover, in the vicinity of the cropmark enclosures which have been discussed above as possibly Iron Age in origin, a larger cropmark enclosure has been tentatively identified as a Roman camp or fortlet, though this area has seen much modern extraction which may have impacted on any surviving subsurface remains. A similar enclosure is known from aerial photographs along with the route of a spur of Ryknield Street to the north of Staveley, and an enclosure defined by a ditch is known at King's Wood, north of Chesterfield, an earthwork site which sits on a natural eminence at the confluence of the Sud Brook and Barlow Brook.

The Roman small finds evidence from the Coal Measures can be fairly neatly divided down by finds of single coins and a few coin hoards, and also by pottery scatters existing within the plough soil, representing some form of localised activity. Single coin finds are found either in the centre of settlements such as those known from Eckington, Staveley and Dronfield, or from low-lying sheltered valley settings, for example the single coin from the Totley Brook or the three separate single coins from near each other in the Rother Valley just north of Wingerworth. There are three larger coin hoards known from the Coal Measures. The first was recovered from a natural plateau on the low hillside to the south of Temple Normanton, the second was found on the gently undulating higher ground immediately to the north of Morton and the third was located at Newlands just above the Codnor Park Reservoir. Where pottery scatters are known on the Coal Measures, they occur in similar locales to the chance finds, predominantly on shallow valley slopes or natural plateaus on the valley sides such as above the Muster Brook north of Temple Normanton, or the two scatters in the area around the village of Horsley. Most of the pottery scatters are noted as containing, or largely consisting of, Derbyshire Ware pottery, which is generally seen as lower status pottery that may have been manufactured at the known pottery kiln sites at Lumb Brook, Hazelwood and Holbrook noted above (Kay 1962; Brassington and Webster 1988).

4.7.1.6 Early medieval (AD410-1066)

Archaeological sites and findspots dating to the early medieval period are rare across all of Derbyshire and the Peak District, and on the Coal Measures, the density of sites is 0.03 per 100ha, only one third of the average for all landforms.

Four of the known sites are accounted for by stone sculpture, three of which are probably wayside crosses indicating ancient routeways, and the fourth still stands in the churchyard of St. Werburgh's, Castle Hill east of Blackwell. The three 'wayside' crosses are all known from the high moorlands to the west of the Carboniferous Limestone,

and probably represent some of the original routes between the heart of the Peak District and the lowlands of the Cheshire Plain. The original site of one at Horwich south of Whaley Bridge is also thought to be suggestive of a lost early medieval chapel site, though this has never been investigated.

A single bank and ditch boundary feature which delineates the parish boundary between Ripley and Denby is thought to have an early medieval origin, as is the church of St. Lawrence in Heanor, though again, no clear evidence supports this. At Stanley Grange, near Ilkeston, an inhumation within an oak coffin has been ascribed a Roman or early medieval date, though no scientific dating has been undertaken on the remains. The two early medieval small finds known consist of a silver Viking ingot from fields to the east of Temple Normanton, and a bronze cooking utensil found in Church Gresley in the very southern tip of Derbyshire. This is of particular interest as the HER also notes that a potential kiln on the site may have related to the early medieval period, and if accurate this would provide an important early example of pottery manufacture in this region to stand alongside the well-attested medieval and post-medieval traditions.

4.7.1.7 Medieval (AD1066 – c.AD1700)

It is clear from the increase in known sites from the medieval period onwards, that it is at this point that the use and exploitation of the Coal Measures landscape visible in the modern era begins. Having acknowledged the dramatic increase in known sites in comparison to other periods, it must also be noted however that the relative density of sites on the Coal Measures stands at 0.75 medieval sites per 100ha, significantly lower than the average across Derbyshire and the Peak District as a whole. It is known from documentary and place name evidence that areas of the Coal Measures were wooded for longer than other lowland areas of the county and that clearance happened later (Barrett 2006, 4), with Hart (1981, 132) noting place names such as Birchett and Woodhouse.

Whilst the impact of industry has been substantial on the Coal Measures, the low-lying landscape east of the high ground of the Peak undoubtedly attracted a large amount of medieval agriculture, as evidenced through the high percentage of known farmsteads and field systems with medieval origins. Field systems and associated enclosures of a medieval date account for over 2% of all known sites on the Coal Measures, with farmsteads and large houses (including cruck frame barns) accounting for a further 4.63%.

Deer parks and other enclosed parks and gardens are noted as occurring reasonably frequently on the Coal Measures, though these are all truncated in some way, and some entries are only listed as possible parks relating to either documentary evidence or ephemeral boundary features (see Wiltshire and Woore 2009). Some of the deer parks such as Codnor Park and Staveley Park, no longer preserve any 'set aside' land, with the entire area that would have been encompassed in the medieval park, now taken up by fields. The suspected Walton Deer Park is an example of a park which is now completely beneath a later built-up area. It is evident that other parks are at least partially preserved, generally with some of the original area still standing as woodland, examples of this include the Holmesfield Park to the south-west of Dronfield, Stainsby Park south of Doe Lea, and also the colossal Lyme Park in Cheshire, which is split between many different modern land usages, but retains some old woodland within the original boundaries. All these sites are in 'woodland-pasture' landscapes, and as has been noted for other landforms, the existence of relatively undisturbed woodland which can be traced to the medieval and post-medieval periods provides an opportunity to investigate landscapes which have not been subjected to the full impact of post-medieval and modern industry as well as the woodland archaeology of the region.

There is a reasonably wide variety of industrial sites known from the Coal Measures, presaging the post-medieval boom in the region, predominantly utilising the natural resources of this landscape, coal, clay and ironstone. Clay and ironstone extraction is shown by the small-scale bell pits though undoubtedly many medieval extraction sites have been lost through the impact of large post-medieval and modern extraction of the same resources. While there are few excavated pottery kilns, the HER notes medieval pottery kilns at Burton Road, Swadlincote in the south of Derby, illustrating the long currency of this industry in that region. Medieval iron working is also increasingly recognised in the archaeological record, for example the extensive remains at Stanley Grange on the Stanley Brook between Derby and Ilkeston. At this monastic grange site, eight iron-working furnaces were excavated along with evidence for all stages of the industrial iron process (Challis 2002; Beswick and Challis 2004). There are a few known coal extraction sites which have been ascribed a medieval origin, such as Alfreton Park near Swanwick or the Simonfield coal mine at West Hallam close to Stanley Grange.

There are some deserted and shrunken medieval villages known on the Coal Measures though proportionally less than on some other landforms. It is impossible to say without a more in-depth study of such sites whether the fewer sites on the Coal Measures is indicative of less depopulation on this landform, or whether it represents the impact of industrial land use, in comparison to the Carboniferous Limestone for example, which remained in agricultural or even pastoral use, and has many more deserted sites known.

There are ridge and furrow remains know from aerial photograph analysis, though this is not as widespread as on some other landforms, which is most likely to be because of the intensive post-medieval use of the Coal Measures landscapes. As has been noted in other chapters, ridge and furrow has an importance over and above its inherent archaeological value, as where medieval ridge and furrow remains exist then this indicates that the ploughing which formed it was the last major impact on that portion of land. The potential for ridge and furrow to mask and preserve earlier remains must be noted when dealing with such archaeological features.

4.7.1.8 Post-medieval to Modern (c.AD1700 – present day)

As noted in the introduction to this chapter, the Coal Measures are largely considered to be something of an unknown area as regards their archaeological associations, which is due in large part to the impact of post-medieval and modern development and industry on the landscape. As with the medieval period however, the density of 2.62 post-medieval and industrial sites per 100ha is relatively low in comparison to the average across all landforms, though this figure does not take into account the scale of impact of some of the opencast workings and industrial sites on the Coal Measures. Indeed, the huge impact of some of the post-medieval and modern industries will have removed traces of some of the more-ephemeral, though no less important industries. Within the east of Derbyshire, sites relating to small-scale extraction of clay and iron ore are an important part of the early post-medieval industrial development of the county, as are the often slight remnants of charcoal and white coal production sites.

Post-medieval and modern quarrying, extraction and industrial processing of the extracted material accounts for the largest percentage of any type of site known from the archaeological record for this landform. The extraction recorded in the HER and NMR ranges from the small-scale coal prospecting and more-extensive areas of bell-pit extraction, such as that known from the Gibbet Moor and Gardom's Edge uplands in the north-west of the landform, through to sites such as the colossal opencast Old Brampton Markham Colliery south-east of Staveley which is flanked by man-made spoil hills.

The processing of the extracted raw materials took place on the Coal Measures, again with a huge variation in the scale of the activities taking place. Sites are known ranging from the incredibly small-scale, such as single forge buildings and pottery kilns, up to vast works such as the Avenue Chemical and Coke Works which stretched along the side of the River Rother south of Chesterfield and which incorporated its own pit head, a site which is currently under remediation and publication of its history is awaited.

The other principal type of site relating to the post-medieval and modern periods, is the infrastructure which served the industry of the area. This is primarily represented by three different categories of site. Railways and associated structures make up the largest proportion of sites with some still in use to the present day, such as the Chesterfield to Sheffield Midland Line which opened in 1870. The two remaining types of site are the roads and the canals, and again many of those remain in use to the present day, though the industrial use of the canals has long since disappeared, although with considerable investment in recent years by British Waterways the canals are becoming more widely used again, primarily for leisure, but also with a small amount of industry. Most of the roads noted within the HER and NMR relate to the turnpiking of existing routeways, and in the vast majority of cases these have remained major routeways with little potential of preserving associated remains of this period, toll houses being the usual exception. Perhaps the most interesting sites relating to the travel and infrastructure of this period are those sites which fell out of use at some point and have not been maintained into the modern era, therefore potentially preserving industrial period archaeology. Examples of these types of site from the Coal Measures include principally the mineral railways used by works and mines such as the Great Central Railway, Derbyshire Main Line which fell out of use as the pits and works closed and now exists as a series of embankments and phantom field boundaries. The lines themselves for such sites will have been comprehensively dismantled, but work on the Cromford and High Peak Railway for example has demonstrated the potential for peripheral and associated structures to survive around the line (Rimmer 1998; Jessop 2004; Pallant and Brightman 2006;).

4.7.2 Evaluation and Mitigation Implications on the Millstone Grit (see table 7.8 for summary)

The work of the North Derbyshire Archaeological Trust in the area around Unstone (Hart 1981) has illustrated the serious potential of fieldwalking as an evaluation technique on the Coal Measures. The perception that the Coal Measures are short on archaeological remains due to the impact of later industry may prove misleading, as the North Derbyshire Archaeological Trust work both at Unstone and on Roman Chesterfield has shown that where a considered programme of fieldwork is applied, archaeological remains and finds can and will be discovered (see also Research Agenda – Chapter 7).

The significance of the Roman period on the Coal Measures does not lie with the quantity of finds, as it is severely under-represented in comparison to the other major landforms. Rather the significance is in that many sites are known from ploughsoil collection of artefacts and from aerial photography. Where arable land remains on the Coal Measures, and has not been impacted upon by later industry or development, there appears to be both good formation of cropmarks, and also reasonable survival of artefacts within the ploughsoil. Not only can lithic material be identified, as noted above, but also a number of pottery scatters are known. Where pottery exists in the ploughsoil, this is often indicative of a site being actively truncated by ploughing, as pottery will quickly fragment over a number of seasons. Whilst Roman pottery is more robust than prehistoric pottery, this still holds true, and where such finds are made as part of a fieldwalking evaluation, a high priority should be attached to excavating and recovering the threatened archaeological features. Increased use of aerial photography as a prospection technique, and testing cropmark sites by excavation must also be high priorities when devising strategies for addressing the archaeological impact of developments or extraction (see also Research Agenda – Chapter 7).

It is true that the post-medieval and modern industry has had a major impact on the landscape of the Coal Measures, but the low relative density of sites noted above for this period suggests that there are still large areas of this landform which have not been impacted upon. The majority of the larger processing and extraction sites are no longer in use or are exhausted, and so the potential for these to be impacted upon by modern developments is considerable. These sites are of historic importance in themselves as they are a part of the larger story of the industrial north Midlands, arguably the crucible of the industrial revolution. This must also be tempered against the ubiquity of such sites in this area, and also the degree to which these sites have existing documentary and cartographic sources accurately charting them.

4.8. Landform 1k – Mudstones

Landform 1k encompasses the Mercia Mudstones which underlie much of southern Derbyshire around the Trent Valley and abuts areas of sand and gravel terracing (landform 2d), along with other lowland mudstone formations such as the Edlington Formation in the extreme east of the county near the Magnesian Limestone. Landform 1k, whilst sharing geological similarities with landform 1g (Shales and Siltstones) has a largely different topographic setting, and this has resulted in a different type of land use through history.

There is very little current or potential impact upon the mudstones landform from minerals and aggregates extraction, though there is a limited potential for extraction relating to brick clay. The potential significance for this landform lies with the potential overlap of sites where there is impact relating to the overlying sand and gravel resources in the low-lying areas of southern Derbyshire.

There was no dedicated aerial photograph transcription targeted on this landform, though portions of aerial photograph Blocks 3 and 4 covered areas of landform 1k. Block 3 is discussed in Chapter 4.4 and Block 4 is discussed in Chapter 5.3. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

4.8.1 Archaeological Associations (chronological)

The mudstones landform hosts 1313 HER entries and 554 NMR entries of which 285 are duplicated giving a total number of known archaeological and historical sites of 1582 within the combined lists. The breakdown of the sites within this combined list are presented in Table 4.8.1 below, where they are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. The mudstones host a total site ratio of 4.08 per 100 hectares, which is noticeably lower than the average density for all sites across Derbyshire and the Peak District of 6.54. This low density is particularly noteworthy as the mudstones are overlain in some areas by sand and gravel terraces (landform 2d), one of the most archaeologically rich landforms in the study area. This is suggestive of a genuine preference of past settlement and activity to gravitate towards the free-draining and fertile sands and gravels and away from the clay geology of the mudstones.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**15**	**0.06**	**0.12**	**1.4**
Findspot	14	0.05	0.0611	1.31
Lithic Scatter	1	0	0.0456	0.09
Neolithic	**14**	**0.05**	**0.24**	**1.31**
Artefact Scatter	1	0	0.0173	0.09
Findspot	11	0.04	0.1216	1.03
Occupation Site	2	0.01	0.0027	0.19
Bronze Age	**24**	**0.09**	**0.4**	**2.24**
Barrows/Ring Ditches	6	0.02	0.3019	0.56
Findspots	15	0.06	0.1146	1.4
Possible Fish Weir	1	0	0.0003	0.09
Settlement Site	2	0.01	0.0006	0.19
Iron Age	**15**	**0.06**	**0.05**	**1.4**
Artefact Scatter (pottery)	2	0.01	0.0006	0.19
Findspot	3	0.01	0.021	0.28
Hillfort	1	0	0.0027	0.09
Pit Alignment/Enclosures	9	0.03	0.0106	0.84
Romano British	**98**	**0.37**	**0.43**	**9.16**
Artefact Scatter (pottery)	4	0.02	0.0152	0.37
Buildings	2	0.01	0.0036	0.19

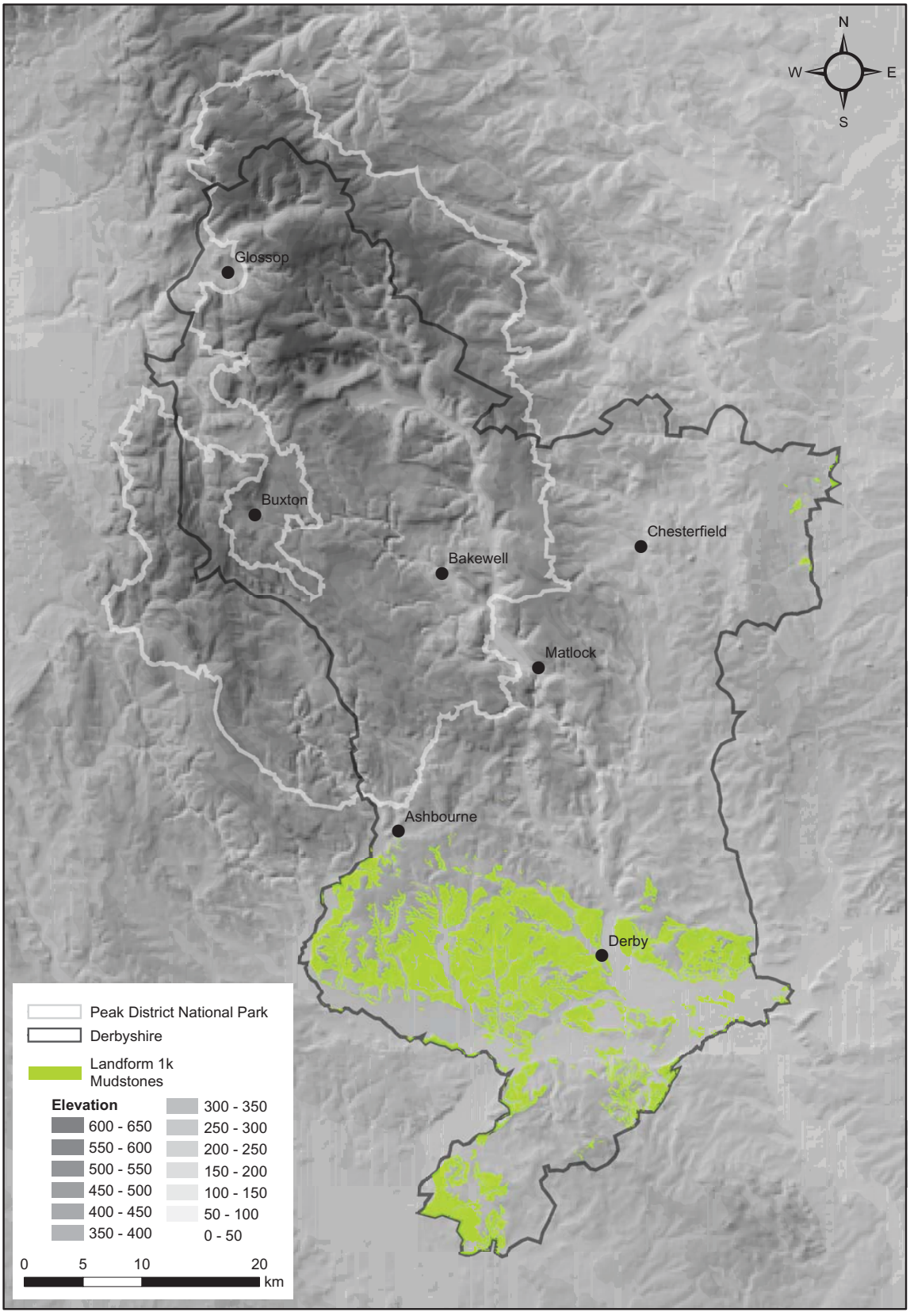

Figure 4.8.1 Extent of landform 1k - Mercia Mudstones

Enclosures/fields/settlements	13	0.05	0.0565	1.21
Findspots	45	0.17	0.1572	4.21
Fort and vicus	2	0.01	0.0021	0.19
Inhumation	2	0.01	0.0067	0.19
Roads and associated sites	30	0.11	0.0945	2.8
Early Medieval	**7**	**0.03**	**0.08**	**0.65**
Cemetery	1	0	0.0012	0.09
Sculpture (crosses)	1	0	0.0106	0.09
Towns/settlements	3	0.01	0.0067	0.28
Trackway	2	0.01	0.003	0.19
Medieval	**343**	**1.31**	**1.1**	**32.06**
Abbey/Priory	3	0.01	0.0009	0.28
Boundaries/Linear Earthworks	7	0.03	0.0386	0.65
Castle	2	0.01	0.0055	0.19
Church	32	0.12	0.0897	2.99
Cross/Sculpture	9	0.03	0.0377	0.84
Deer Parks/Parks	12	0.05	0.0423	1.12
DMVs	21	0.08	0.0353	1.96
Enclosures/Field Systems	176	0.67	0.3329	16.45
Findspots	7	0.03	0.0872	0.65
Fishponds	8	0.03	0.0097	0.75
Halls/Farmstead	32	0.12	0.0973	2.99
Hospital/Almshouse	3	0.01	0.0055	0.28
Industrial Sites	3	0.01	0.0255	0.28
Preceptory	1	0	0.0006	0.09
Quarrying Remains	8	0.03	0.0255	0.75
Roads	8	0.03	0.017	0.75
Settlements	1	0	0.0082	0.09
SMVs	8	0.03	0.0219	0.75
Well	2	0.01	0.0012	0.19
Post Medieval-Modern	**472**	**1.8**	**3.39**	**44.11**
Aircraft crashsite	1	0	0.0103	0.09
Agricultural buildings /Field Systems	34	0.13	0.3776	3.18
Battlefield	1	0	0.0009	0.09
Cemetery	1	0	0.0003	0.09
Enclosures	12	0.05	0.0295	1.12
Gardens/Lakes/Ponds	30	0.11	0.0684	2.8
Golf Course	2	0.01	0.0055	0.19
Halls/Large Houses	70	0.27	0.08	6.54
Hospitals/Almshouses	8	0.03	0.0024	0.75
Industrial Sites	2	0.01	0.038	0.19
Lead Mining/Working	1	0	0.1985	0.09
Military Sites	27	0.1	0.0471	2.52
Mills and Factories	52	0.2	0.1839	4.86
Motor Racing Circuit	1	0	0.0003	0.09
Quarrying/Stone Working	10	0.04	0.3566	0.93
Railway Lines/Buildings	30	0.11	0.3049	2.8
Religious Buildings	48	0.18	0.1541	4.49
Roads/Tracks/Boundaries	27	0.1	0.1918	2.52
Other Buildings	108	0.41	0.4207	10.09
Wells/Pumps	7	0.03	0.0295	0.65

Multiperiod Remains	**33**	**0.13**	**0.37**	**3.08**
Boundaries/Field Systems	10	0.04	0.0073	0.93
Earthworks	4	0.02	0.0012	0.37
Findspots	5	0.02	0.0046	0.47
Artefact Scatters	14	0.05	0.017	1.31
Unknown Date	**49**	**0.19**	**0.47**	**4.58**
Enclosures/earthworks	41	0.16	0.0061	3.83
Findspots	8	0.03	0.156	0.75
TOTAL SITES	**1070**	**4.08**	**6.54**	**100**

Table 4.8.1 Breakdown of all sites on the mudstones by period and site type.

4.8.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

On the mudstones, all Palaeolithic and Mesolithic entries in the combined lists are represented by single finds and one single lithic scatter. Twelve of the entries represent fifteen separate Palaeolithic handaxes and a mammoth tusk, though the descriptions in the combined lists make it clear that at least eleven of these artefacts, including the mammoth tusk, come from gravel deposits overlying the mudstones that are not accurately mapped at the scale of geological mapping used for this project and so are erroneously related to mudstones. For this reason these finds have been excluded from the mudstones section and are rather included in chapter 5.3 on sand and gravel terraces. A further hand axe was found close to the River Trent at a point where the lower gravel terraces are thin and the mudstone lies close to the surface. It is very likely that this artefact also derived from the glacial gravels, and Palaeolithic artefacts within gravel deposits are discussed in chapter 5.3. Of the remaining artefacts, one was found on a localised high point in the gently undulating terrain at around 75m OD, and the Mesolithic flint scatter at the Castle Pit Hill site sits on a bluff to the south of the River Trent, a natural high point in the landscape. Local high points and river bluffs are typical sites for Mesolithic activity in river valleys, and though the dataset is small for this landform, it fits well with the other landforms in the Trent Valley and also corresponds well with other landscape-scale studies of lithic scatter locations such as those around the rivers Till and Tweed in Northumberland (e.g. Passmore and Waddington 2009). When development impacts on topographic features such as these, it is important that close-spaced fieldwalking forms a part of the evaluation and recording strategy as it is rare for Mesolithic structural remains to exist beneath the ploughzone (see also Research Agenda – Chapter 7).

4.8.1.2 Neolithic (3900 – 2200BC)

The majority of Neolithic archaeology on the mudstones consists of individual lithic findspots and artefact scatters. Of the eleven individual findspots, ten are stone or flint axeheads, generally viewed as high-status items. Most of the individual items were recovered in and around Derby during various development works, however the three stone axeheads found further to the west were all discovered between the 95m and 105m contours on the sides of narrow valleys defined by relatively small water courses. This suggests that Neolithic activity extended further up-catchment and valley sides than in the typical river terrace settings known in the Trent Valley, though the sample is small and more data is needed before this can be established as anything more than speculative.

There are two areas of probable Neolithic settlement noted in the combined lists. The first is represented by two Neolithic pits located amongst medieval and post-medieval remains in the outskirts of Melbourne. The site is located at a relatively low elevation in a small natural basin in the landscape which is now dominated by Melbourne Pool, originally a medieval millpond which was enlarged into a small lake during Victorian times taking advantage of the local topography. This natural topography suggests that there has probably been a body of water here for some considerable time, and this easily-accessible water source may have been a key attraction to Neolithic groups.

The second area is the later Neolithic remains at Willington Quarry (Wheeler 1979), which extends across the sands and gravels (landform 2b) and on to the mudstones where the mudstones are the dominant parent geology. Willington Quarry sits to the immediate north of the River Trent and is a significant multi-period site hosting a wealth of Neolithic, Bronze Age, Iron Age and early medieval remains and is discussed in more detail in chapter 5.3 (Sands and Gravels).

4.8.1.3 Bronze Age (2200 – 700BC)

The picture of known Bronze Age remains on the mudstones is similar to that of the Neolithic with single findspots being the predominant type of 'site' in the combined lists, with one 'settlement' site accounted for by the Willington Quarry multi-period remains which extend across the sand and gravel terrace and onto this landform, and are discussed in chapter 5.3. The principal difference is that during the Bronze Age there are also funerary monuments known, in the form of ring ditch barrows. Of the seven ring ditches and barrows known on this landform, four are within the cropmark complex at Breaston on the relatively flat lower terraces immediately north of the Trent. A further cropmark ring ditch is known overlooking the River Mease in the very southern extent of Derbyshire, positioned on a false ridge above the river at c.75m OD, and another cropmark complex within the Church Broughton airfield also contains a single ring ditch. The final monument known is a bowl barrow still existing as a slight earthwork. This barrow sits on a local high spot in the landscape at c. 90m OD on a spur of high ground above the Sutton Brook with commanding views south to the wide Dove Valley. A key point to note for the mudstones landform is that cropmark formation appears good and this, along with the substantial arable agriculture practised on the landform, suggests that aerial photograph analysis would be an especially fruitful prospection technique.

Well over half the Bronze Age entries in the combined lists are accounted for by single findspots. Almost half of the finds are Bronze Age metalwork and of those where a relatively precise provenance can be identified, they are all found close to water sources or in a position overlooking river valleys. A bronze flanged axe and two palstaves were found in small valleys defined by brooks on the high ground to the east of the mid-reaches of the River Dove; a looped palstave was recovered from the flanks of a local high spot to the north of Ticknall in south Derbyshire, and a bronze sickle was found in an uncertain location to the west of Chaddesden on the side of the valley above Darley Abbey. Lithic finds are recorded within Chaddesden and on the western side of the valley above Darley Abbey and it is possible that this general area to the north of Derby may represent some focus of activity during the Bronze Age. The remaining finds, including further metalwork are noted as coming from gravel pits and quarries which extend on to the areas mapped as landform 1k.

There is only one Bronze Age 'settlement' site noted in the combined lists, that of Willington Quarry noted above and discussed in full detail in chapter 5.3 (Sands and Gravels). Given the number of known Bronze Age sites in the Trent Valley area as a whole, it would seem reasonable to suggest that some of the undated cropmark sites may belong to this period. Bronze Age settlement remains tend to take a similar form to Neolithic period remains, inasmuch as the archaeology is normally represented by dispersed and truncated cut features alongside the more visible cropmark monuments, ring ditches being the principal example.

4.8.1.4 Iron Age (700BC – AD43)

As with other landforms, sites which can be clearly ascribed to the Iron Age are scarce though it is possible, and even probable, that some of the many undated cropmark sites on this landform date to the Iron Age or Romano-British periods. From the limited data available on this landform, there are two different types of settlement archaeology known. The first is represented by the lowland fort at Borough Hill near Walton on Trent, and the second is represented by the pit alignments and enclosures which have been dated to this period.

The Borough Hill 'hillfort' (see Hogg 1979) is a scarp-edge enclosure occupying a low promontory of high ground to the east of the River Trent and enclosing a little over 3ha. The hillfort does not occupy the highest local point and is overlooked by higher ground to the east, instead opting for the more easily-defendable scarp edge defined by the Mercia Mudstones, suggesting a military purpose. A defensive circuit consists of the earthwork remains of a single bank and ditch to the north-east and smaller ramparts enhancing the natural protection on the scarp edges. The hillfort sits at 66m OD at its highest point. While at first glance, this monument may stand in stark contrast to the imposing hillfort monuments of the Derbyshire and Peak District uplands, the altitude may be the only significant difference. The average area enclosed by the upland hillforts is 3.45ha; most of the upland forts accommodate steep scarp edges and overlook water courses, with four of the known hillforts positioned above significant watercourses which would have acted as major routeways, as is the case with Borough Hill overlooking the Trent. Whilst the Borough Hill hillfort currently exists in isolation, there is a potential parallel with the lowland hillforts which stand along the courses of the rivers Till and Tweed in north Northumberland (Passmore and Waddington 2009), such as that at Groat Haugh near Norham (NMR UID 1340336) for example. The steep river cliffs of the Tweed leading inland

to the fertile sands and gravels of the Milfield Basin may be seen as a useful comparison to similar landforms in the upper and middle Trent Valley and its tributaries, and should more lowland hillforts come to light through aerial photography or field survey, then this could be viewed as an important new strand to the study of the Iron Age in this region (see also Research Agenda – Chapter 7).

There are four known enclosure and pit alignment sites which have been dated to the Iron Age, though as noted above it can be reasonably anticipated that some of the undated cropmark sites of similar form will date to the Iron Age. Two pit alignments are known, both close to the Trent floodplain in close proximity to the river. The pit alignment to the east of Willington probably represents part of the same complex of cropmarks which extends northwards into the areas which have been excavated surrounding the Mercia Marina development (Beamish 2009; Brightman and Waddington forthcoming). One of the other known complexes of Iron Age linear features was excavated to the west of Willington at the Willington Quarry site (Wheeler 1979). From the limited fieldwork undertaken, the later prehistoric archaeological remains are often represented by linear ditches and pit alignments on the lower terraces of the Trent, which present a more formal partitioning of the landscape than seen in earlier periods. These linear features are generally very visible from aerial photography, and it should be a key research focus to better understand the widespread cropmark enclosure evidence of the Trent Valley, and also to attempt an understanding of whether there is continuity of settlement in these (presumably agricultural) landscapes through into the Roman period, as there is with some of the upland 'native' settlements.

The final boundary feature noted in the combined lists is an Iron Age ditch close to the concentration of Roman period archaeological remains near Littlehay Grange to the north of Ockbrook. The concentration of known Romano-British sites and small finds in this area is discussed below, but the presence of confirmed Iron Age archaeological features, and also individual findspots, indicates a continuity of farming and settlement from prehistory through the Roman period.

There are also pit alignments and linear boundary features dating to the Iron Age known from the sands and gravels which overlie the Mercia Mudstones in much of the area around the River Trent, and these are discussed in chapter 5.3 (Sands and Gravels).

As noted above, a pottery scatter is known from near the cluster of Roman remains north of Ockbrook. Iron Age pottery finds were also present within the assemblage from the Castle Pit Hill site which sits on a river bluff overlooking the Trent (noted above in the section on Palaeolithic and Mesolithic remains). The final findspot within the combined lists is for a single Iron Age quern discovered on a valley side in the Cubley Brook, close to one of the pieces of Bronze Age metalwork noted above. While the archaeological record is meagre for Iron Age artefacts, the survival of late prehistoric and Romano-British pottery in the ploughsoil is good and rapid large-scale landscape prospection through fieldwalking can be used as an effective technique for locating sites of this period as well as those of earlier periods.

4.8.1.5 Roman (AD43 – 410)

As with other landforms, there is a stepped increase in the amount of known archaeology for the Roman period with nearly 10% of all known sites on the landform falling into this period. The fort at Little Chester (Derventio) near Darley Abbey narrowly extends onto landform 1k but largely lies on alluvium (3a) (see chapter 6.1 for a full discussion of the site). A second Roman military site on the mudstones is postulated at Camp Hill on the outskirts of Creswell sitting on the outcropping of the Edlington Formation mudstones within the Magnesian Limestone. This site has never been investigated through modern fieldwork though scattered finds of Roman coins are known from the surrounding area.

Other than around Roman Derby and the fort at Little Chester, the principal concentration of finds and sites lies to the north of Ockbrook, east of Derby. In an area measuring roughly 3km by 3km, there are 22 known scatters of Romano-British pottery recovered from fieldwalking. Three sites labelled as 'settlements' probably representing small farmsteads similar to Little Hay Grange (see below), the earthwork remains of the site known as Giant's Hill, and the excavated remains of the Little Hay Grange site which uncovered a substantial first century AD stone building overlying a demonstrably Iron Age ditch (Myers 2006b).

It must be noted that there is a significant fieldwork bias within the dataset for this area, as the wealth of finds and

sites known in the Erewash area is largely due to a dedicated programme of fieldwork undertaken by the Ockbrook and Borrowash Historical Society in an area that had, until the work began, been largely blank in the HER (Myers 2006b). Despite this bias it is evident that there is some concentration of activity in this area, and the work undertaken again illustrates the effectiveness of fieldwalking followed by targeted excavation as a key methodology for identifying archaeological potential upon this landform.

There is a significant network of Roman roads known on the mudstones emanating from the area of Derventio and Roman Derby, indicating its importance as the centre of Roman south Derbyshire. Much work has been dedicated to identifying the courses of the Roman roads in Derbyshire (see Taylor 2006). However, as noted in chapter 5.9 (Shales and Siltstones) any opportunities arising from development work to refine the current knowledge of the alignment and construction of the roads should be a priority. The road systems are also likely to represent foci for settlement activity during this period, and application of a suite of archaeological techniques would be desirable. An example of mitigation for development which impacts upon the suspected route of a Roman road might include: fieldwalking if the conditions are suitable, due to the proven effectiveness of this technique in the area to the north of Ockbrook; geophysical survey to test for the presence of structures associated with the road line and also the course of the road line itself; evaluation trenches in areas of pasture or to test geophysical or aerial photograph results in regards to the position of the road; targeted excavation based upon the results of the prospection techniques employed.

There are two Roman burials noted within the combined lists. The first is within the confines of the Roman fort and vicus at Derventio, and the second is a tentatively dated Roman cremation from the early medieval cemetery south of Borrowash discussed in the section below.

Artefact scatters and findspots account for half the known Roman sites on the mudstones landform, twenty-two of which represent the concentration of sites north of Ockbrook discussed above. All but eight of the small finds are Roman pottery, with the remaining being: six coins or small coin hoards, one find of lead pigs and a silver lanx. All the coin finds are located in built-up areas, with four in the western outskirts of Derby and the remaining two are towards the south of Borrowash close to the early medieval cemetery with the potential Roman cremation burial (noted below). The lead pigs were discovered at a farm near Alkmonton, close to the southern extent of the Carboniferous Limestone and the Derbyshire orefield. The Risley Park lanx is a silver plate of some renown having been discovered in 1729 and then lost. It re-emerged in the 1990s and was displayed in the British Museum before it was realised that this was a fake. The whereabouts of the original Risley Park Lanx is unknown.

4.8.1.6 Early Medieval (AD410 – 1066)

For Derbyshire and the Peak District as a whole, the archaeological record for the early medieval period is sparse, with a few key sites known in very specific locales. For the mudstones, this picture holds true, with only six sites (less than 1% of all known sites on the landform) attributable to the early medieval period and of these, one is an ancient trackway across the high ground south-east of Dale Abbey with only an unproven tradition relating it to this period. Of the early medieval settlements recorded in the combined lists for this landform, one entry represents the postulated early medieval core of Derby which would have formed the chronological link between the fort and vicus at Roman Derventio and the known medieval town. Derby is known to be one of the five boroughs of the Danelaw (The Anglo-Saxon Chronicle – Bately 1986) though to date there are no known Anglo-Scandinavian era archaeological remains from the city, and the discovery of such should be a future focus of research, especially in light of the known Viking remains from Repton and Ingleby (see chapter 4.4). The second known site is the deserted medieval village of Barton Blount which has at least a tenth century origin (Beresford 1975, 346).

Other sites relating to the early medieval period on this landform are the Anglo-Saxon cross shaft at Brailsford, and also the cemetery site south of Borrowash that was presumably destroyed with the construction of the Midland Railway line. The NMR records relate that a cemetery site was discovered during construction work in 1866 at King's Newton, near Melbourne (NMR no. 315628), while there were some Anglo-Saxon artefacts and clear east-west aligned burials, there were also Neolithic artefacts, and a skull pierced with a flint arrowhead found on the site. As the site is now lost, there has been no modern work to clarify the situation and it is thought that the early medieval cemetery disturbed an earlier Neolithic burial area or funerary monument. A further grave is recorded, probably from the same funerary complex, which contained artefacts of Merovingian origin dating it to the early Anglo-Saxon period (Barrett 2006a).

4.8.1.7 Medieval (AD1066 – c.AD1700)

As with many of the landforms, there is a substantial increase in the known archaeological sites in the medieval period. More-recent archaeological remains can have a greater landscape impact and are therefore more obvious, or in many cases, medieval sites became the forerunners of modern settlements, industry or agricultural centres and are still preserved within the modern landscape.

The low-lying and reasonably fertile nature of the mudstones landform lends itself to agriculture and many medieval field systems and the remains of agriculture such as field lynchets and ridge and furrow are known preserved within the post-medieval and modern agricultural landscape. Medieval agriculture can be especially visible from aerial photography, and it is known that cropmark formation is good on this landform from the number of other cropmark sites of different periods. As has been noted in other chapters, a key general point to note concerning ridge and furrow cultivation especially is that it, whilst it can have an adverse impact on earlier buried archaeological remains, it also has the potential to mask and preserve features cut into the substratum beneath the ridges. It is important that this is recognised when dealing with any development that impacts on medieval agricultural remains in a landform and topographical setting where earlier remains might be reasonably anticipated in certain locales.

There are 21 deserted medieval villages known across the mudstones landform. They are regularly distributed across the landscape. The sites often occupy natural terraces on valley sides such as Mercaston or Radbourne, or on localised high points in the Trent Valley such as near Arleston, Barrow upon Trent. The potential of deserted medieval villages to inform on the medieval period as a whole, and also the more specific pressures relating to the incidence of depopulation which they represent, is very good, and a high level of importance should be attached to investigating any remains impacted upon by development.

There are two known castles on this landform. Melbourne Castle was never completed, having been sacked during the Wars of the Roses and then finally almost completely demolished in the 17th century. The castle developed from a fortified manor house rather than being purposely constructed as a stronghold (as at Castleton for example), and this is clear in its location as it sits in the base of the valley overlooked by hills on both sides. The second castle is at Tutbury. Tutbury castle sits on a steep motte enhancing the natural slopes on the inside of a bend of the River Dove. The first medieval stone castle was built on the site shortly after the Norman Conquest (Williams 2006, 587) though the name 'Tutbury' indicates a fortified settlement of early medieval origin (Ekwall 1991). Recent fieldwork within Tutbury (Pedersen 2006) revealed three previously unknown burials which have been radiocarbon dated to the eleventh or twelfth centuries (Marshall and van der Plicht 2008).

In addition to the amount of land enclosed for farming during the medieval period, there are also 12 entries within the combined lists relating to medieval deer parks and hunting grounds. Such enclosed land is often associated with large houses and manorial halls and can be of inconsiderable historic significance in their own right. Where these enclosed areas continued into the post-medieval period they provide an opportunity to investigate land which may have escaped the impacts of post-medieval and modern farming and industry.

There are a significant number of religious buildings present within the combined lists for this landform. There are three large monastic houses known: the Augustinian Abbey at Darley Abbey is known to be one of the largest in the county, though its definite location is unknown (Robinson 2001; Shakarian 2008). The Benedictine Priory at Tutbury was founded at the same time as Darley Abbey, and the remaining fabric is now incorporated into the parish church. The final priory known is the Cluniac house of St. Helen's Priory in the centre of Derby which was dependent on Bermondsey Abbey. Many of the brethren from here relocated to Darley Abbey and the priory fell out of use in the 14th century (NMR no. 313374). As well as the large monastic houses, there were three hospitals and almshouses during the medieval period. One of these also operated as a preceptory of the Knights Hospitaller, located in Yeaveley, south of Ashbourne. As well as these larger religious buildings, the mudstones landform also hosts 32 churches which have medieval origins or demonstrably medieval fabric within the buildings.

4.8.1.8 Post Medieval – Modern (c.AD1700 – present day)

As is noted within the introduction (chapter 1) and also in chapter 7, the built heritage forms a substantial volume of known sites within the combined lists for all landforms. Whilst of historical importance, the impact on historic buildings through aggregate extraction and is typically less than that on the unknown sub-surface remains which are the primary focus of this analysis and predictive model.

Due to the nature of the post-medieval and modern land use on this landform, there is a greater focus on industry than the predominantly agricultural landscape visible on the upland landforms. Mills, factories, quarries and other industrial sites account for 52 of the post-medieval and modern sites, with only 34 agricultural buildings and field systems. This is a clear illustration of the role of industry and the expansion of urban areas in the lowlands of Derbyshire at this time as during the medieval period there are 176 known enclosures and field systems on the same landform. The principal industries represented in the archaeological record are corn cultivation, brick production, lime-working and also a number of silk mills in and around Derby. The early water-powered mills are related to the very earliest mills further up the Derwent, which have World Heritage Site status. The industrial remains of Derbyshire are of international importance in some cases, and development or extraction in the vicinity of known works (predominantly utilising water courses) has the potential to impact upon unknown archaeological deposits and structures associated with these industries. When dealing with possible impacts on post-medieval industrial sites, the standard desk-based techniques, such as historic map regression, can be key in locating any unknown structures. Substantial stone structures are also normally detectable by geophysical survey, though in areas of known industrial activity, there is also a likelihood that previous groundworks have introduced material which can disrupt geophysical survey. Test pits and evaluation trenches can be especially useful in pin-pointing the location of such industrial remains.

As noted above, there is a much lower ratio of post-medieval field systems and agricultural land in the HER and NMR lists than on the upland landforms. It can be reasonably suggested that the more extensive industrial remains and the amount of built-up area is a principal reason for this as well as the re-organisation of the medieval field systems into larger rationalised fields for the more intensive agriculture of today.

There are 70 large houses and halls on the mudstone landform dating to the post-medieval and modern periods. Some of these are related to the industrial sites, such as factory manager's houses, though others are manors and country houses, many of which can be viewed as a continuation of the medieval manorial system. The principal impact on these houses and halls is likely to be one of setting or encroachment into their grounds. In a similar way to medieval deer parks and grounds, the partitioning of a landscape can have a number of effects on any archaeological remains. When land such as deer parks or country estates is partitioned, then it must be noted that there is a greater chance of preservation of archaeological remains on this land, as it may well have been preserved away from impacts of modern development.

4.8.2 Evaluation and Mitigation Implications on the Mudstones (see table 7.9 for summary)

Where the mudstone is the parent landform for the high ground and bluffs above river valleys and river courses, these topographic locations have the potential to host both earlier and later prehistoric remains. Fieldwalking is an applicable technique for many periods, but often represents the most suitable technique for large-scale prospection for early prehistoric sites, most commonly represented by lithic scatters. Where it is possible that more substantial later prehistoric remains may exist, these are more suited to earthwork survey where upstanding remains are known or potentially geophysical survey. Where remains can be identified, these may take the form of linear ditch or bank earthworks and such archaeological features can be effectively sampled through evaluation trenching in order to determine their significance.

As well as in the specific locales noted above, fieldwalking is an applicable technique in general on this landform due to the number of both known lithic scatters, and also pottery scatters representing Roman sites (see also Research Agenda – Chapter 7).

As has been noted for other landforms, ridge and furrow is not only of interest in itself, but it also has the potential to mask and even preserve earlier remains and features below, and this must be considered an important evaluation objective for any development which impacts upon upstanding earthworks on this landform (see also Research Agenda – Chapter 7).

5. Superficial Geology Landform Assessments

The following three chapters (5.1 – 5.3) represent the assessments for the three superficial landform elements. On these landforms the principal driver of archaeological and palaeoenvironmental associations is the superficial or drift deposits overlying the bedrock geology. The associations, along with evaluation and mitigation issues, are summarised for all landform assessment chapters in the tables in Chapter 7.

5.1 Landform 2a – Till

Landform 2a encompasses the various areas of till deposits, sometimes referred to as 'Boulder Clay'. Till is a veneer of clay-heavy drift deposit laid down directly by a glacier and the term 'till' covers a wide variety of similar deposits. Landform 2a is widespread within Derbyshire and the Peak District and the areas shown are the large concentrations at the scale of British Geological Survey mapping. There are evidently other small pockets of till across the study area, but for the purposes of this analysis only those known from the 1:50,000 geological mapping are included. The largest concentration of till overlies the mudstone, siltstones and sandstones south of Ashbourne, capping the undulating higher ground which is cut by the south-flowing minor tributaries of the Trent such as the Wyaston Brook, Bradley Brook and Spinneyford Brook. As well as this major concentration, there are also smaller, yet significant till deposits on the eastern gritstone moors, around Rowsley and Bakewell, and in localised deposits to the north-east and south of Derby, capping and forming areas of higher ground in these lower-lying regions of south Derbyshire (Fig. 5.1.1).

Clay geologies in general are often considered to have fewer archaeological associations than those landforms generally accepted as more attractive for settlement during the past, for example sand and gravel river terraces or the Carboniferous Limestone plateau, although in nearby Leicestershire the claylands have been shown to host significant archaeological remains of most periods (Clay 2002). Clay geologies typically host clay-heavy soils which are harder to work and depending on conditions can be anything from waterlogged to indurated. Recent interest in the potential of clay landscapes has led to a compilation of multidisciplinary research (Mills and Palmer 2007). A substantial amount of the most recent research has focussed on prospection for sites in clay landscapes through aerial photography and the necessary conditions for the formation of cropmarks (e.g. Coleman 2007), illustrating that cropmarks can still be prevalent, but normally during drought years (Grady 2007) and where the soil is thinner so as not to retain too much moisture (Evans 2007). Clay-heavy soils have the potential to retain upstanding remains better than lighter soils if such areas have experienced minimal cultivation.

The principal importance of the till landform is in its removal as a capping layer overlying landforms which are targeted for extraction such as Carboniferous Limestone (1a) or Millstone Grit (1f).

There was no dedicated aerial photograph transcription targeted on this landform, though portions of all aerial photograph blocks included areas of landform 2a. Aerial photograph transcriptions are discussed in Chapters 4.1, 4.2, 4.4 and 5.3. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

The area of landform 2a encompasses 24,056.88ha which represents 7.31% of the total area of Derbyshire and the Peak District.

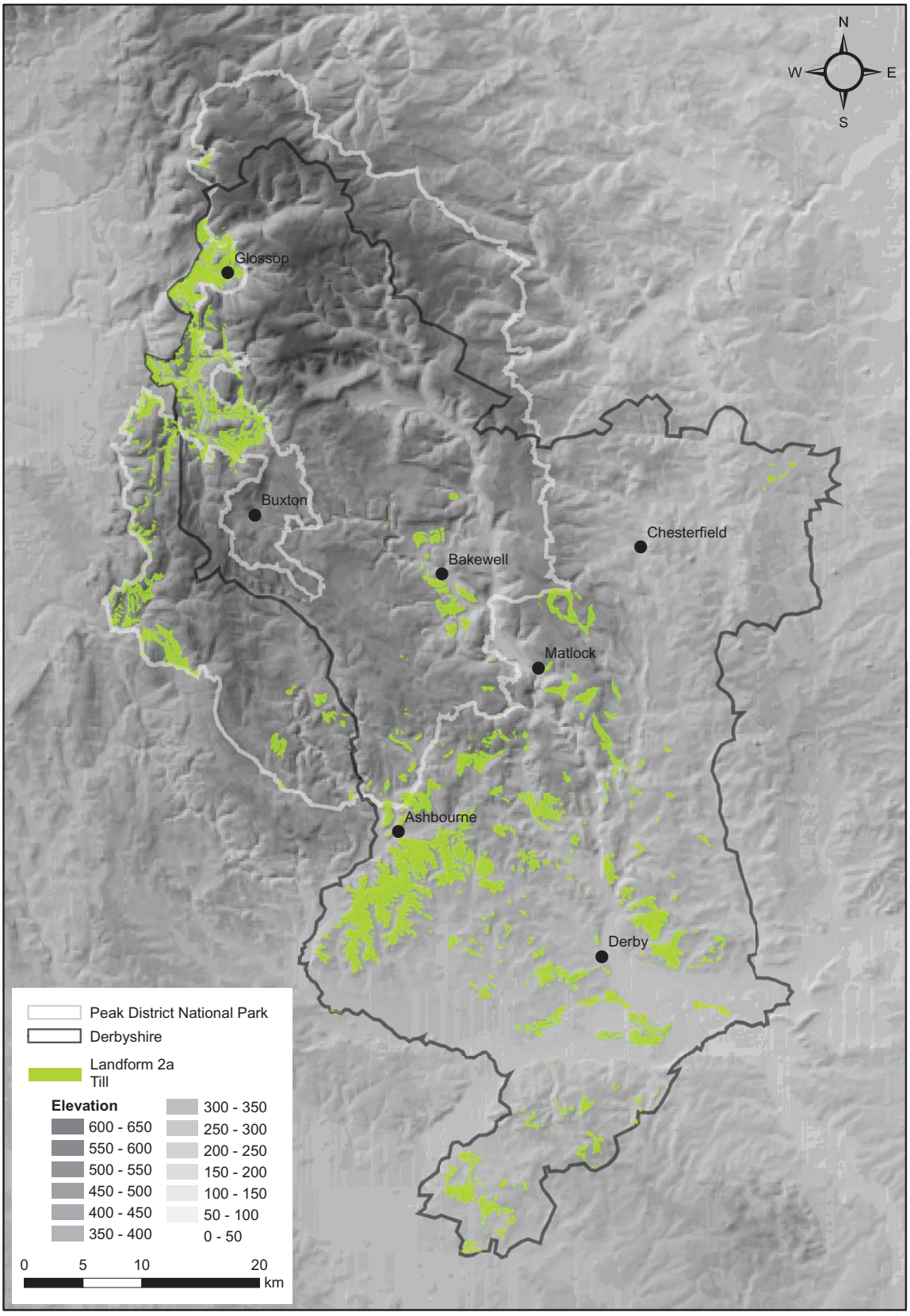

Figure 5.1.1 Location of landform 2a within Derbyshire and the Peak District.

5.1.1 Archaeological Associations (chronological)

The Till landform hosts 1235 HER entries and 437 NMR entries of which 541 are duplicated giving a total number of known archaeological and historical sites of 1131 within the combined lists. The breakdown of the sites within this combined list is presented in Table 5.1.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 2a hosts a total site ratio of 4.7 sites per 100 hectares. Although the overall densities for sites by period is slightly lower for this landform than for the overall averages for the study area, the two sets of figures show good general agreement, which is suggestive of the fact that the specific associations of the till can also be driven by the associations of the underlying bedrock landform.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**8**	**0.03**	**0.12**	**0.71**
Findspot	6	0.02	0.0611	0.53
Lithic Scatter	2	0.01	0.0456	0.18
Neolithic	**5**	**0.02**	**0.24**	**0.44**
Findspot	5	0.02	0.1216	0.44
Bronze Age	**72**	**0.3**	**0.4**	**6.37**
Artefact Scatter	2	0.01	0.0027	0.18
Barrows/Cairns	41	0.17	0.3019	3.63
Cremation Cemetery	2	0.01	0.0021	0.18
Enclosure/Field System	2	0.01	0.021	0.18
Findspots	22	0.09	0.1146	1.95
Kiln	1	0	0.0003	0.09
Rock Art	1	0	0.004	0.09
Standing Stone/Stone Circle	1	0	0.0155	0.09
Iron Age	**5**	**0.02**	**0.05**	**0.44**
Findspot	4	0.02	0.021	0.35
Pit Alignment	1	0	0.0106	0.09
Romano British	**89**	**0.37**	**0.43**	**7.87**
Artefact Scatter (pottery)	9	0.04	0.0152	0.8
Building	1	0	0.0036	0.09
Burial	1	0	0.0067	0.09
Cremation Cemetery	1	0	0.0003	0.09
Enclosures/fields/settlements	7	0.03	0.0565	0.62
Findspots	29	0.12	0.1572	2.56
Fort	2	0.01	0.0021	0.18
Lead Mining	1	0	0.0003	0.09
Pottery Kiln Site	3	0.01	0.0049	0.27
Roads and associated sites	30	0.12	0.0945	2.65
Settlement	5	0.02	0.003	0.44
Early Medieval	**11**	**0.05**	**0.08**	**0.97**
Burial/Barrow	1	0	0.0109	0.09
Enclosure	1	0	0.0012	0.09
Findspot	3	0.01	0.0219	0.27
Sculpture	2	0.01	0.0106	0.18
Towns/settlements	2	0.01	0.0067	0.18
Trackway/Boundaries	2	0.01	0.003	0.18
Medieval	**235**	**0.98**	**1.1**	**20.78**
Artefact Scatter	1	0	0.0018	0.09
Boundaries/Linear Earthworks	5	0.02	0.0386	0.44

Castle/motte	1	0	0.0055	0.09
Church/Religious Buildings	14	0.06	0.0897	1.24
Sculpture/Wayside crosses etc	6	0.02	0.0377	0.53
Deer Parks/Parks	18	0.07	0.0423	1.59
DMVs	13	0.05	0.0353	1.15
Enclosures/Field Systems	108	0.45	0.3329	9.55
Findspots	6	0.02	0.0872	0.53
Fishponds	2	0.01	0.0097	0.18
Granges	1	0	0.0897	0.09
Manor House/Farmstead	26	0.11	0.0973	2.3
Hospital/Almshouse	2	0.01	0.0055	0.18
Industrial Sites	1	0	0.0255	0.09
Lead Mining	3	0.01	0.003	0.27
Mill	1	0	0.0027	0.09
Other Buildings	3	0.01	0.003	0.27
Quarrying/Mining Remains	2	0.01	0.0255	0.18
Roads/Tracks	10	0.04	0.017	0.88
SMVs	12	0.05	0.0219	1.06
Post Medieval-Modern	**623**	**2.59**	**3.39**	**55.08**
Agricultural buildings /Field Systems	70	0.29	0.3776	6.19
Aircraft Crash Site	1	0	0.0103	0.09
Brickworks/Pottery and clay working	8	0.03	0.0356	0.71
Canals and associated	13	0.05	0.0237	1.15
Enclosures	3	0.01	0.0295	0.27
Findspots	6	0.02	0.0313	0.53
Gardens/Parks/Lakes/Ponds	23	0.1	0.0684	2.03
Golf Course	2	0.01	0.0055	0.18
Halls/Large Houses	20	0.08	0.08	1.77
Industrial Sites	1	0	0.038	0.09
Iron/Steel Working Sites	3	0.01	0.0176	0.27
Lime Working Sites	6	0.02	0.0389	0.53
Military Sites	30	0.12	0.0471	2.65
Other Mills and Factories	78	0.32	0.1839	6.9
Quarrying/Mining/Clay Extraction	44	0.18	0.3566	3.89
Railway Lines/Buildings	136	0.57	0.3049	12.02
Religious Buildings	35	0.15	0.1541	3.09
Reservoirs	9	0.04	0.0058	0.8
Roads/Tracks/Boundaries	34	0.14	0.1918	3.01
Sculpture/Memorials/Crosses	1	0	0.0067	0.09
Other Buildings	90	0.37	0.4207	7.96
Wells/Pumps/Fountains	10	0.04	0.0295	0.88
Multiperiod Remains	**8**	**0.03**	**0.37**	**0.71**
Artefact Scatters	8	0.03	0.017	0.71
Unknown Date	**75**	**0.31**	**0.47**	**6.63**
Enclosures/Earthworks/Cropmarks	39	0.16	0.0061	3.45
Findspots	32	0.13	0.156	2.83
Standing Stone/Circle	4	0.02	0.0064	0.35
TOTAL SITES	**1131**	**4.7**	**6.54**	**100**

Table 5.1.1 Breakdown of all sites on Till by period and site type.

5.1.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

There are only eight entries within the HER and NMR relating to the pre-Neolithic periods, all of which are single finds or lithic scatters, the final being the site at Lismore Fields. Two Acheulian handaxes demonstrate a Lower Palaeolithic presence within Derbyshire and the Peak District. The first handaxe was recovered from a garden near Mickleover School, just off the highest point of a localised eminence in a rolling landscape. The second handaxe came from a ploughed field to the east of Hopton village on the southern reaches of the Carboniferous Limestone. The handaxe was found within the eastern end of the shallow valley now dominated by Carsington Reservoir. Mesolithic finds are represented by a single flint core found in the vicinity of the Hoben Limestone Works just off the line of the Cromford and High Peak Railway – now a cycle trail – close to Carsington Pastures. The final known site from this period is a scatter of mixed flint and chert artefacts found in the vicinity of the Roman fort at Melandra Castle (Ardotalia) near Glossop. This site sits on a low natural promontory protected by a curve of the Glossop Brook, and is a close topographic parallel to the location of other Mesolithic sites in the county, for example the Lordsmill Street site in Chesterfield (Myers 2006, 9), or the Unstone sites (Hart 1981), both on the eastern Coal Measures.

The earliest phase of activity at Lismore Fields, Buxton (Garton 1991) (see below for discussion of the Neolithic archaeology at Lismore Fields), yielded lithic tools and manufacturing debitage dating to the Mesolithic – indeed the circular post-built building on the site is potentially Mesolithic in date and this question remains unresolved, though the excavator has reservations about ascribing a Mesolithic origin to the roundhouse purely on the basis of the proximity of a lithic chipping floor and has suggested that this feature may actually relate to much later medieval or post-medieval activity coincidental with the prehistoric remains (Garton pers. comm..) Having said this, it must be noted that there is now a precedence for similar post-built circular houses belonging to the Mesolithic as demonstrated by the two structures at Lesmurdie Road, Elgin (Suddaby 2007).

5.1.1.2 Neolithic (3900 – 2200BC)

Whilst there are few Neolithic entries within the HER and NMR for the till, one of them is the key site of Lismore Fields which sits on till overlying shale at the junction of the Carboniferous Limestone and Millstone Grit just outside Buxton.

The site at Lismore Fields contained the remains of two post-built rectangular buildings dating to the Neolithic along with a number of pits and post alignments which formed a settlement of some permanence. The site was located within an upland basin at around 300m OD (Clay 2006, 71) and sat in the confluence between two small streams with a spring approximately 90m distant (Garton 1991, 13). The Lismore Fields Neolithic occupation was dated through a suite of five radiocarbon dates to 3990-3105 cal. BC and palaeoenvironmental finds included emmer wheat, chaff and flax seeds (Garton 1991, 13). This site is similar to others known from the north of England with Neolithic occupation in the form of post-built structures, hearths and midden pits, along with evidence for agriculture. Similar sites include Bolam Lake, Northumberland (Waddington and Davies 2002), Lanton Quarry, Northumberland (ref.) and Mercia Marina, Willington in the Trent Valley (Brightman and Waddington in press), though these similarities should be noted alongside the fact that Lismore Fields represents the only northern English Neolithci site which has true rectangular post-built structures as opposed to the more flimsy, often triangular structures at the sites noted above. The only local comparanda is a post-built rectangular excavated at Willington Quarry (Wheeler 1979) though this has never been directly radiocarbon dated. Outside of the East Midlands, perhaps the best analogy would be with the recently discovered rectangular house at Llandegai in North Wales (Kenney 2008). Such sites are key to our understanding of the Early Neolithic and the development of a sedentary and agricultural way of life in the region and also the country as a whole. Whilst there was preservation of charred organics, as noted above, it was noted that the till landform in this area is acidic, and as such, there was only very fragmentary bone survival (Garton 1991, 13).

Five single finds are known from on the Till dating to Neolithic period, all of them stone axe heads of varying materials. Two of the axe heads are of uncertain provenance: a flint axe head from within the boundaries of the medieval Lyme Park, and a polished stone axe head found somewhere within the town of Spondon, in an area which is now a residential estate. Three additional axe heads are known with better locational information: an amphibolite axe head from the crest of a hill on the undulating landscape west of Yeaveley, a polished flint axe head recovered from the Greenfield Brook beneath what is now Dovestones Reservoir in Saddleworth, and an unspecified stone axe head from the flanks of the shallow valley north of Narrowdale Hill, Alstonefield. The paucity of finds for the Neolithic period means that few conclusions can be drawn about the use of the till landscapes at this time. The fact that all

Figure 5.1.2 Neolithic post-built Building 1 from Lismore fields. Picture reproduced with permission of Daryl Garton.

known finds are stone axe heads, commonly viewed as 'prestige' items, is consistent with the general picture noted across most landforms, where there is a potential collection and reporting bias focussing on larger, easily recognisable and aesthetically pleasing items. However, axe heads are associated with the felling of timber and the creation of clearances and so their distribution is also helpful in identifying patterns of settlement and their presence on till deposits indicates that such areas were by no means avoided by Neolithic farmers.

5.1.1.3 Bronze Age (2200 – 700BC)

The key point to note with the known Bronze Age remains on this landform is that generally the associations follow that of the underlying bedrock and landscape topography. With the barrows or cairns, these can be found on the visible break of slope in prominent positions, such as the now lost cairn sitting on the saddle between Pea Low and Steep Low near Alstonefield (Bateman 1861, 126), or on the summit of natural highpoints in the landscape such as the Lady Low bowl barrow which sits on a natural promontory jutting into the Manifold Valley (Barnatt 1996, 236). Both of these examples are on till which overlies the Carboniferous Limestone (1a). Further south in Derbyshire, the associations are also similar to that of the underlying bedrock and topography. In the gently undulating landscapes defined by the Mercia Mudstones (1k), a barrow is known from the summit of a localised highpoint between Alkmonton and the Bentley Brook.

A significant complex of cropmarks is known from near Breaston in the Trent Valley which incorporates ring

ditches, enclosures and linear features and has been ascribed a broad Bronze Age date. The range of archaeological features identified from aerial photography at Breaston form a close parallel to those known at Mercia Marina prior to the most recent excavations (Brightman and Waddington forthcoming), and the key point to note is that this cropmark complex spreads across a number of different landforms, suggesting that when dealing with the Trent Valley sites of this period, the till deposits did not exert a particular hindrance to settlement, even if the sand and gravel terraces presented a more-attractive option. Possibly the extension of settlement in to the till areas reflects an increasing density of settlement and pressure on available space?

A site of some importance is the Bronze Age cremation cemetery excavated in 2003 in Littleover, Derby (Cherrington 2003), which is now included in the scheduled area of this portion of Ryknield Street Roman road (SM23287). The site was located through evaluation trenching aimed at testing geophysical results across the site, and as with Lismore Fields, the archaeological remains encountered were not expected (Garton 1991, 13). The site yielded no fewer than five cremations within the evaluation trenching alongside a late Iron Age pit alignment (noted below), and also Roman and post-medieval routeways (Cherrington 2003). The site sits just off the highest local point and may represent burials placed alongside a natural routeway which continued to be used through prehistory into the Roman period and later (Cherrington 2003, 5).

Where Bronze Age findspots are known, they tend to occur near known Bronze Age sites, or in similar topographic settings to known Bronze Age sites. This is best illustrated by the four Bronze Age metalwork finds known from on the till. Three are known from prominent and visible locations similar to many barrows: an Early Bronze Age flat axe from the summit of a promontory overlooking Lathkilldale, a Middle Bronze Age palstave from the vicinity of a local highpoint east of Hartshorne, and a Late Bronze Age spearhead recovered from the high saddle of land defined by two deeply-incised brooks to the north of Fenny Bentley. The final piece of Bronze Age metalwork is a Late Bronze Age sword found with the remains of a food vessel to the west of Stanton in Peak close to the Stanton Moor Scheduled Monument (Bateman 1848, 85). It is worth noting a small concentration of Early Bronze Age lithic finds from the area around Hopton Incline south of Brassington, which include a barbed-and-tanged arrowhead found during fieldwork undertaken by the North Derbyshire Archaeological Trust (Hart 1981, 66-8). This cluster remains to be tested by further fieldwork in surrounding areas however, as currently it seems likely that it is the result of fieldwork bias rather than denoting a real focus of Bronze Age activity.

5.1.1.4 Iron Age (700BC – AD43)

As with many of the landforms, evidence for Iron Age activity is sparse on till deposits. Most of the Iron Age 'sites' recorded within the HER and NMR are individual findspots. A spearhead is known as a find from the ploughsoil near to a possible Bronze Age barrow on the hillside above the Bradley Brook (Greaves 1861) and a single Iron Age coin is known from a non-specific location within the Osmaston estate, Derby. Iron Age pottery is known from Little Chester Roman fort at Derby, indicating a degree of settlement continuity from the Iron Age into the Romano-British period which may be partially responsible for the dearth of solidly-dated Iron Age sites in the county. An Iron Age beehive quern was found in fields which sit on a till deposit overlying substantial glaciofluvial and glaciolacustrine deposits near Swarkestone in the Trent Valley. Whilst this is only one find, it does come from the middle terraces of the Trent Valley at a very similar altitude to the probable Iron Age linear features and pit alignment excavated at Mercia Marina c. 5km to the west (Brightman and Waddington forthcoming).

Of the two sites listed which are not just single findspots, the first is a cairn burial within a group of three cairns at Haddon Fields (Ward 1888). While there is no clear dating evidence other than early medieval finds in one of the other barrows, an Iron Age quern was re-used as part of the gritstone cist housing a crouched inhumation, suggesting a potential Iron Age date. The final Iron Age site known on the till is a pit alignment partially excavated during evaluation works in Littleover (Cherrington 2003). This site sat on a local high point in the gently undulating landscape of south Derbyshire, north of the Trent Valley, but the archaeological associations are similar to some of those noted on the Glaciofluvial sand and gravel terraces adjacent to the Trent, again particularly at Mercia Marina, Willington, where Bronze Age cremations were found near an Iron Age pit alignment (Brightman and Waddington in press).

5.1.1.5 Roman (AD43-410)

Whilst there is a significant amount of Roman-period archaeology known on the till in comparison to that of other periods, there appear to be few specific associations which do not correspond with the associations already noted for the underlying bedrock landform. The majority of Roman 'sites' are represented by findspots, artefact scatters and various sections of the Roman road network which cross the county. There are two notable concentrations of pottery scatters. The first is in the area around Carsington Water, focussing around the Brough Field site which now lies beneath the reservoir. The second major concentration is in the area around Ockbrook and Borrowash and represents the work of the Borrowash and District Historical Society surrounding the excavated Roman building at Little Hay Grange (Palfreyman 2001). This picture is reinforced by a Roman pottery kiln (Hughes 1964) from on the till within the complex of pottery kilns in the Hazelwood and Lumb Brook area (Brassington and Webster 1988). Although the precise positioning of the kilns and other associated sites do not appear to relate to any differences in the underlying landform elements, the presence of significant clay deposits is probably a contributory factor in the choice of the general location of the Roman Derbyshire Ware kilns. This echoes the later medieval pottery industries which focus on the south Derbyshire coalfield utilising the rich drift clay deposits.

Potentially the most significant Roman period site on till deposits is the fort at Melandra Castle (Ardotalia) (Petch 1943) and the associated Roman sites surrounding it. Melandra Castle sits on a naturally defensible hill on the inside of a bend in the Glossop Brook and acts as a central hub for many of the Roman roads, connecting the Peak District sites at Brough-on-Noe (Navio) and Buxton (Aquae Arnemetiae) with the sites on the western side of the Pennine and Peak uplands such as Manchester (Mamucium) and Castleshaw (Rigodunum). The fort was an original Agricolan earth and wood construction (Petch 1943) dating to the early pushes north of the Roman army, which was later reconstructed in stone during the Trajanic period. A cremation cemetery is also known from just to the south of the fort, in a roadside setting typical of those found outside sizeable Roman towns, suggesting that the vicus associated with Melandra Castle may have been sizeable and that this was an important Roman settlement on the western edge of the Peak District.

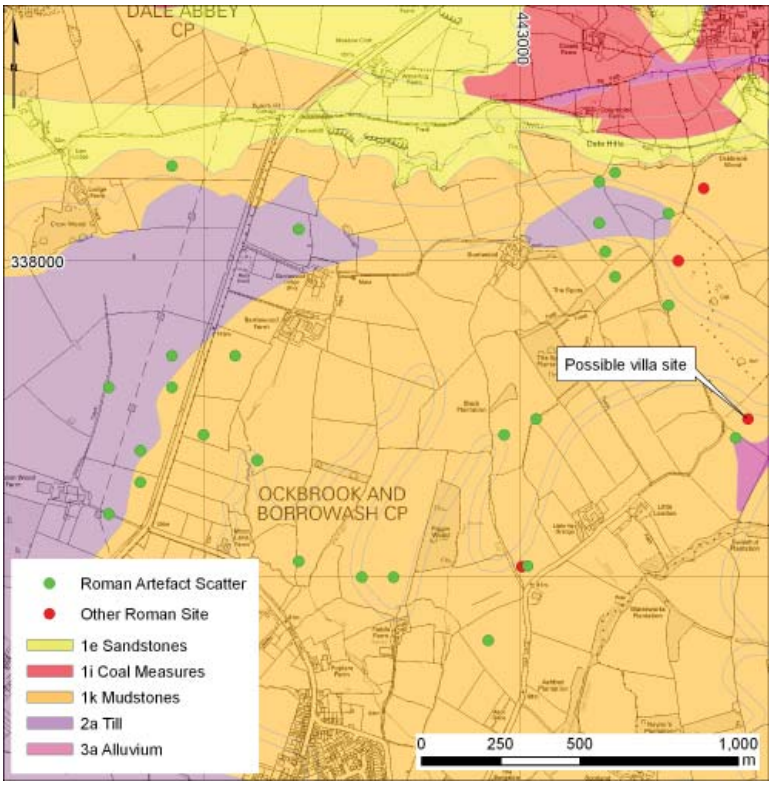

Figure 5.1.3 Distribution of Roman-period sites in the Ockbrook and Borrowash area illustrating that there appears to be no discernible preference for location between the Mudstones (1k) and the till landforms (2a). OS Data. Crown Copyright. All Rights Reserved. Licence No. 100045420.

5.1.1.6 Early medieval (AD410 – 1066)

The amount of known sites on till landforms for the early medieval period agrees well with the overall picture for the county inasmuch as there are very few. One definite early medieval barrow burial is known from Wyaston. This is one of only two 'Anglian' barrow burial, along with Duffield Castle, not on the Carboniferous Limestone plateau (Barnatt 1996, 86), and was a secondary insertion into an earlier barrow accompanied with some typically 'female' grave goods including beads (Barnatt 1996, 60), and is thought to be of roughly 7th century AD date (Barnatt 1996, 62). The monument sits on a highpoint on a saddle of land between the Wyaston Brook and Brown's Brook, though is not on the highest local point and is overlooked from the north-west. One of the three barrows at Haddon Bank (noted above in the Iron Age section) is tentatively dated to the early medieval period on the basis of some probable Saxon pottery (Ward 1888).

Other than these burial sites, the only other known early medieval sites on the till are accounted for by three single findspots and two fragments of cross sculpture. Of the cross sculpture, one is incorporated into a farm wall on the western gritstone moors near to Rainow, and the second may still be in-situ by the side of a modern roadway at Shall Cross just to the south of Whaley Bridge. This second cross may represent an old routeway of some kind. The three findspots known do not come from excavations. A single glass bead was recovered from near Hopton Incline, Brassington and a loomweight is known from the valley of the Cubley Brook.

5.1.1.7 Medieval (AD1066 – c.AD1700)

The increase in known sites in the medieval period is indicative of more intense and widespread land use than in previous periods, with extensive enclosures and field systems which can damage, destroy and in some cases preserve earlier archaeological remains. On till landforms, where the soils are likely to be heavy and clay-rich, the preservation of earthworks will be better than on lighter soils which have experienced more intense ploughing and continued cultivation since the medieval period. This is perhaps best demonstrated by the amount of preserved medieval ridge and furrow observable across this landform (see also Research Agenda – Chapter 7).

Though there are few deserted medieval villages and shrunken medieval villages which occur entirely on till, the key point to note is that as with the remains of medieval period ridge and furrow, upstanding remains can be preserved better due to the heavy clay soils. Examples of deserted medieval villages on till include Little Wilne near the confluence of the Derwent and Trent which sits at a very low-lying level close to the Derwent but is still visible on the ground as a suite of upstanding remains. The deserted medieval village of Handley sits within the boundaries of the medieval deer park of Lyme Park. This also illustrates the preservation which can exist within the boundaries of medieval deer parks often freed from the worst ravages of post-medieval and modern development, as has been noted for other landforms, such as the known remains in Scarcliffe Park on the Magnesian Limestone (1c). A final example of deserted medieval villages on till is that at Offcote which sat on the high saddle of land north-east of Ashbourne overlooking a narrow tributary of the Henmore Brook. This site was known to have upstanding earthwork remains on the heavy clay soils but has subsequently been ploughed flat (Hart 1981, 128) illustrating that such remains are still fragile.

A substantial amount of the archaeological resource for the medieval period is accounted for by churches with medieval origins and manor houses, along with one grange. In general these lie within later post-medieval or modern settlements but where remains are isolated, there is a good chance for ancillary structures to remain. The palimpsest of archaeological evidence that can survive within the holdings of a medieval grange is perhaps best demonstrated by the excavations around Roystone Grange (Hodges 1991) which are discussed in Chapter 4.1 (Carboniferous Limestone).

5.1.1.8 Post-medieval to Modern (c.AD1700 – present day)

A substantial amount of the post-medieval entries within the HER and NMR relate to field systems and, as with the medieval period, this is predominantly well-defined upstanding ridge and furrow. The heavy clay soils can result in a slightly better preservation of upstanding remains where these have not been impacted upon by more recent development. As on other landforms, ridge and furrow remains also have the potential to mask and in some cases preserve earlier features (see also Research Agenda – Chapter 7).

A significant amount of the archaeological sites dating to the post-medieval and modern periods are built sites and

they are not specifically located to take advantage of the till landforms on which they sit. These sites include the many mills which take advantage of the waterways running from the uplands, as well as military installations and the large number of railways which cross the county.

Of those categories of sites which may be positioned to take advantage of the natural clay till, the most clear are the extractive sites relating to the clay as a natural resource and the clay and brickworks that they serviced. A good example is the large clay mine south of Chellaston adjacent to the brickworks. Where such workings are post-medieval in date rather than modern works, they may have archaeological potential in their own right as a part of the industrial heritage of Derbyshire. A final association noted in the HER and NMR which may have some direct correlation with the clay tills is the occurrence of reservoirs, many of which lie in areas where there are large deposits of impermeable clay. Examples of this include Combs Reservoir and Fernilee Reservoir either side of Ladder Hill south-east of Whaley Bridge.

5.1.1.9 Unknown Date

The number of sites of unknown date is noticeably high on the till landform, and this mirrors the sands and gravels (2d). On both landforms a substantial amount of this is accounted for by undated enclosures known from cropmarks, though on till there are also a number of upstanding enclosures and more ephemeral earthworks which may be due to the better preservation on heavier clay soils. It is telling that there are a substantial quantity of undated cropmarks known from the till, as this tallies well with the increasing awareness that clay landscapes are a more productive landform than may have been previously recognised (Mills and Palmer 2007; Clay 2002).

The amount of single findspots of unknown date are also worthy of mention as many of these represent undiagnostic lithic finds, which will date to anywhere from the Palaeolithic through to the Early Bronze Age; all periods which appear underrepresented on the till in comparison to most other landforms suggesting that there is more prehistoric activity on the Derbyshire tills than has perhaps hitherto been thought.

5.1.2 Evaluation and Mitigation Implications on Till Landforms (see table 7.10 for summary)

In a large number of cases, the picture which has come from analysing the archaeological resource on the clay tills is that the underlying bedrock landform and specific topographical settings may be a stronger determinant factor than that of the clay itself, although the density of remains on this landform are likely to be less due to the less free-draining nature of the soils. This is particularly evident from concentrations of archaeological sites of various periods such as the Ockbrook and Borrowash Roman sites or the topographic settings of certain monuments such as the Bronze Age burial cairn at Wyaston.

The Northamptonshire National Mapping Programme project (Deegan 2007) has illustrated the effectiveness of aerial photography as a prospection technique on till. While substantially more sites were recorded on the free-draining geologies, 17% of sites were recorded on the till (Deegan 2007, 108) with a noticeable bias towards later prehistory through the Romano-British period, in comparison to what was termed 'permeable' geologies where the Neolithic and Bronze Age sites where more common (Deegan 2007, 112). The occurrence of a reasonable number of cropmarks on the till in Derbyshire and the Peak District would appear to support this picture, though in this county it should also be noted that the till clearly hosts important Neolithic and Bronze Age remains, though there are no notable monument complexes as on the free draining geologies.

While it is a central aim of this work to analyse both the general patterning and also specific details of archaeological associations, it is also key to deal with specific type sites as these are the best investigated and can offer much in comparison to potential archaeological remains elsewhere on similar landforms. On the till, one of the key prehistoric sites is undoubtedly that of Lismore Fields, and specifically the post-built structures and associated pit features. Due to the ephemeral and dispersed nature of the archaeological remains of post-built timber structures and various types of pits, conventional prospection techniques are generally unsuitable as they are virtually impossible to detect by geophysical survey, are rarely seen on aerial photographs and are a chance discovery if they come up in evaluation trenches. These types of site are very important in terms of the archaeological information they can yield and they are typically discovered and recorded during fairly large-scale surface stripping, as at Lismore Fields, but this is also

the case for Neolithic settlement sites on other landforms (e.g. see landform 2d gravel terraces) and in other areas of the country (e.g. Hey and Lacey 2001; Waddington 2008). It is probable, given the amount of Neolithic material and monumental sites known across much of Derbyshire and the Peak District, though principally the Carboniferous Limestone, Millstone Grit and sands and gravels, that the relative lack of known settlement sites is more a result of the use of traditional prospection and evaluation techniques, and the lack of large-scale development within a National Park, than of a real absence of these sites.

A final key point to note is that earthwork remains can be better preserved in heavier clay soils than on the lighter soils that overlie other landforms due to a lower level of cultivation on these heavier soils after the medieval period. This is most clearly demonstrated by the survival of large tracts of ridge and furrow remains of both medieval and post-medieval date as well as the upstanding remains of deserted medieval villages. As has been noted for other landforms, ridge and furrow is not only of interest in itself, but it also has the potential to mask and even preserve earlier remains and features below, and this must be considered an important evaluation objective for any development which impacts upon upstanding earthworks on this landform (see also Research Agenda – Chapter 7).

5.2 Landform 2b – Undifferentiated Drift Deposits

Landform 2b encompasses undifferentiated superficial deposits which cannot be comfortably identified with any of the other major landform elements and so are dealt with together in this chapter. As the landform elements are derived from the 1:50,000 scale British Geological Survey mapping, the majority of undifferentiated deposits are those characterised as 'head' though this landform element category also includes talus deposits and these are discussed specifically below.

The area of landform 2b encompasses 24,056.88ha which represents 7.96% of the total area of Derbyshire and the Peak District.

The largest single sub-category within landform 2b is 'head', which is an older geological term relating to the highest deposits in a sequence that cannot be classified to any greater degree, and could result from a number of geomorphological process including colluviation or wind action such as that which forms loess.

Only small portions of talus deposits are mapped, principally as the screes in both river valleys and dry valleys. There are no definite archaeological associations with talus deposits which can be derived from analysis of the HER and NMR as all of the entries listed in table 5.2.1 below relate to other categories of undifferentiated drift deposits with the exception of a few sites whose mapped boundaries extend on to scree from other landforms such as the scarp edge hillfort of Fin Cop, Monsal Dale (Waddington in press). The key point to note in relation to talus deposits is the potential for concealing and preserving earlier remains in a manner similar to colluvium, as well as concealment of cave sites. This association is most apposite for this study area in relation to the many cave sites which are known in both the Carboniferous Limestone (1a) and also the Magnesian Limestone (1c) which produce screes below rock outcrops. Many of the known caves contain remains from multiple periods, and have been used by humans for many thousands of years. From the Palaeolithic remains at Creswell Crags (Pettitt et al 2007) to sites such as Fissure Cave near Bradwell (Pill 1963; Gilks 1990) which has yielded both Neolithic and Romano-British pottery, or Fox Hole Cave near High Wheeldon (Bramwell 1971) which contained remains from the Neolithic, Bronze Age and Romano-British periods, it is evident that the caves of the Derbyshire uplands are a key site-type. Due to the rich potential of caves to host archaeological remains, it follows that talus deposits concealing caves are of special importance as they may preserve undisturbed remains, including organic materials if they are located within limestone bedrock – due to the alkaline environment. If cave entrances were blocked early in the Post Glacial or Holocene then the remains in any such caves could date to the Palaeolithic which would be likely to make them of national significance.

Undifferentiated drift deposits host 1159 HER entries and 417 NMR entries of which 909 are duplicated giving a total number of known archaeological and historical sites of 667 within the combined lists. The breakdown of the sites within this combined list is presented in Table 5.2.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 2a hosts a total site ratio of 4.66 sites per 100 hectares.

The breakdown of sites is included below in table form for the sake of completeness, though as this landform element brings together disparate non-categorisable deposits, there is no further chronological discussion beyond the key points already discussed above.

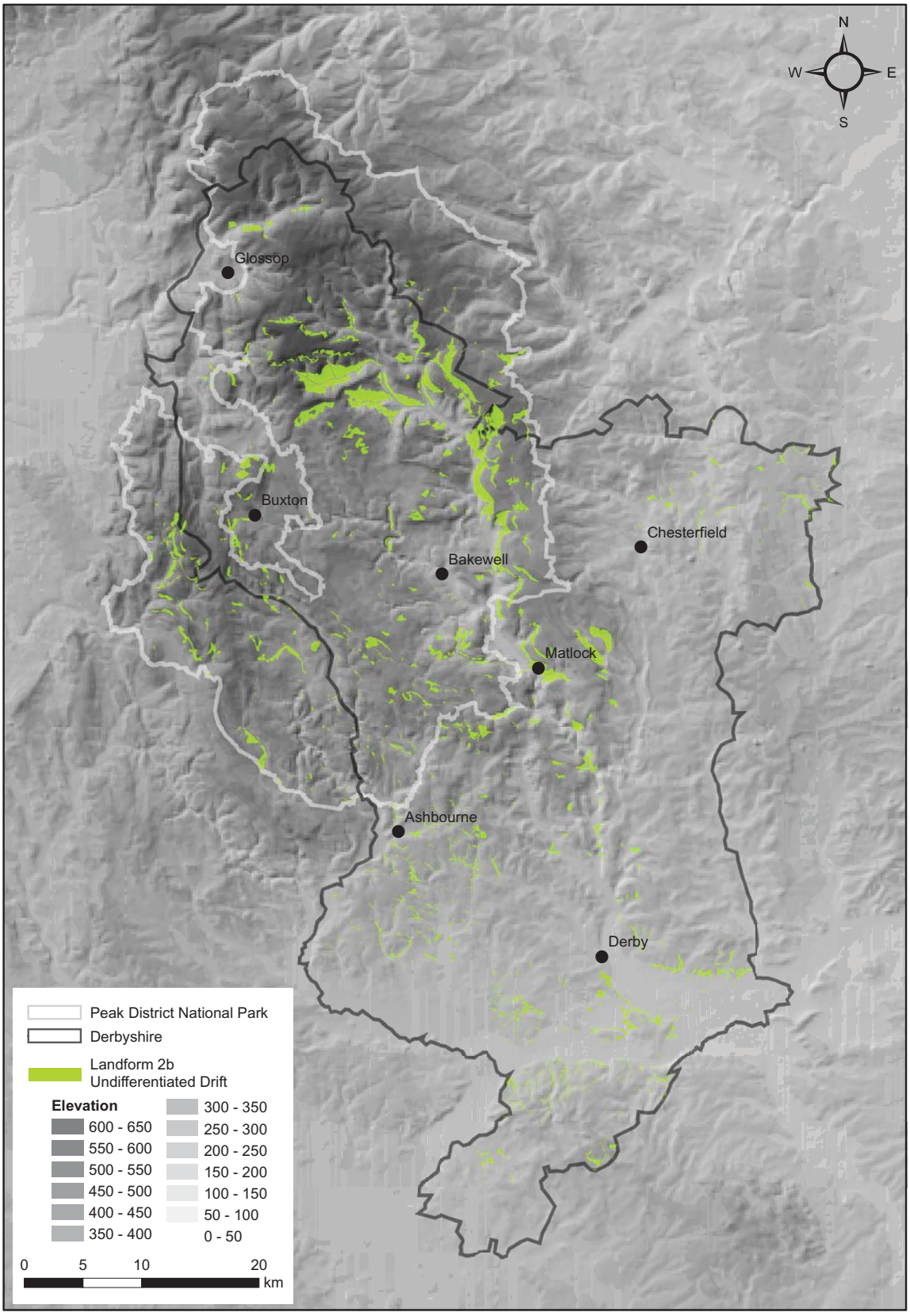

Figure 5.2.1 Location of landform 2b within Derbyshire and the Peak District.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**9**	**0.06**	**0.12**	**1.35**
Findspot	4	0.03	0.0611	0.6
Lithic Scatter	5	0.03	0.0456	0.75
Neolithic	**19**	**0.13**	**0.24**	**2.85**
Caves	2	0.01	0.004	0.3
Findspot	14	0.1	0.1216	2.1
Lithic Scatters	3	0.02	0.0173	0.45
Bronze Age	**63**	**0.44**	**0.4**	**9.45**
Artefact Scatter	2	0.01	0.0027	0.3
Barrows/Cairns	35	0.24	0.3019	5.25
Cairnfields/clearance cairns	4	0.03	0.0255	0.6
Cave	2	0.01	0.0021	0.3
Enclosure/Field System	2	0.01	0.021	0.3
Findspots	17	0.12	0.1146	2.55
Mining Remains	1	0.01	0.0006	0.15
Iron Age	**3**	**0.02**	**0.05**	**0.45**
Findspot	1	0.01	0.021	0.15
Enclosure/Field System	2	0.01	0.0091	0.3
Romano British	**69**	**0.48**	**0.43**	**10.34**
Building	1	0.01	0.0036	0.15
Burial	1	0.01	0.0067	0.15
Enclosures/fields/settlements	11	0.08	0.0565	1.65
Findspots	20	0.14	0.1572	3
Roads and associated sites	36	0.25	0.0945	5.4
Early Medieval	**7**	**0.05**	**0.08**	**1.05**
Burial/Barrow	1	0.01	0.0109	0.15
Enclosure	2	0.01	0.0012	0.3
Findspot	3	0.02	0.0219	0.45
Trackway/Boundaries	1	0.01	0.003	0.15
Medieval	**145**	**1.01**	**1.1**	**21.74**
Artefact Scatter	1	0.01	0.0018	0.15
Boundaries/Linear Earthworks	4	0.03	0.0386	0.6
Church/Religious Buildings	3	0.02	0.0897	0.45
Sculpture/Wayside crosses etc	2	0.01	0.0377	0.3
Deer Parks/Parks	7	0.05	0.0423	1.05
DMVs	8	0.06	0.0353	1.2
Enclosures/Field Systems	73	0.51	0.3329	10.94
Findspots	1	0.01	0.0872	0.15
Fishponds	1	0.01	0.0097	0.15
Granges	4	0.03	0.0897	0.6
Manor House/Farmstead	6	0.04	0.0973	0.9
Hospital/Almshouse	1	0.01	0.0055	0.15
Industrial Sites	4	0.03	0.0255	0.6
Lead Mining	7	0.05	0.003	1.05
Mill	1	0.01	0.0027	0.15
Quarrying/Mining Remains	10	0.07	0.0255	1.5
Roads/Tracks	9	0.06	0.017	1.35
SMVs	3	0.02	0.0219	0.45
Post Medieval-Modern	**301**	**2.1**	**3.39**	**45.13**
Agricultural buildings /Field Systems	55	0.38	0.3776	8.25

Brickworks/Pottery and clay working	1	0.01	0.0356	0.15
Canals and associated	4	0.03	0.0237	0.6
Findspots	2	0.01	0.0313	0.3
Gardens/Parks/Lakes/Ponds	7	0.05	0.0684	1.05
Halls/Large Houses	2	0.01	0.08	0.3
Iron/Steel Working Sites	7	0.05	0.0176	1.05
Lime Working Sites	4	0.03	0.0389	0.6
Military Sites	4	0.03	0.0471	0.6
Other Mills and Factories	29	0.2	0.1839	4.35
Quarrying/Mining/Clay Extraction	55	0.38	0.3566	8.25
Railway Lines/Buildings	21	0.15	0.3049	3.15
Religious Buildings	13	0.09	0.1541	1.95
Roads/Tracks/Boundaries	38	0.27	0.1918	5.7
Sculpture/Memorials/Crosses	8	0.06	0.0067	1.2
Sports Ground	1	0.01	0.0033	0.15
Other Buildings	40	0.28	0.4207	6
Wells/Pumps/Fountains	10	0.07	0.0295	1.5
Multiperiod Remains	**4**	**0.03**	**0.37**	**0.6**
Caves/Rock Shelters	4	0.03	0.0012	0.6
Unknown Date	**47**	**0.33**	**0.47**	**7.05**
Cave	3	0.02	0.038	0.45
Enclosures/Earthworks/Cropmarks	32	0.22	0.0061	4.8
Findspots	12	0.08	0.156	1.8
TOTAL SITES	**667**	**4.66**	**6.54**	**100**

Table 5.2.1 Breakdown of all sites on undifferentiated drift deposits by period and site type.

5.3 Landform 2d – Sand and Gravel Terraces

The principal area of sands and gravels within Derbyshire and the Peak District is the Trent Valley and the lower reaches of its tributaries. Other than this, small expanses of sand and gravel terracing are known in parts of the other major river valleys of the county, with the most notable concentrations around Brough within the Hope Valley (the name given to a section of the Upper Derwent Valley and that of its tributary, the Noe), and small pockets in the vicinity of Bakewell and Rowsley near the confluence of the Wye and Derwent.

Sand and gravel terraces tend to form settlement foci throughout Britain (e.g. RCHME 1960), the Thames Valley (e.g. Gardiner 1984; Fulford and Nichols 1992), the Vale of York/Vale of Mowbray (e.g. Harding 2000) or the Milfield Basin of north Northumberland (Passmore and Waddington 2009)). They are typically free-draining with fertile, light and tractable soils and often provide ideal locales for settlement positioned above the river floodplain, but close to fresh flowing water. As these terraces typically lie on the margins of river channels they are also accessible by river transport, indeed they border the main arteries of communication both in the past and today. Sand and gravel areas are today prone to modern development, on account of their value as mineral but also because they are attractive areas for modern settlement, road and rail expansion, and being flat they have attracted a great many airfields up and down the country.

The area of landform 2a encompasses 11,941ha which represents only 3.63% of the total area of Derbyshire and the Peak District. Despite this, the sand and gravel terraces should be considered a significant and sensitive archaeological landform, and it must also be recognised that of all the landforms discussed as part of this project, the sands and gravels are one of the key landforms targeted for aggregates extraction. The significance of this landform as both a key source of aggregate, and as a focus of highly significant cultural heritage remains cannot be overstated, and the resolution of these two apparently conflicting statements must be the aim of minerals planning within Derbyshire and the Peak District.

5.3.1 Aerial Photograph Transcription Block 4

The aerial photograph transcription block 4 consisted of two separate areas covering the Trent Valley sand and gravel, effectively completing the entire National Mapping Programme coverage for this part of the Trent Valley. The two areas of aerial photograph transcription on landform 2d have a total area of 13,700 ha.

The aerial photograph transcription has highlighted a significant amount of prehistoric archaeology over and above that already known on the sand and gravel terraces including refinement of the scale and extent of the Neolithic cursus monuments, and discovery and mapping of ring ditches, linear field systems and potential settlement sites including probable round houses. As well as the extensive prehistoric remains mapped, it is possible that many of the enclosures and field systems may relate to the Romano-British period, which would expand our knowledge of this period within the Trent Valley. Extensive remains of medieval and post-medieval ridge and furrow have been mapped as upstanding earthwork remains though it has also been noted that there has been degradation of such sites through the twentieth century. Alongside some of the agricultural remains, the extent of some deserted medieval villages has been accurately mapped. An accurate record has also been made of many of the large modern sites including military bases and sand and gravel extraction sites.

One of the major outcomes of the mapping has been the increased resolution achieved in the transcription of known sites, perhaps the clearest example being the Potlock cursus discussed below. The new mapping has produced a much more accurate plot of the extent and alignment of this enigmatic monument (Fig. 5.3.3) which can now be clearly proven to extend beyond the original extent of mapping. Whilst the continuation of the monument has been known for some time (D. Barrett pers. comm.), this has never been accurately mapped.

Ring-ditch monuments are generally categorised as the remains of small funerary monuments dating to the Early-Mid Bronze Age, potentially analogous to the cairn monuments of the Peak District uplands. Ring-ditch monuments, however, have a long currency of use and not all can be clearly ascribed to this period. As is discussed further below, there is a ring ditch which appears to predate the Aston cursus, which would extend this tradition considerably, back into the Neolithic. Barrow burial was also practiced during the Anglo-Scandinavian portion of the early medieval period, as demonstrated by the excavated barrow cemetery at Heath Wood, Ingleby (Richards 2004).

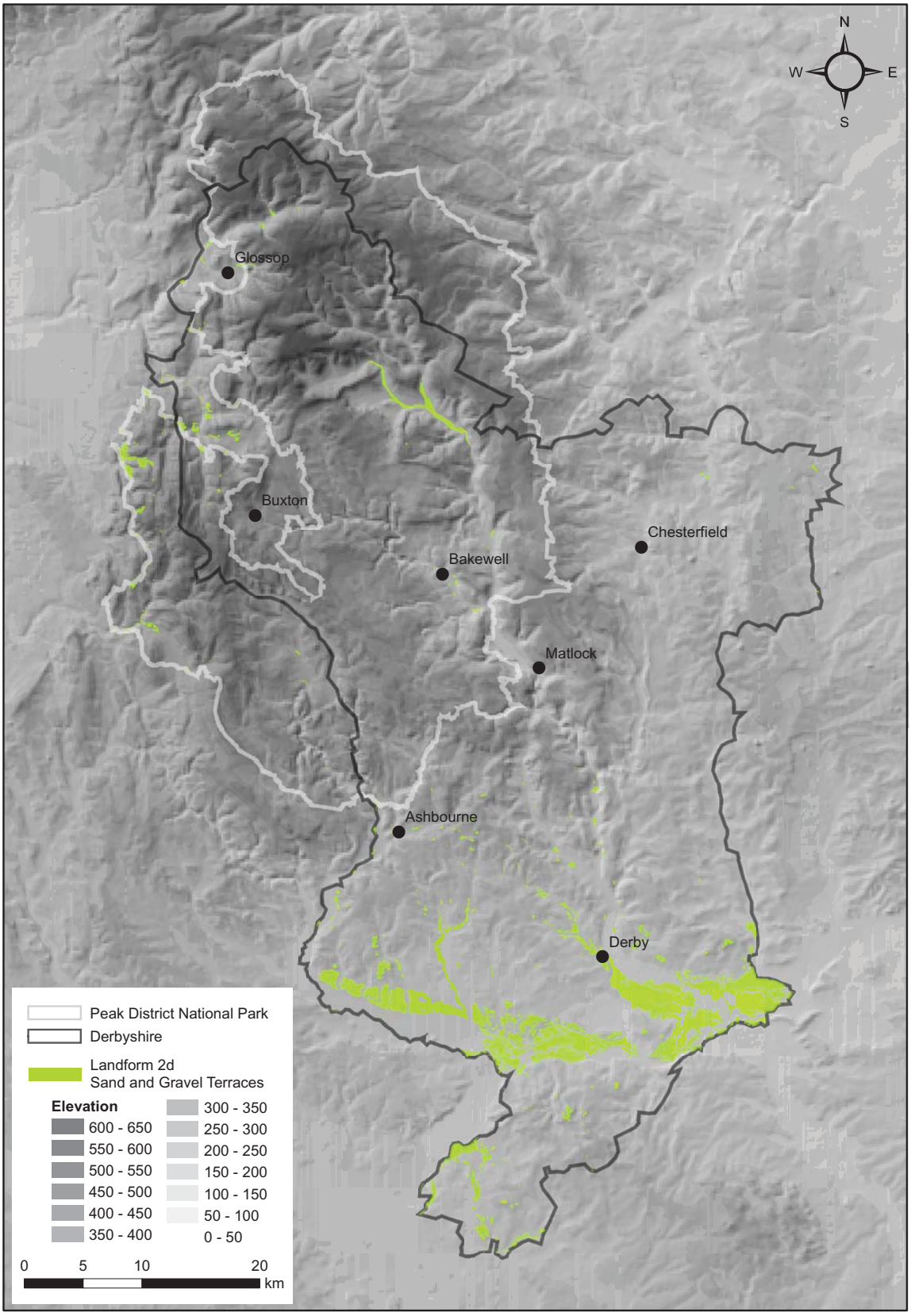

Figure 5.3.1 Location of landform 2a within Derbyshire and the Peak District.

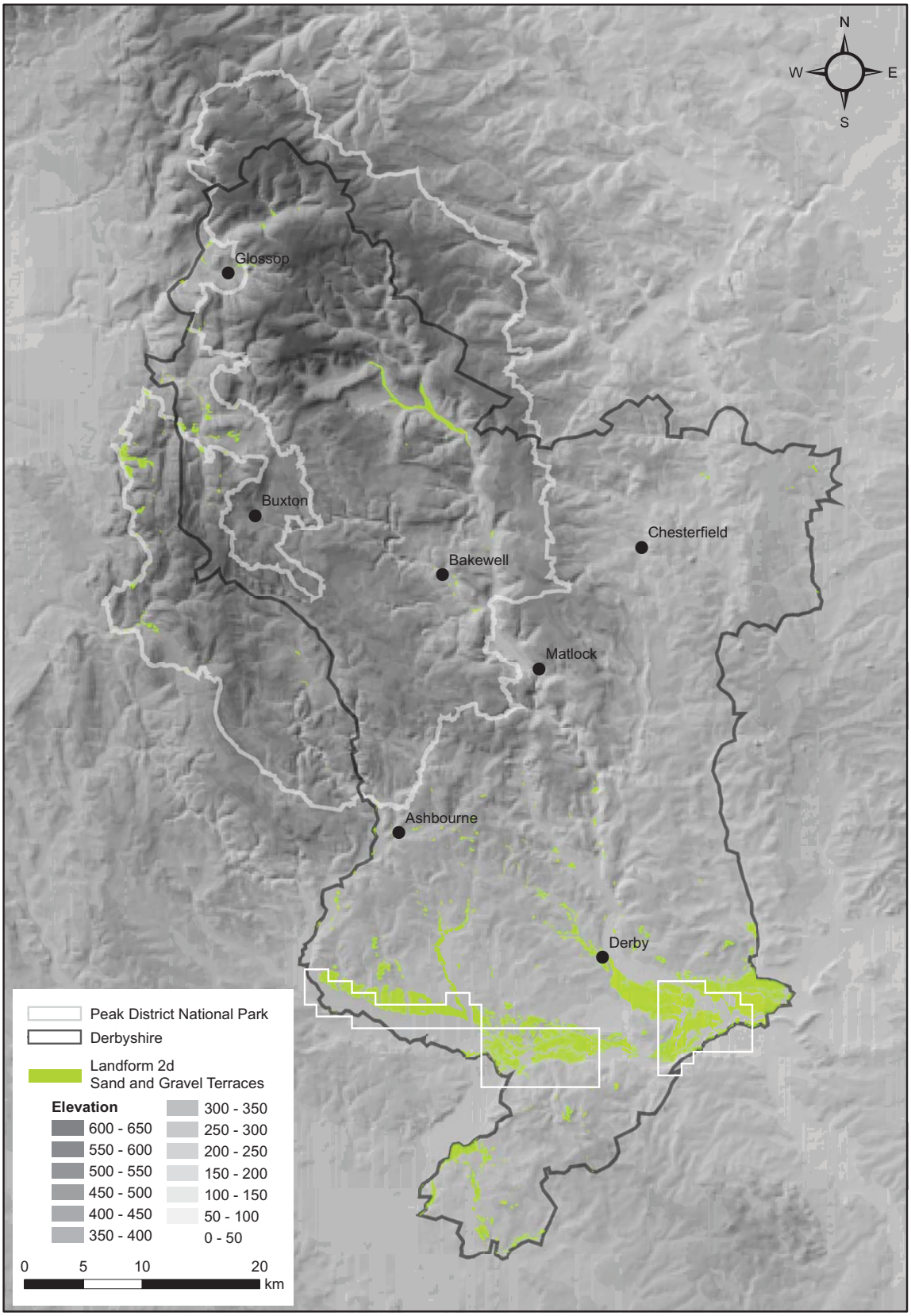

Figure 5.3.2 Landform map showing aerial photograph block 4

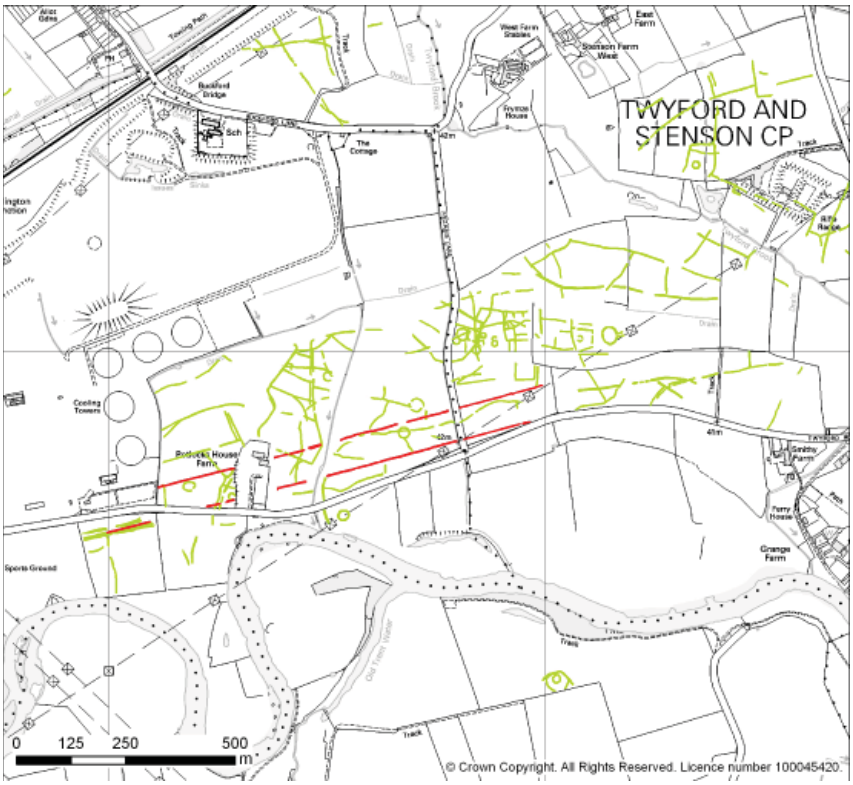

Figure 5.3.3 The Potlock cursus (marked in red) as it has been re-mapped following this project.

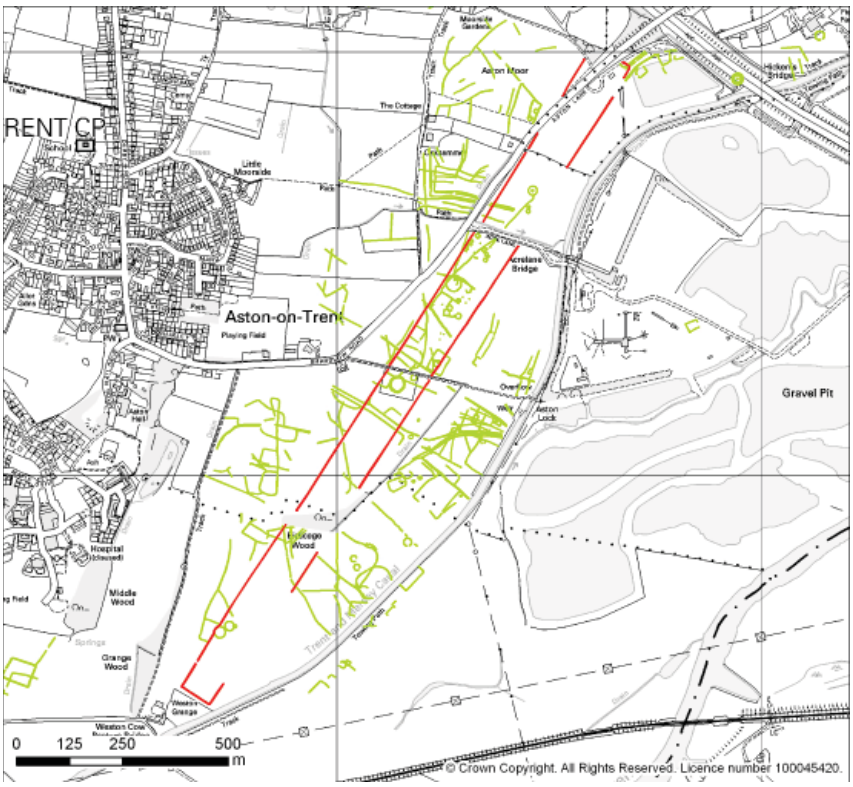

Figure 5.3.4 The wealth of cropmark evidence of prehistoric and probable prehistoric date east of Aston, with the transcription of the Aston cursus monument noted in red.

As is discussed below in the main analysis of archaeological associations, there are many linear boundary features and enclosures of varying forms known from the sand and gravel terraces that have been accurately mapped as part of this transcription exercise. Without a definitive morphology, it is difficult to ascribe these to a particular date, and in general these monuments are placed within the later prehistoric and Romano-British periods. A particular type of site already known from the Trent Valley sand and gravel terraces are pit alignments. Whilst these are generally characterised as being of late prehistoric date, there are examples known from both the Trent Valley and wider regions with a much wider chronological spread. There is a fuller discussion of these monuments in the chronological associations below. On the Trent Valley sand and gravel terraces there is also a substantial amount of linear boundary features and enclosures of unknown date. As with the pit alignments, these are discussed more fully in the chronological associations below.

As with other sand and gravel terraces, the Trent Valley is a fertile, free-draining and attractive place for agriculture through many periods. One of the most evident expressions of the fertile agriculture of this landform is the substantial amount of medieval and post-medieval upstanding ridge and furrow remains.

The modern impact on the Trent Valley is a notable one. Intensive land-use of the fertile river valley for agriculture, extraction and development invariably leads to the truncation of earlier remains. One of the clearest demonstrations of the impact of the modern era on the Trent Valley is illustrated below (Fig. 5.3.10). A large-scale depot and forces base from the Second World War has been mapped to the east of Hilton. This in itself will have had a major impact on this area of the sand and gravel terraces, but subsequently the base was largely removed and the area has been subsumed into the expanding development area of Hilton.

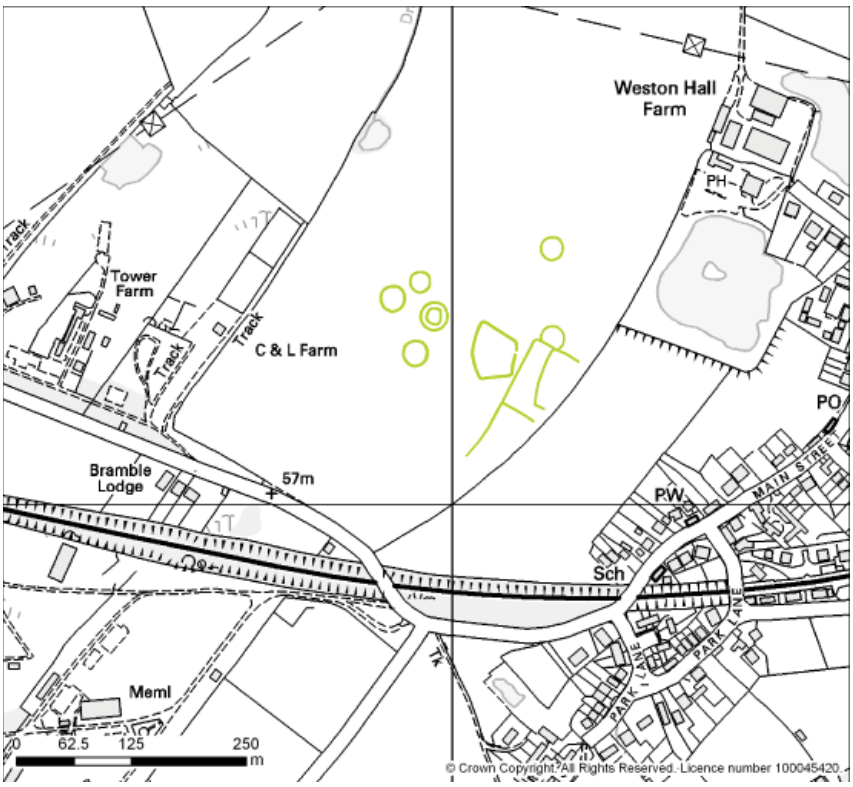

Figure 5.3.5 Grouping of ring ditch monuments to the west of Weston upon Trent.

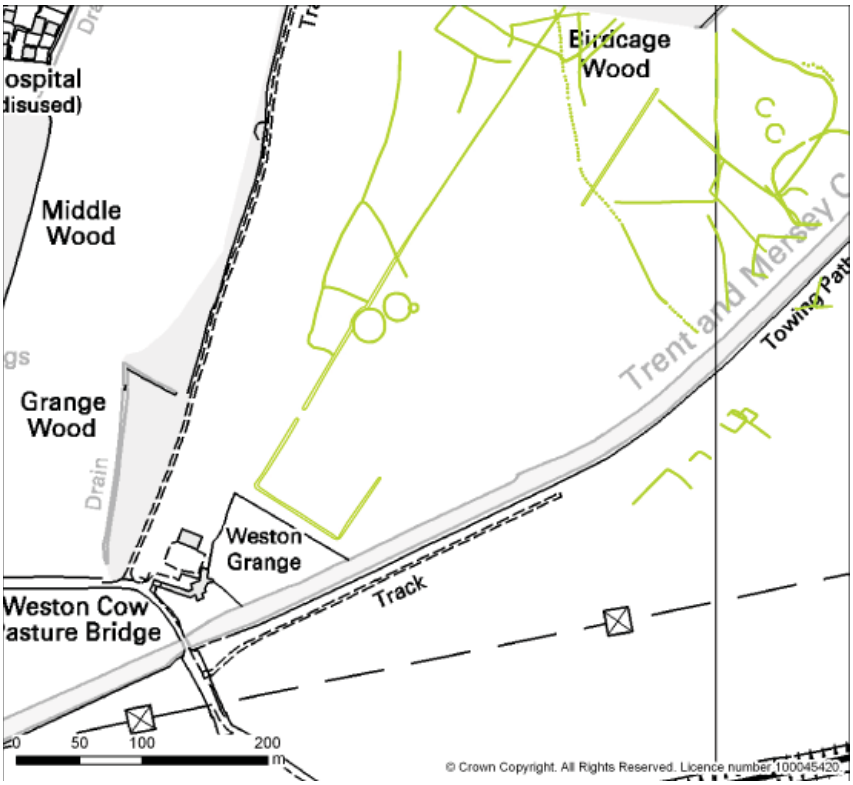

Figure 5.3.6 A number of ring ditches can be seen within and around the Aston Cursus. In the centre of the illustration, the cursus monument respects a pre-existing ring ditch, illustrating the fact that some of these monuments date back to the Neolithic period.

Figure 5.3.7 A series of linear boundaries and land divisions along with rectilinear and sub-circular enclosures in the vicinity of the Potlock cursus west of Twyford.

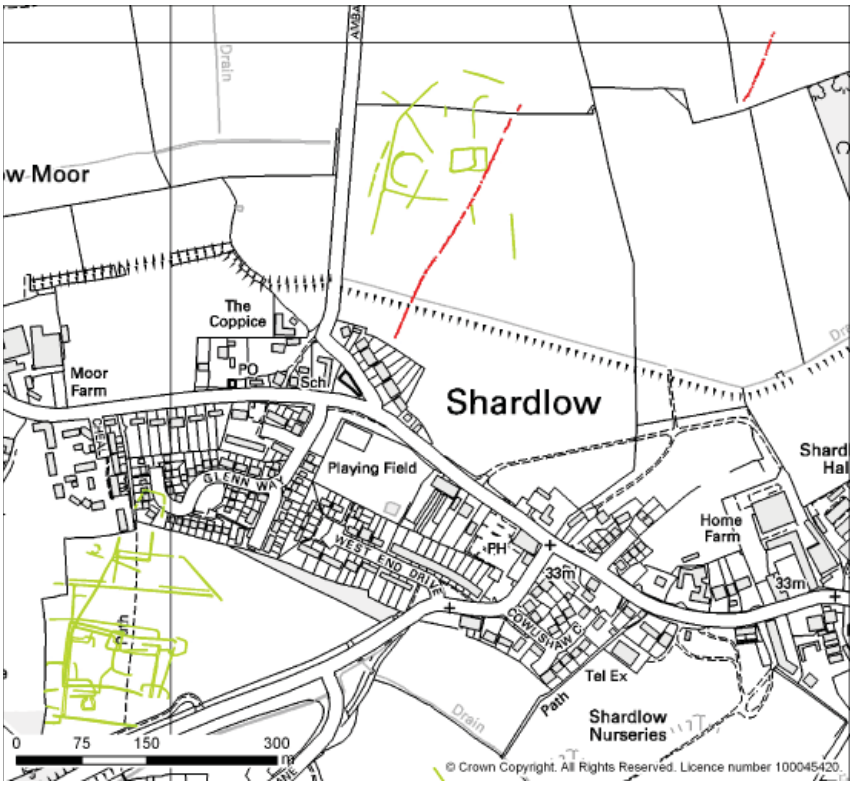

Figure 5.3.8 Pit Alignments to the north of Shardlow village (shown in red).

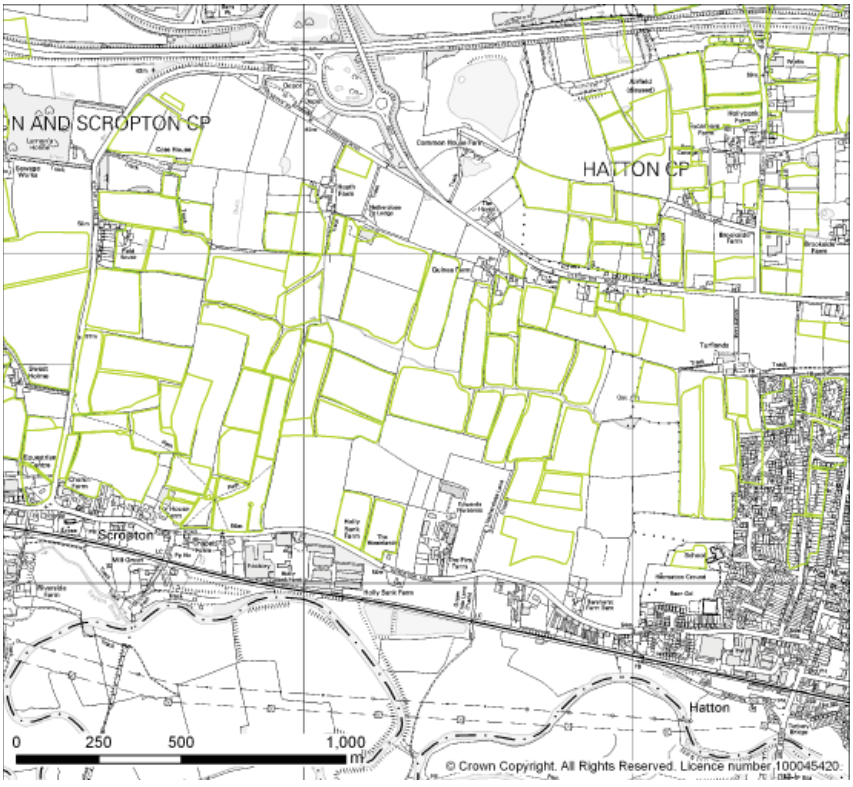

Figure 5.3.9 Extensive ridge and furrow field systems to the east of Scropton in the western reaches of the Derbyshire Trent Valley.

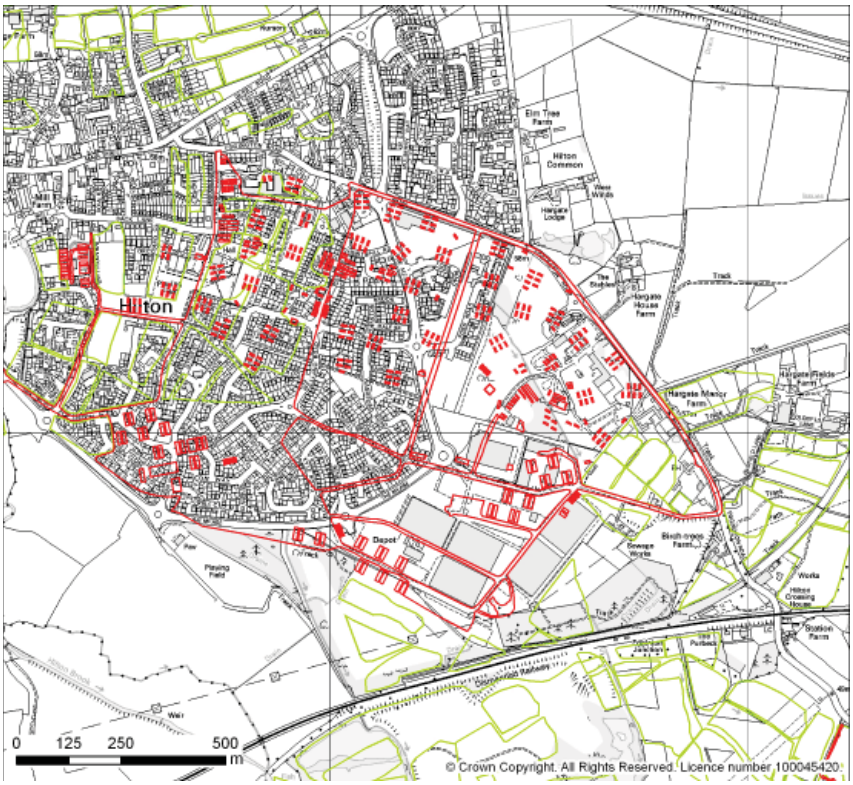

Figure 5.3.10 A large World War II military base and depot in the Trent Valley (shown in red), now almost completely subsumed within the modern town of Hilton. This aptly demonstrates the rapidly changing nature of the sand and gravel terrace landscape even over the few generations since the Second World War.

5.3.2 Archaeological Associations (chronological)

The sands and gravels host 1320 HER entries and 707 NMR entries of which 1173 are duplicated giving a total number of known archaeological and historical sites of 855 within the combined lists. The breakdown of the sites within this combined list is presented in Table 5.3.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 2d hosts a total site ratio of 7.16 sites per 100 hectares. This density is only narrowly higher than the average for Derbyshire and the Peak District as a whole (6.54 site per 100ha), though this should not be taken as indicative of relative importance. Many of the known sites on the sand and gravel terraces are either large sites which only count as one single entry and therefore skew the overall density, or are monuments unique to this landform such as the known cursus monuments. Unique monuments such as the cursuses or the monuments in the Catholme complex in Staffordshire (Buteux and Chapman 2009) give this landform a special archaeological significance over and above the stated density (see also Research Agenda – Chapter 7).

One of the key reasons why the numbers of sites for so many periods on the sand and gravel terraces are depressed is that there is very low potential generally for upstanding remains to survive on these land surfaces due to the widespread and long history of cultivation which in many cases has included deep as well as shallow ploughing resulting in heavy truncation of remains. Deeply cut large features survive relatively well and tend to have a high level of visibility on aerial photographs but small, ephemeral and dispersed remains are difficult to evaluate or prospect for. Some of the rarest forms of archaeological remains such as small dispersed cut features dating to the Neolithic or Bronze Age are more prevalent on the sand and gravel terraces than on other landforms, and in such cases, strip, map and sample represents the best, and often the only, archaeological technique to identify and record such remains.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**4**	**0.03**	**0.12**	**0.47**
Findspot	1	0.01	0.0611	0.12
Gravel Pit Assemblage	2	0.02	0.0006	0.23
Lithic Scatter	1	0.01	0.0456	0.12
Neolithic	**16**	**0.13**	**0.24**	**1.87**
Cursus	2	0.02	0.0009	0.23
Findspot	9	0.08	0.1216	1.05
Henge	1	0.01	0.0009	0.12
Ring Ditch	1	0.01	0.0003	0.12
Settlement Sites	3	0.03	0.0027	0.35
Bronze Age	**31**	**0.26**	**0.4**	**3.63**
Barrows/Cairns	14	0.12	0.3019	1.64
Cropmark Cremation Cemetery	2	0.02	0.0021	0.23
Cropmark Enclosure	3	0.03	0.021	0.35
Findspots	11	0.09	0.1146	1.29
Standing Stone/Stone Circle	1	0.01	0.0155	0.12
Iron Age	**23**	**0.19**	**0.05**	**2.69**
Findspot	3	0.03	0.021	0.35
Pit Alignment/Cropmark Enclosure	18	0.15	0.0106	2.11
Rectilinear Enclosure	1	0.01	0.0091	0.12
Settlement	1	0.01	0.0003	0.12
Romano British	**42**	**0.35**	**0.43**	**4.91**
Building/Farmstead	2	0.02	0.0036	0.23
Enclosures/fields/settlements	1	0.01	0.0565	0.12
Findspots	14	0.12	0.1572	1.64
Fort and vicus	1	0.01	0.0021	0.12
Possible fortlets	2	0.02	0.0027	0.23
Roads and associated sites	22	0.18	0.0945	2.57
Early Medieval	**14**	**0.12**	**0.08**	**1.64**
Burial/Barrow	0	0	0.0109	0
Church	3	0.03	0.0024	0.35
Enclosure	0	0	0.0012	0
Findspot	4	0.03	0.0219	0.47
Sculpture	4	0.03	0.0106	0.47
Towns/settlements	3	0.03	0.0067	0.35
Trackway/Boundaries	0	0	0.003	0
Medieval	**275**	**2.3**	**1.1**	**32.16**
Artefact Scatter	1	0.01	0.0018	0.12
Church/Religious Buildings	24	0.2	0.0897	2.81
Sculpture/Wayside crosses etc	10	0.08	0.0377	1.17
Cemetery	1	0.01	0.0006	0.12
Deer Parks/Parks	7	0.06	0.0423	0.82
DMVs	7	0.06	0.0353	0.82
Enclosures/Field Systems	183	1.53	0.3329	21.4
Findspots	4	0.03	0.0872	0.47
Iron Foundry	1	0.01	0.0255	0.12
Manor House/Farmstead	15	0.13	0.0973	1.75
Motte	2	0.02	0.0055	0.23
Other Buildings	5	0.04	0.003	0.58
Pit Alignments	3	0.03	0.0009	0.35

Ponds, fishponds	3	0.03	0.0097	0.35
Quarrying/Mining Remains	2	0.02	0.0255	0.23
River Revetments	1	0.01	0.0012	0.12
Roads/Tracks	2	0.02	0.017	0.23
SMVs	4	0.03	0.0219	0.47
Post Medieval-Modern	**321**	**2.69**	**3.39**	**37.54**
Agricultural buildings /Field Systems	42	0.35	0.3776	4.91
Battlefield	1	0.01	0.0009	0.12
Canals and associated	10	0.08	0.0237	1.17
Enclosures	2	0.02	0.0295	0.23
Findspots	2	0.02	0.0313	0.23
Gardens/Parks/Lakes/Ponds	7	0.06	0.0684	0.82
Halls/Large Houses	15	0.13	0.08	1.75
Industrial Sites/Foundries/China Works	12	0.1	0.038	1.4
Other Mills and Factories	33	0.28	0.1839	3.86
Quarrying/Mining/Clay Extraction	22	0.18	0.3566	2.57
Railway Lines/Buildings	28	0.23	0.3049	3.27
Religious Buildings	28	0.23	0.1541	3.27
Roads/Tracks/Boundaries	10	0.08	0.1918	1.17
Sportsground	1	0.01	0.0033	0.12
Other Buildings	104	0.87	0.4207	12.16
Wells/Pumps/Fountains	4	0.03	0.0295	0.47
Multiperiod Remains	**1**	**0.01**	**0.37**	**0.12**
Artefact Scatters	1	0.01	0.017	0.12
Unknown Date	**128**	**1.07**	**0.47**	**14.97**
Enclosures/Earthworks/Cropmarks	127	1.06	0.1523	14.85
Findspots	1	0.01	0.156	0.12
Standing Stone/Circle	0	0	0.0064	0
TOTAL SITES	**855**	**7.16**	**6.54**	**100**

Table 5.3.1 Breakdown of all sites on sands and gravels by period and site type.

5.3.2.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

The combined HER and NMR lists reveal few Palaeolithic and Mesolithic archaeological finds and sites, which is evidently not a true indication of the potential of the sand and gravel landforms to host such remains, as they have been shown to be the main foci of such activity in other areas where concerted fieldwalking campaigns have been undertaken (e.g. Mulholland 1970; Passmore and Waddington 2009). The two entries characterised on this table as 'gravel pit assemblages' are single entries within the HER relating to a volume of material from two separate gravel quarries, principally comprising Palaeolithic hand axes. Mesolithic flint assemblages are known from a number of sites on the sands and gravels as residual within later feature fills, but where no Mesolithic structural features have so far been recognised. Examples of such sites include Swarkestone Lowes (Elliott and Knight 1999), Willington Quarry (Wheeler 1979; Beamish 2009) and Mercia Marina, Willington (Brightman and Waddington forthcoming).

Swarkestone Lowes sits on a raised gravel island to the north of the River Trent and is a multi-period site containing a Bronze Age barrow cemetery preceded by Early Neolithic settlement remains (Posnansky 1955; 1956; Greenfield 1960), late prehistoric and Romano-British features (Losco-Bradley 1993; Elliott and Knight 1999, see discussion below), and also a substantial assemblage of Early Mesolithic material (Elliott and Knight 1999, 91). The material recovered was of characteristic broad-blade form and included end scrapers and blades knapped from both locally-derived flint from the gravels, local cherts and Wolds-type flint, potentially indicating a widely roaming territorial group (Elliott and Knight 1999, 91). At Willington Quarry, the lithic assemblage was largely post-Mesolithic, though it did contain Later Mesolithic cores indicating tool manufacture on site (Saville 1979, 143). At Mercia Marina, there was a smaller total assemblage than from the other two sites noted, but a substantial portion dated to the Mesolithic

period supporting the picture of hunter-gatherers using the sand and gravel terraces (Brightman and Waddington forthcoming).

Perhaps the key potential of the sands and gravels to host Palaeolithic remains lies with those deposits and finds which may exist sealed within the sediment body. Palaeolithic hand axes known from gravel workings demonstrate that Palaeolithic artefacts can be carried in the sands and gravels, suggestive of very early human activity further up catchment (see also Research Agenda – Chapter 7). More significantly, there is the potential for earlier gravel terraces to exist within the sediment body which preserve Palaeolithic in situ remains as has been noted at Farndon in Nottinghamshire further down the Trent Valley (Garton and Jacobi 2010).

5.3.2.2 Neolithic (3900 – 2200BC)

As with the Palaeolithic and Mesolithic remains, the raw volume of Neolithic finds and sites within the HER and NMR lists does not relate to the potential of the sand and gravel terraces to host Neolithic remains of great significance. Neolithic sites defined by midden pits and post-built structures are rare and only a decade ago, there were few known across Britain. The fact that there are now a number of such sites known in the Derbyshire portion of the Trent Valley (e.g. Willington Quarry (Wheeler 1979; Beamish 2009), Hill Farm, Willington (Hughes and Jones 1996), Mercia Marina, Willington (Brightman and Waddington forthcoming)) is highly significant for Neolithic studies and shows this is clearly a major focus for Neolithic settlement as well as the ritual activity associated with the cursus monuments among others, and also funerary activity shown by the proliferation of ring ditches, some of which date to the Neolithic. It can also be extrapolated from other substantial sand and gravel expanses such as the Thames Valley (Fulford and Nichols 1992), the Vale of Mowbray/Vale of York in North Yorkshire (Harding 2000) and the Milfield Basin in Northumberland (Passmore and Waddington 2009) that the free-draining and fertile gravel terraces of the Trent Valley are likely to be a key focus for Neolithic settlement.

There are a number of major Neolithic ceremonial monuments on the Trent Valley sands and gravels which indicate that the Middle Trent Valley formed a key focus for ceremonial activity and the coming together of surrounding communities to carry out ritual and worship at communal monuments. This area is conspicuous as there are two major tributaries within this section of the Middle Trent Valley, those of the Dove and Derwent, and each of these confluences appears to have attracted ceremonial monuments to their vicinity. This could be associated with these places forming the areas where dispersed groups from different valley reaches could easily meet. Two important sites include rare northerly examples of cursus monuments at Potlock and Aston. Both cursuses are situated among a crowded area of other cropmarks with the Aston cursus overlain by presumably late prehistoric linear features (Loveday 2006, 43).

A key feature of the Aston cursus is that the one of the cursus' ditches respects an earlier ring ditch monument (Fig. 5.3.11) (Gibson and Loveday 1989) which has implications for both the construction of the cursus and more importantly the age of ring-ditch monuments, of which there are many known across the Trent Valley. The majority of ring ditches identified through aerial photography are ascribed a presumed date largely contemporary with the Later Neolithic-Early Bronze Age monuments of the uplands. This picture has been partially confirmed through excavation of a handful of such monuments such as those at Mercia Marina, Willington where radiocarbon dates were obtained from the fill of a small ring ditch suggesting contemporaneity with Early Bronze Age post-built structures and cremations on the site (Brightman and Waddington forthcoming). Cursuses are broadly a phenomenon of the Early to Middle Neolithic and at Aston it is clear that the ring ditch predates the cursus monument indicating an early, and possible primary, Neolithic date. There is an important need to gain a better understanding of the date range, form and function of ring ditch monuments on the sand and gravel terraces of the Trent Valley, as the crop mark evidence still remains poorly understood overall. Limited excavation was undertaken on the ditches of the Potlock/Findern cursus by Oxford Archaeology during larger investigations though no datable material was recovered (2006).

Settlement remains broadly contemporary with the cursus monuments have not been widely recognised, though midden pits containing diagnostic Early Neolithic Carinated Bowl pottery are known from Mercia Marina, Willington, close to the Potlock cursus (Brightman and Waddington forthcoming) and from Willington Quarry (Wheeler 1979). While no structural remains dating to the Early Neolithic were identified on this site, it is likely that where these remains exist they take the form of ephemeral and truncated post-built structures similar to those identified at Lismore Fields in the Peak District uplands (Garton 1991). Midden pits containing Early Neolithic Carinated Bowl, such as those from Mercia Marina, have also been identified at Willington Quarry (Manby 1979, 146) and from within the

Figure 5.3.11 Aerial photograph of the Aston cursus respecting the line of an existing ring ditch monument. (CUCAP BCL21 25-JUN-1970 © ULM).

Aston cursus beneath a later Beaker period barrow (Gibson and Loveday 1989), though there is no clear functional relationship suggesting the cursus is contemporary. A similar form of pit containing the then first known example of Early Neolithic Carinated Bowl in Derbyshire was excavated beneath one of the Early Bronze Age barrows at Swarkestone Lowes (Greenfield 1960). It is evident that there is a tradition of Early Neolithic settlement within the Trent Valley but these remains are often found amongst later features as the typical dispersed midden pits in which it occurs are very difficult to prospect for. They do not generally show as cropmarks, they are not large enough to register on geophysical surveys and if evaluation trenches land on them this is usually more by chance than design. A method that has been used for identifying areas of potential Neolithic settlement, however, is close-spaced fieldwalking which has the advantage of allowing small and tight clusters of flintwork to be identified and, with it being a rapid technique, large areas can be examined and compared and contrasted. However, the main way in which such sites are found both in the Trent Valley and across England generally is by large open area surface stripping, as in the case of Willington Quarry and Mercia Marina. Adjacent to, and incorporating parts of, the Mercia Marina site, earlier excavations at the Hill Farm site also found Neolithic midden pit remains indicative of settlement, though in this case the predominant pottery type identified was Early-Middle Neolithic Impressed Ware (Hughes and Jones 1996).

Until the most recent excavations at Swarkestone Lowes (Elliott and Knight 1999), this site was best known as an Early Bronze Age barrow cemetery. Excavations in the mid-20th century (Posnansky 1955; 1956; Greenfield 1960) illustrated that there were inhumations and cremations dating to the Early Bronze Age as well as the strong possibility of early medieval re-use of the barrows. The reason why the discussion of this site is included here is that Greenfield (1960) also identified Beaker-period postholes and pits underlying one of the barrows suggestive of settlement activity on the site prior to its construction. Coincidence of domestic and funerary remains on one site is not unusual for the Early Bronze Age, with the same pattern noted at Mercia Marina, Willington (Brightman and Waddington forthcoming) and also in the Bronze Age remains of the gritstone East Moors (Barnatt 1999). Later Neolithic-Early Bronze Age (Beaker period) settlement evidence is rare and significant.

Extensive investigations have been undertaken on a portion of the Trent further upstream at the confluence where the rivers Mease and Tame flow into the Trent. This work was undertaken as part of an Aggregates Levy Sustainability Fund project entitled 'Where Rivers Meet' and the majority of the significant archaeological remains investigated belonged to the Late Neolithic and Early Bronze Age periods of the Catholme monument complex (Buteux and

Chapman 2009). The 'Where Rivers Meet' Project focussed on an area which lay largely within Staffordshire, but it is a site of major importance in the overall story of the Trent Valley sand and gravel terraces and so is relevant in predicting the significant archaeological associations throughout Derbyshire. The study area for the 'Where Rivers Meet' Project contained a number of distinctive monuments giving a relatively complete continuity of use through the Neolithic and into the Bronze Age. Four cursus monuments, of which three are sizeable examples, along with a possible bank barrow sitting at a low altitude just above the flood plain represent the earlier Neolithic activity in the area (Buteux and Chapman 2009, 64). The later Neolithic Catholme Ceremonial Complex is perhaps the most intriguing as there are two monuments recorded which are unique in this region and defy easy classification. The 'Sunburst Monument' comprises a 2m wide ring ditch enclosing a central pit with twelve rows of pits or post pits radiating out from the central point (Buteux and Chapman 2009, 68). Dates from the fill of the internal ditch date the monument to c. 2500 cal. BC (2580-2450 cal. BC, SUERC-11072; 2620-2460 cal. BC, OxA-16052) (Buteux and Chapman 2009, 71). The 'Woodhenge Monument' comprises 39 radiating lines of post-pits which form five concentric rings similar in form to Woodhenge near Avebury (Buteux and Chapman 2009, 73). A suite of radiocarbon dates was obtained, and the modelling of these dates suggested a construction date of 2550-2480 cal. BC at 68% confidence (Buteux and Chapman 2009, 74) suggesting a contemporaneity between the two monuments. The importance of the Catholme Ceremonial Complex lies in the fact that it reinforces the importance of the Trent Valley sand and gravel terraces during the Neolithic and Bronze Age as a focus of ritual and ceremonial activity as well as a focus of settlement. Sites such as these are incredibly rare and can provide much important information.

The Trent Valley maintains its focus as a centre for ritual and ceremonial monuments into the Later Neolithic-Early Bronze Age, as evidenced by the Twyford henge monument. This henge has been accurately mapped as part of this project, and is roughly equivalent to the Bull Ring henge on the Carboniferous Limestone (see chapter 4.1). Significant complexes of henge monuments are known from other sand and gravel river valleys in the north of England such as the Thornborough complex in the Vale of Mowbray/Vale of York (Harding 2000) or the Milfield henges in north Northumberland (Passmore and Waddington 2009). Perhaps the most important feature of the Twyford henge is that a later barrow sits within the centre of the now ploughed-flat earlier monument. The continuity of use of such a monument further illustrates the potential significance which the sand and gravel landscape has as a centre of ceremonial activity.

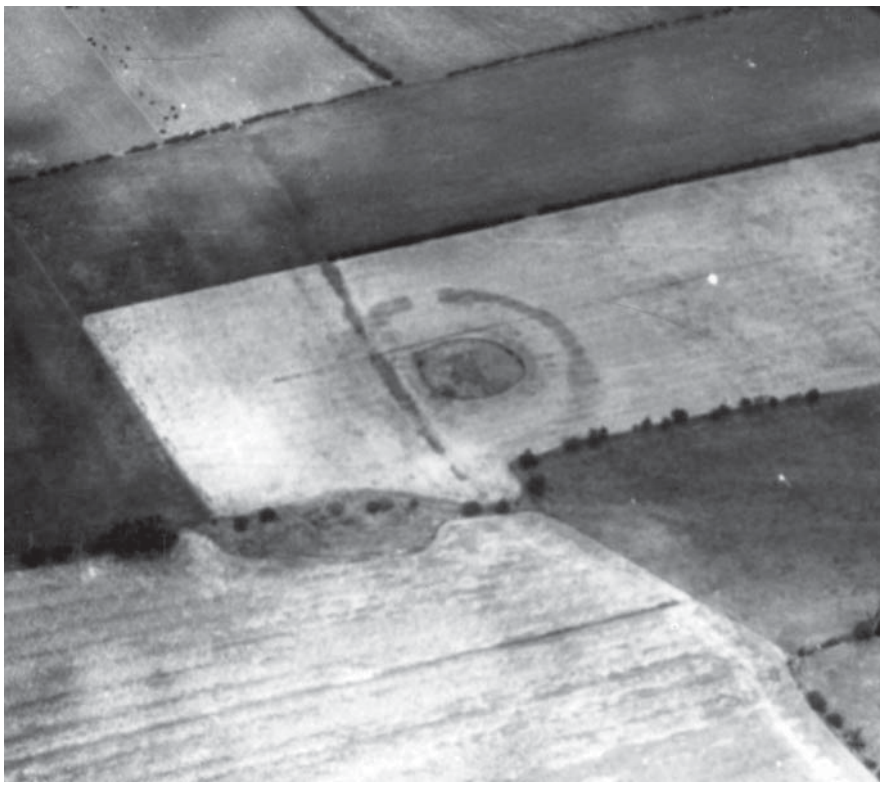

Figure 5.3.12 The Twyford Henge and round hill barrow within the centre.
(SK 3328/34 4380/N33 19-JUN-1990 © Crown copyright. NMR).

All of the known individual Neolithic single findspots recorded within the HER and NMR are stone axeheads. These finds have either been made as chance finds during development, such as from the road construction of the Allestree link road, or new development in the locale of the Long Eaton cemetery, or from ploughed fields generally on the lower gravel terraces in river valleys such as by the River Noe in Hope or the River Trent in Sawley.

5.3.2.3 Bronze Age (2200 – 700BC)

There are a number of key sites relating to the Bronze Age for the Trent Valley sand and gravel terrace landform. These sites are all multi-period but with substantial amounts of Bronze Age remains. The Mercia Marina site, near Willington (Brightman and Waddington forthcoming), contained the remains of four post-built structures, one circular and three more-enigmatic triangular structures with samples from all but one of the triangulars returning Early Bronze Age dates. Accompanying these was a substantial ring ditch and a penannular ring ditch close to at least one cremation pit. The cremation pit appeared to have had three separate phases of use, all relating to the Early-Mid Bronze Age. Radiocarbon dates illustrated that the primary fill of the pit dated to 1890-1690 cal. BC (3465±25 bp, NZA 30351) and the secondary cremation dates to 1610-1430 cal. BC (3235±30 bp, NZA 30238) (Brightman and Waddington forthcoming). Middle Bronze Age Deverel Rimbury pottery was also recovered from a nearby lower terrace (Brightman and Waddington forthcoming). Earlier evaluation work which encompassed part of the Mercia Marina site also recovered Early Bronze Age pottery from posthole fills, which equates well with the later excavations and dating (Hughes and Jones 1996).

At Willington Quarry, a major assemblage of pottery was excavated providing a reasonably complete sequence through the Late Neolithic and Early Bronze Age (Manby 1979). Though these finds were associated with a series of cut features including pits and postholes, there were no clear post-built structures identified (Wheeler 1979, 78). In light of the ephemeral, truncated triangular post-built structures from nearby Mercia Marina (Brightman and Waddington forthcoming), the possibility should not be discounted that Bronze Age post-built structures existed on the site but were masked by later features or truncated by later agriculture. However, the dense spread of pits and post holes on the Willington Quarry site meant that it was hard to identify patterning in the mass of postholes let alone identify which pits could belong to any one period.

The formation of cropmarks on sands and gravels is generally very good, and as discussed in the section above, there are substantial amounts of cropmarks both already known and that have been recorded as new and amended sites as part of this project. The HER and NMR lists record 14 barrows or ring ditches on the sand and gravel landform, though a number of these are within the Swarkestone Lowes site discussed above. Most of the known ring ditches sit on the gravel terraces relatively close to the river though some are found on raised ground above the valley floor such as the Blakelow Farm barrow at Burntheath. Barrows and ring ditches where excavated have shown to have a great variety of form and a long currency of usage as a monument type (Clay 2006, 81).

5.3.2.4 Iron Age (700BC – AD43)

On the sands and gravel terraces, the principal form of known Iron Age remains are cropmark enclosures, pit alignments and field systems, though few of these have been clearly demonstrated to be of Iron Age date and such an attribution has rested more on assumption than by demonstration. A more definite chronology is required and testing of such cropmarks by targeted radiocarbon dating remains an important research priority. Pit alignments are known from the gravel terraces near Barrow upon Trent and a number from north-east of Willington, including the excavated Mercia Marina alignment (Brightman and Waddington forthcoming). Other excavated pit alignments are known from Aston Hill (Abbott and Garton 1995) and Swarkestone Lowes (Elliott and Knight 1999). Following the review of pit alignments by Waddington (1997), pit alignments remain an enigmatic monument class though they are clearly an important part of the landscape and can date from the Neolithic through to early medieval periods. Further work is needed to produce some kind of chronological framework for this monument class in the Trent Valley and to gain a more in-depth understanding of the morphology of such sites and their variety. The ambiguity of dating such sites has been highlighted by the excavation of a pit alignment at Holme Pierrepont (Guilbert 2007) which has been demonstrated to be clearly post-medieval in date despite being very similar to late prehistoric pit alignments. Further afield, Mesolithic pit alignments are known from Crathes in Aberdeenshire (Murray et al2009) and Neolithic alignments at Eweford East in Lothian (Shearer and McLellan 2008).

Figure 5.3.13 Bronze Age cremation vessel recovered from a multi-phase pit at Mercia Marina, Willington.

Figure 5.3.14 The 1971 excavations at Willington Quarry (Wheeler 1979).
(SK_2827_57 30-07-1971 © English Heritage. NMR).

A substantial number of linear features and enclosures identified through aerial photography have been ascribed a late prehistoric date (see also Research Agenda – Chapter 7). As with other periods, there are a number of key sites which illustrate the often-complex and multi-period archaeology of the sands and gravel terraces. At Swarkestone Lowes a cropmark complex of late prehistoric date was investigated (Elliott and Knight 1999). The complex consisted of a small sub-circular ditched enclosure, two parallel pit alignments (noted above), the remains of a post-built roundhouse, and a later large curvilinear ditch which appeared to describe the limits of the site on the top of a notable gravel island (Elliott and Knight 1999, 79). A similar unenclosed late prehistoric settlement formed part of the archaeological remains from Willington Quarry (Wheeler 1979). The Willington Quarry remains were split through association with two typologically different styles of late prehistoric pottery into an early phase, probably dating to the Late Bronze Age-Early Iron Age, and a later phase dating to between the fourth and first centuries BC (Wheeler 1979, 78). Both phases consisted of post-trench roundhouses, pits, hearths and linear boundary features, though the roundhouses were unenclosed unlike the broadly contemporary site at Fisherwick, Staffordshire (Smith 1979).

The Mercia Marina site noted above also contained a substantial number of linear features, with those on the lower terraces close to the canal forming a coherent division of the landscape that appeared to incorporate a pit alignment as part of the complex (Brightman and Waddington forthcoming). Although no dates were obtained from these features, the form suggests contemporaneity with the other excavated examples of late prehistoric boundary features in this area of the Trent Valley and are therefore thought most likely to be Iron Age in date. This tallies well with the investigation of a number of linear ditch features to the south of the river at Willington Power Station by Oxford Archaeology (2006) which dated the fills of a number of linear features to the Late Bronze Age and Iron Age through association with finds. It is important to note here that dating of boundary features is notoriously difficult. Ditches and pits are difficult to date as organic samples within them could have arrived in the fill as residual material and what is required, ideally, is organic material structurally related to the boundary feature, such as the stumps of timber posts or discarded organic tools or other artefacts that can be dated, or in situ burnt deposits. The only other way is to take multiple dates from any given pit or linear fill context and model the dates statistically to test which, if any, are likely to be residual, and so arrive at a probability of the date being associated with the use of the boundary.

Figure 5.3.15 Pit alignments visible across in the centre of the photograph describing a linear route and in-turned trackway. (SK_3428_38 19-06-1990 © English Heritage. NMR)

5.3.2.5 Romano-British (AD43 – 410)

The majority of known Roman sites on the sands and gravels are accounted for by the Roman road network which both crosses the landform, but also makes use of the natural routeways provided by the river valleys. The roads, and also the other known Roman sites, cluster around two known Roman period centres – the fort of Navio at Brough-on-Noe and Roman Derby, specifically the fort and vicus of Derventio at Little Chester on the banks of the River Derwent. Three finds of Roman coins add to the picture of Little Chester and the region around modern Derby as a major centre during this period. At Brough, the fort itself stands on areas categorised as landform 1g shale but a substantial amount of the vicus sits on the sands and gravel terraces above the river to the north of the fort itself (Dearne 1993). The vicus at Brough is of considerable size and represents one of the largest excavations of a vicus site anywhere in the Roman Empire (Dearne 1993).

The most substantial Romano-British farmsteads so far known on the sands and gravels are two farmsteads known from the multi-period Willington Quarry site (Wheeler 1979). Farmstead 1 overlay the Iron Age features noted above and consisted of three phases of Romano-British farming activity, including a series of rectilinear enclosures and pottery diagnostic of the first century AD, before falling out of use (Wheeler 1979, 105-7). The second farmstead was similar in form, including rectilinear enclosures and individual rectilinear compounds, and it was clear that this farmstead was in use at least during the third century AD, again through dating of diagnostic pottery (Wheeler 1979, 110-1).

With both the Iron Age and the Roman periods, it is likely that the relatively low number of sites in the HER and NMR is not a true reflection of the rich potential of the sand and gravel landform to host archaeological remains from these periods. The substantial number of undated cropmark sites which are tentatively dated to the general late prehistoric period suggest that our knowledge of this period and the list of definite sites will grow as these sites are investigated. Indeed it is suggested that sites from the Middle Bronze Age through to the Roman period may currently be largely invisible in the archaeological record (Dave Barrett pers. comm.). This has been a feature of the sand and gravel terraces elsewhere, as in the Milfield Basin for example, until large-scale strip, map and sample conditions has started revealing a consistent pattern of timber post-built roundhouses dating to the middle and Late Bronze Age, together with Iron Age burials, none of which would be identifiable from the typical suite of archaeological prospection techniques. It is likely that such remains exist across the sand and gravel terraces of the Middle Trent Valley but they are only likely to come to light as a consequence of large-scale area stripping and assiduous monitoring and mapping by experienced field archaeologists as such remains tend to be ephemeral and difficult to recognise in sands and gravels that wet and dry differentially, thus making spotting small and dispersed archaeological remains challenging. To the previously-recognised remains, Iron Age and Roman ditched enclosures at Swarkestone Quarry and Chapel Farm can be added (D. Knight pers. comm.) and the publication of these sites will provide further elucidation to this period in the Trent Valley.

5.3.2.6 Early medieval (AD410 – 1066)

The most thoroughly excavated remains relating to the early medieval period are those from Willington Quarry (Wheeler 1979). A small early medieval settlement was uncovered lying predominantly on the sands and gravels. The Willington Quarry site has already been noted above a number of times as it yielded significant multi-period archaeology on an attractive terrace location in the fertile Trent Valley. The coincidence of Neolithic and early medieval archaeological remains on the same site is something which has been recognised in other areas of England (Passmore and Waddington forthcoming) and is a subject that requires further analysis. The early medieval remains from Willington Quarry took the form of three dispersed Grubenhäuser or sunken featured buildings and a potential post-built structure (Wheeler 1979, 125). Whilst occasionally visible on aerial photography, Grubenhäuser are relatively small and often do not show up on aerial photography and are not recognised until a terrace surface is stripped of its topsoil. The recent excavations at Willington Quarry have also noted dispersed Anglo-Saxon features, adding to the picture gleaned from the 1970s excavations (Beamish 2009).

Other than the settlement remains at Willington Quarry, there are very few known sites relating to the early medieval period from the sands and gravels. The most important is the putative 'burh' site outside Bakewell on a high gravel terrace above the Wye (Hart 1981; Stetka 2001). A small portion of the site was evaluated in 1997 by Trent & Peak Archaeology (C.R. Hart pers. comm.), though no evidence of a ditch and bank was found, but much of the site still remains to be systematically tested by excavation. The presence of such a site would tally well with the wealth of Anglo-Saxon and Anglo-Scandinavian sculpture still housed in Bakewell church and the Anglo-Saxon ceramics that

have been reported from fields adjacent to the site (Stetka 2001).

As has been noted for other periods the potential for the sands and gravels to host remains dating to the early medieval period should be considered to be greater than that suggested by the paucity of entries within the HER and NMR. The remains at Willington Quarry mirror other early medieval remains from sand and gravel expanses in other areas of the country such as the extensive remains around the royal townships of Yeavering and Maelmin in the Milfield Basin, Northumberland (Hope-Taylor 1977; Johnson and Waddington 2009; Miket et al 2009) and the recent discovery of an Anglo-Saxon village at Lanton Quarry in Northumberland (Waddington in press) and that at nearby Thirlings (O'Brien and Miket 1991). Also, the early medieval remains of the sand and gravel terraces must be viewed alongside the important Anglo-Scandinavian remains immediately to the south of the Trent Valley at Repton (Biddle and Kjølbye-Biddle 1992) and Heath Wood, Ingleby (Richards 2004).

5.3.2.7 Medieval (AD1066 – c.AD1700)

A substantial majority of the known sites dating to the medieval, and also a large portion of post-medieval (see below), periods relate to field systems; predominantly ridge and furrow earthwork remains. The majority of known ridge and furrow remains are ascribed a medieval date largely on morphology rather than through field investigation, as much is now ploughed flat. The incidence of more-recent cultivation on the sand and gravel terraces has important implications for evaluation and mitigation, and these are discussed below.

As with other landforms, the medieval period sees a predictable increase in the built heritage within the HER and NMR, and with the sand and gravel landform this is most notable in the amount of churches and chapels which have either medieval origins or surviving medieval fabric. Such religious buildings are generally located within settlements which are either now substantially larger than their medieval counterparts, such as St. Mary's in the sprawling estates of Chaddesden, north-east of Derby, or within shrunken medieval villages such as the All Saints Church at Mackworth, north-west of Derby. As well as the religious buildings recorded, it is also worthy of note that there are a number of large farmsteads and manor houses in the low-lying valley settings where the sand and gravel terraces are found. Where manor houses are known to have existed, such as at Repton, noted in the Domesday Book, there is the potential that associated features, such as landscaping or ancillary buildings, may exist and these could be impacted upon by development in the area.

The sand and gravel landform also hosts deserted and shrunken medieval villages, many of which exist cheek-by-jowl with the extensive remains of medieval cultivation discussed above. Examples of such sites include the possible deserted medieval settlement, ridge and furrow, and possible moated site at Drakelow in the very southern reaches of Derbyshire on the Trent sand and gravel terraces near Branston. Another example is the deserted medieval village at Church Wilne which extends across a large till deposit (see chapter 5.1 also) and onto both sand and gravel and alluvial terraces adjacent to the course of the Trent. One of the key differences with deserted and shrunken villages from other landforms is that on the sand and gravel terraces they are largely known as cropmark sites rather than containing many, if any, upstanding remains. This is largely in keeping with the processes of preservation observed for sites of other periods in this landform as a result of intense agriculture.

5.3.2.8 Post-medieval to Modern (c.AD1700 – present day)

As with the medieval period, the post-medieval and modern period is characterised in the archaeological record by a substantial amount of built heritage, the vast majority still fully extant, and also the earthwork remains of field systems, predominantly as ridge and furrow. The importance of post-medieval ridge and furrow is largely the same as for the medieval period and is discussed below.

Important aspects of the built heritage within the post-medieval and modern periods includes mills, factories and other industrial works. The riverine location of sand and gravel deposits means that, as with alluvium (Chapter 6.1), there are a number of industrial buildings and complexes that are known sited to harness the natural water power. Sites such as the Market Street Cotton Mills in Drayton, or the Rykneld Mills Silk Mill in Derby (Pevsner and Williamson 1978, 182) have important regional significance as part of the industrial heritage of Derbyshire. The earliest silk mills of Derby formed an important part of the early industrial revolution and the mill noted above is a part of the Derwent Valley Mills World Heritage Site.

The various areas where this landform is found, whether the broad Trent Valley, or the slightly steeper and more incised tributary valleys in the Derbyshire uplands, represent natural routeways and it is likely that they have been used as such through much of the human occupation of this region. Into the post-medieval and modern periods, the construction of the railways and canal systems broadly followed the existing valleys as a 'path of least resistance', though there are notable exceptions discussed in other chapters.

As has been amply demonstrated through the aerial photograph transcription, the fertile landscape of the sand and gravel terraces has been a focus for agriculture, particularly arable, through a great deal of the past. It is likely that much of the ridge and furrow remains known date to this period, or has an ambiguous date which could fall in either the medieval or post-medieval period. The effects of ridge and furrow cultivation on the preservation of remains are discussed further below.

5.3.2.9 Unknown date

With the exception of one findspot, every entry of unknown date within the HER and NMR relates to the extensive cropmark evidence from the Trent Valley. As has been noted for various periods and discussed below, the extent of cropmark evidence underlines the significance of the sands and gravels as both an attractive locale for settlement, and also a vital resource for understanding the archaeology of the county and the wider area.

5.3.3 Evaluation and Mitigation Implications on the Sand and Gravel Landform (see table 7.11 for summary)

There are a number of substantial extraction sites on the sand and gravel terraces, most of which relate to the modern period. A key point relating to sand and gravel extraction is the impetus it has provided for archaeological discovery. Most of the key multi-period sites noted above through the period-by-period discussion are related to large-scale extraction in some way and the archaeology carried out in advance of works – Willington Quarry (Wheeler 1979; Beamish 2009) and the Hill Farm site, part of which has become later known as Mercia Marina (Hughes and Jones 1996; Brightman and Waddington forthcoming). It is evident that the sand and gravel landform form, by and large, a sensitive archaeological landscape and aggregate extraction tends to affect large parcels of land in these areas. The same point also applies to other large scale development such as roads, which are especially prevalent on this landform and utilise the same natural routeways of the river valleys that have been used for millennia. The important multi-period site at Swarkestone Lowes (Elliott and Knight 1999) was investigated as a result of the construction of the Derby southern bypass, the creation of which also created the demand for considerable quantities of aggregate extracted from the Hill Farm site at Willington.

The key multi-period sites known on the sand and gravel terraces (e.g. Mercia Marina – Brightman and Waddington forthcoming; Swarkestone Lowes – Elliott and Knight 1999; Willington Quarry – Wheeler 1979; Beamish 2009), illustrate the prevalence of truncated cut features as a defining archaeological characteristic of many periods. As has been noted for other landforms, these sites are rarely found or adequately recorded through the use of traditional linear evaluation trenches. Where landforms have the potential to host this type of archaeology an open-area strip, map and sample mitigation strategy may well be the best option for achieving a complete understanding of the archaeological remains if permission is granted. Mapping all known archaeological remains in advance of selective excavation also has the benefit to a developer of turning the archaeological mitigation into a 'known quantity', something which would not be the case with a large-scale watching brief exercise for example (see also Research Agenda – Chapter 7).

Previous work on sand and gravel terraces (e.g. Passmore and Waddington 2009) has illustrated the effectiveness of close-spaced fieldwalking (linewalking at 2m intervals) as this can produce highly informative results in respect of the potential location of sub-surface Mesolithic, Neolithic and Early Bronze Age sites, as well as for those periods that produce robust ceramic material. Targeting evaluation trenches or test pits according to the results of fieldwalking provides a means of assessing these surfaces prior to determination. Large-scale evaluation trenching is a blunt tool for locating the above-mentioned types of archaeology and if they fail to land on archaeological deposits that may very well survive in the area of investigation it can potentially result in large areas being considered archaeologically sterile when this is not the case. Establishing the potential of such sites rather than the distribution of remains across the entire site is key at the pre-determination phase for this landform. This allows the back loading of works that

could include strip, map and sample, discussed above, as a robust but economic post-permission mitigation method that ensures all archaeological remains, whether small, dispersed or post-built, are fully recorded in plan.

A previous ALSF project assessed the role of geophysical survey on the Trent Valley ands and gravel terraces (Knight et al. 2007). In brief, the conclusions of the report as to the efficacy and application of geophysical survey were: there is a high correlation between geophysical surveys and the results of excavation generally, indicating the effectiveness of geophysical survey on this landform; there is less of a correlation between geophysical survey and aerial photography indicating that these are complementary rather than interchangeable techniques (Knight et al. 2007, 45).

Cropmark formation is good on the sand and gravel terraces although cropmarks will tend to reveal large and continuous features but will be unlikely to reveal small, dispersed and shallow-cut features – which mean that much archaeology will be excluded from the typical repertoire of cropmark formation features. Through this project, and also other mapping programmes, there is now a comprehensive record of the cropmark evidence for much of the Trent Valley, and this mapping should always be consulted during local authority plan-making as well as being an essential part of any desk-based assessment study as part of a planning application (see also Research Agenda – Chapter 7).

The areas of ridge and furrow remains noted from aerial photography are important for a number of key reasons. First such remains are important in their own right for the information that can be gleaned relating to the medieval and post-medieval farming landscape and how the sand and gravel terraces have formed an attractive and fertile setting for agriculture for millennia, up to the present day. Secondly, there is a key importance relating to ridge and furrow remains in the impacts that they have on any earlier remains. There is a clear negative effect in some cases, where the furrows may truncate earlier features, but ridge and furrow can also mask and preserve earlier remains. On the sand and gravel terraces the extensive cropmark evidence and the known multi-period sites with intercutting and overlaying archaeological features suggest that beneath the ridge and furrow on this landform, there is a significant likelihood that earlier remains will exist as truncated deposits, but possibly in a state of better survival than in areas that have been ploughed flat by modern intensive cultivation (see also Research Agenda – Chapter 7).

It is clear that the sand and gravel terraces are a significant landform for hosting archaeological remains and have been a focus of settlement for millennia. The sensitivity of this landscape must be noted, especially as this is also a landform which is at high risk due to its value as an essential mineral resource.

6. Holocene Landform Assessments

The following two chapters (6.1 – 6.2) represent the assessments for the three Holocene landform elements. The principal importance of these distinctive landform elements is that they often overlie superficial deposits and can mask earlier remains, as well as often being landforms that will require removal in order to access aggregate resource such as sand and gravel terraces (2d). The associations, along with evaluation and mitigation issues, are summarised for all landform assessment chapters in the tables in Chapter 7.

6.1 Landform 3a – Alluvium

Landform 3a is represented by the alluvial floodplain deposits in the major river valleys of the county. The most significant deposits are in the Trent Valley along the meandering course of the county's principal river, but there are also major deposits within the Derwent and Wye valleys and also lesser alluvial deposition in all the smaller tributary valleys (Fig. 6.1.1).

The Holocene alluvial terraces which account for this landform are the significant valley-bottom deposits formed by floodplain sediment deposition. Such deposits are the closest surfaces to the river channels and, in the Trent Valley at least, are typically inset below the glaciofluvial sand and gravel terraces (2d). Migration of river channels and various floodplain events result in a complex pattern of alluvial deposits and palaeochannels which can be of vastly different ages. The key point to note is that, as with sand and gravel terrace deposits, there is significant potential for earlier remains and land surfaces to exist sealed within the sediment body.

There was no dedicated aerial photograph transcription targeted on this landform, though portions of all aerial photograph blocks included areas of landform 3a, particularly Block 4. Aerial photograph transcriptions are discussed in Chapters 4.1, 4.2, 4.4 and 5.3. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

The area of landform 3a encompasses 24,056.88ha which represents 7.96% of the total area of Derbyshire and the Peak District.

6.1.1 Archaeological Associations (chronological)

Alluvium hosts 2341 HER entries and 827 NMR entries of which 2113 are duplicated giving a total number of known archaeological and historical sites of 1055 within the combined lists. The breakdown of the sites within this combined list is presented in Table 6.1.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 3a hosts a total site ratio of 5.85 sites per 100 hectares in comparison to the overall average density for the whole study area of 6.54.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**6**	**0.03**	**0.12**	**0.57**
Findspot	3	0.02	0.0611	0.28
Lithic Scatter	3	0.02	0.0456	0.28
Neolithic	**11**	**0.06**	**0.24**	**1.04**
Cave	1	0.01	0.004	0.09
Cursus	1	0.01	0.0009	0.09
Findspot	9	0.05	0.1216	0.85
Bronze Age	**21**	**0.12**	**0.4**	**1.99**
Barrows/Cairns/ring ditch	14	0.08	0.3019	1.33
Findspots	7	0.04	0.1146	0.66
Iron Age	**6**	**0.03**	**0.05**	**0.57**

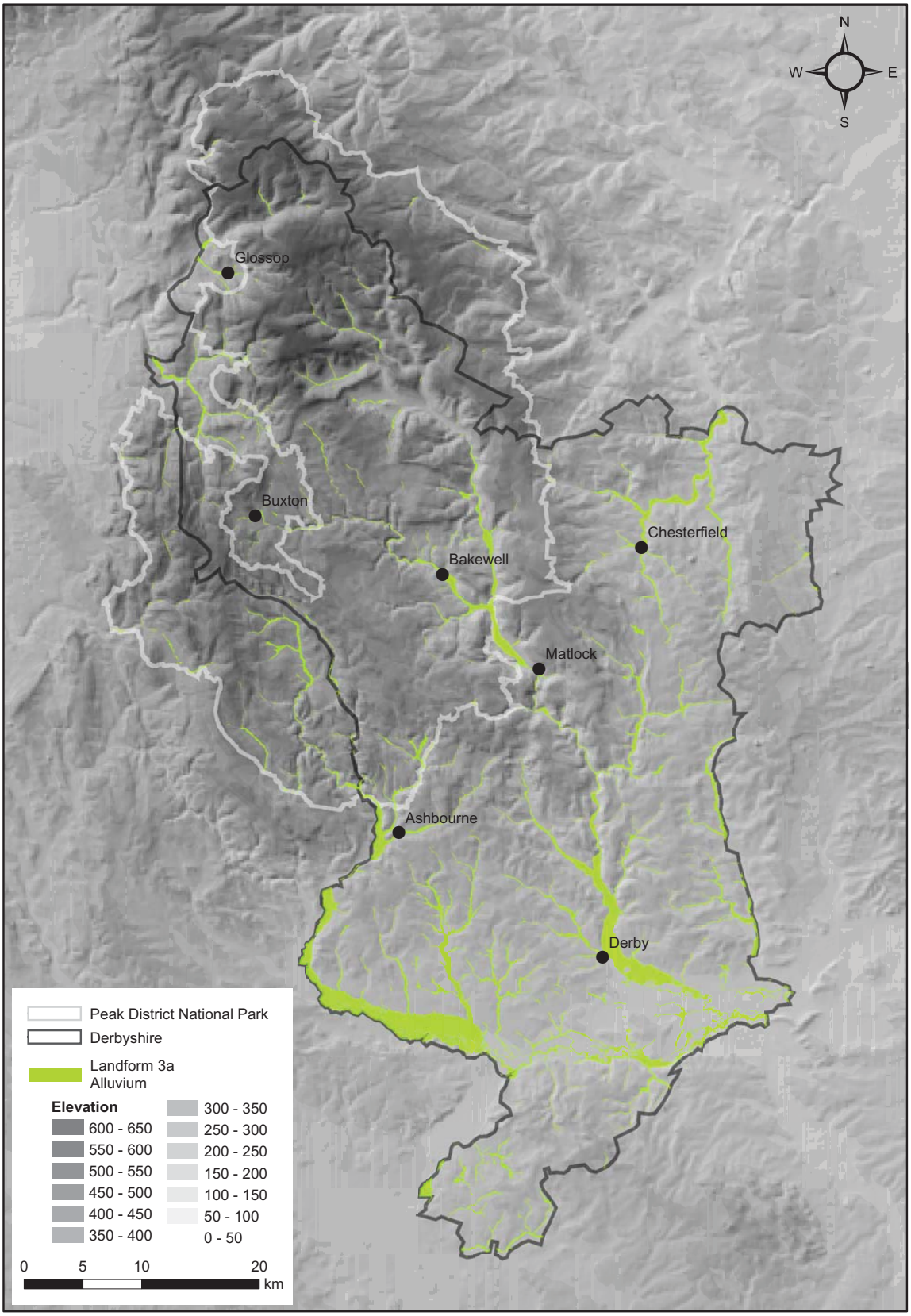

Figure 6.1.1 Location of landform 3a within Derbyshire and the Peak District.

Findspot	2	0.01	0.021	0.19
Pit Alignment/Cropmark Enclosure	4	0.02	0.0106	0.38
Romano British	**83**	**0.46**	**0.43**	**7.87**
Altar	1	0.01	0.0003	0.09
Bathhouse	2	0.01	0.0009	0.19
Bridge	1	0.01	0.0003	0.09
Building/Farmstead	1	0.01	0.0036	0.09
Cave	1	0.01	0.0049	0.09
Cemetery	1	0.01	0.0003	0.09
Cremation/Inhumation	3	0.02	0.0067	0.28
Enclosures/fields/settlements	5	0.03	0.0565	0.47
Findspots	19	0.11	0.1572	1.8
Fort and vicus	1	0.01	0.0021	0.09
Roads and associated sites	44	0.24	0.0945	4.17
Settlement	4	0.02	0.003	0.38
Early Medieval	**9**	**0.05**	**0.08**	**0.85**
Cemetery	1	0.01	0.0012	0.09
Cave	1	0.01	0.0003	0.09
Enclosure	1	0.01	0.0012	0.09
Findspot	3	0.02	0.0219	0.28
Sculpture	1	0.01	0.0106	0.09
Settlements	1	0.01	0.0067	0.09
Trackway/Boundaries	1	0.01	0.003	0.09
Medieval	**272**	**1.51**	**1.1**	**25.78**
Artefact Scatter	2	0.01	0.0018	0.19
Church/Religious Buildings	12	0.07	0.0897	1.14
Sculpture/Wayside crosses etc	2	0.01	0.0377	0.19
Cemetery	1	0.01	0.0006	0.09
Deer Parks/Parks	10	0.06	0.0423	0.95
DMVs	11	0.06	0.0353	1.04
Enclosures/Field Systems	163	0.9	0.3329	15.45
Findspots	8	0.04	0.0872	0.76
Fishponds	5	0.03	0.0097	0.47
Grange	2	0.01	0.0897	0.19
Hospitals/Almshouses	3	0.02	0.0055	0.28
Iron Foundry	2	0.01	0.0255	0.19
Manor House/Farmstead	19	0.11	0.0973	1.8
Mills	6	0.03	0.0027	0.57
Other Buildings	2	0.01	0.003	0.19
Quarrying/Mining Remains	1	0.01	0.0255	0.09
Roads/Tracks/bridges	17	0.09	0.017	1.61
SMVs	5	0.03	0.0219	0.47
Tree	1	0.01	0.0003	0.09
Post Medieval-Modern	**520**	**2.89**	**3.39**	**49.29**
Agricultural buildings /Field Systems	51	0.28	0.3776	4.83
Battlefield	1	0.01	0.0009	0.09
Canals and associated	12	0.07	0.0237	1.14
Findspots	1	0.01	0.0313	0.09
Fish Weir	5	0.03	0.0015	0.47
Gardens/Parks/Lakes/Ponds	17	0.09	0.0684	1.61
Halls/Large Houses	1	0.01	0.08	0.09

Industrial Sites/Foundries	31	0.17	0.038	2.94
Military Sites	6	0.03	0.0471	0.57
Other Mills and Factories	102	0.57	0.1839	9.67
Quarrying/Mining/Clay Extraction	34	0.19	0.3566	3.22
Railway Lines/Buildings	66	0.37	0.3049	6.26
Religious Buildings	24	0.13	0.1541	2.27
Reservoir	1	0.01	0.0058	0.09
Roads/Tracks/Boundaries	30	0.17	0.1918	2.84
Sportsground	3	0.02	0.0033	0.28
Other Buildings	128	0.71	0.4207	12.13
Wells/Pumps/Fountains	7	0.04	0.0295	0.66
Multiperiod Remains	**5**	**0.03**	**0.37**	**0.47**
Artefact Scatters	3	0.02	0.017	0.28
Cropmarks	2	0.01	0.0073	0.19
Unknown Date	**122**	**0.68**	**0.47**	**11.56**
Caves	26	0.14	0.038	2.46
Enclosures/Earthworks/Cropmarks	81	0.45	0.1523	7.68
Ford	2	0.01	0.0006	0.19
Findspots	11	0.06	0.156	1.04
Mining/Extraction Site	2	0.01	0.0006	0.19
TOTAL SITES	**1055**	**5.85**	**6.54**	**100**

Table 6.3.1 Breakdown of all sites on alluvium by period and site type.

6.1.1.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

The entire Palaeolithic-Mesolithic archaeological resource for the alluvium landform relates to single findspots and three known scatters, all of Mesolithic lithic material. This is largely unsurprising as in almost all cases, current alluvial land surfaces will have formed after the Late Upper Palaeolithic. Although Mesolithic activity may have been common in such locales, with most of the current alluvial surfaces having formed since the Mesolithic any Mesolithic material is likely to survive buried within the sediment body rather than occur at or near the surface, with the exception of where upstanding 'islands' occur within the alluviated areas. Two of the lithic findspots, from Bradwell and the Bar Brook below Big Moor, and one of the scatters, from Oaken Clough above Longdendale, may well represent material derived from the gritstone and peat landforms above and washed down onto the alluvial deposits through more-recent water action and so instances where secondary deposition could account for the presence of such artefacts should be borne in mind.

6.1.1.2 Neolithic (3900 – 2200BC)

As with the earlier prehistoric periods, the Neolithic period on the alluvium is entirely represented by single finds, almost all of which are stone axe heads. There is a potential bias in the collection as has been noted in other chapters, as easily recognisable and aesthetically pleasing artefacts may be more likely to be collected, though not all stone axe heads are 'prestige' items and so these items may have been relatively ubiquitous. The distribution of stone axe heads is an important indicator of the extent of Neolithic settlement, and with Derbyshire, there is a bias towards river valleys and water courses (as noted in other chapters) which fits in well with the general patterning of Neolithic stone axe heads known from other regions. During dedicated fieldwalking on many landforms, such items as stone axe heads are very rare in comparison to other flint tools and debitage both in this county (e.g. Hart 1981; Barnatt pers comm) and in other regions (e.g. Gardiner 1984; Richards 1990; Passmore and Waddington 2009).

The known Neolithic findspots are widely distributed across the study area from two polished stone axe heads from the Derwent floodplain close to the Roman site of Derventio in north Derby to a polished flint knife from the a small area of alluvial deposition to the north of Etwall. One concentration is worthy of note however, four polished stone axe heads are known from the valley of the Bradwell Brook which runs through Bradwell, suggesting a potential concentration of Neolithic activity in this area of the Hope Valley.

6.1.1.3 Bronze Age (2200 – 700BC)

All of the known Bronze Age entries within the HER relate to individual findspots. The 14 possible ring ditch monuments relate to the aerial mapping component of this project and due to the inherent inaccuracies of using a 1:50,000 scale base mapping for determining much of the landform element data, may in fact lie on the sand and gravel terraces. The mapping related to these possible monuments is now within the HER and fieldwork is needed to determine the genuine landform association of these sites. For a full discussion of Bronze Age ring ditch monuments in the Trent Valley see chapter 5.3.

A few individual findspots are known from across the county including a bronze axe from Miller's Dale and a bronze palstave from Youlgreave. While there are very few Bronze Age artefacts and sites known from the alluvium, especially in comparison to the explosion of activity from the Late Neolithic-Early Bronze Age on other landforms, the very presence of Bronze Age artefacts reinforces the likelihood of buried land surfaces relating to this period.

With all the earlier periods of prehistory, up until the Iron Age, the relative densities of sites illustrate the point made above, that the alluvial surfaces are largely more recent in origin. For the Palaeolithic through to the Neolithic, the densities of sites per 100ha are a quarter of those for the study area as a whole.

6.1.1.4 Iron Age (700BC – AD43)

Whilst there are very few sites known to date to the Iron Age, these include cropmark monuments such as pit alignments and enclosures. The importance of this is that these are some of the earliest major monuments still visible on the alluvial deposits and that where these exist they can provide an effective terminus ante quem for the formation of the alluvial land surface on which they sit. Over and above the few sites known, there is also a substantial number of undated cropmark enclosures, and as with the sands and gravels it is likely that many of these may date to the late prehistoric and Romano-British periods. Pit alignments and cropmark enclosures are known from west of Scropton, Derby racecourse and close to Willington power station where the cropmark complex crosses from the sand and gravel landforms to the alluvium, all within the valley floor of the Trent Valley.

6.1.1.5 Roman (AD43 – 410)

As with most other landforms, the known Roman finds tend towards reasonably discrete overall clusters around the known centres of Roman activity and settlement. With the alluvial valley floor deposits these occur around Little Chester, north Derby (Derventio), and Buxton (Aquae Arnemetiae). There are also a few other clusters of known finds which are worthy of note. In Bakewell, there are two known scatters of Roman pottery from around the church, and also a Roman altar found just to the south of the town, close to the potential Anglo-Saxon burh (Stetka 2001) and which now stands in the main doorway of Haddon Hall. The second concentration of possible significance is represented by a group of findspots in the narrow valley occupied by Stoney Middleton which includes a coin hoard and a pair of silver bracelets.

The majority of Roman period finds and sites on alluvium relate to the fort, vicus and town around Derventio, north of the centre of Derby, close to the banks of the Derwent. This site and its environs have been subjected to much investigation (see Brassington 1967; 1982; 1982a; 1993; 1996; 1997; Todd 1967; Williams 1991; Shakarian in press; Sparey-Green 2002). The fort first developed in the AD70s (Brassington 1967) and is close by a substantial civilian settlement (Birss and Wheeler 1975) which incorporates industrial sites (Brassington 1980) and cemeteries at the nearby Derby racecourse (Wheeler 1985).

6.1.1.6 Early medieval (AD410 – 1066)

In keeping with the overall picture of the early medieval period in the county, there are relatively few finds and sites known on the alluvium. Probably the most significant cluster is represented by a group of known Anglian period burials from Derby racecourse (Barrett 2006a, 2) and a find of an Anglo-Saxon 'accessory cup' from close by noted in the HER. Derby is known as a major Anglo-Scandinavian centre and it is important that finds and sites indicate the presence of a suspected but largely invisible earlier Anglo-Saxon settlement bridging the gap between the Roman and Viking towns, though more recent excavations have given a glimpse of this period, for example the excavations

at Derby Courthouse and Queen Street (D. Barrett pers. comm.).

Other than the minor concentration around Derby, the known early medieval sites are distributed widely across the county. The Grey Ditch near Bradwell cuts across the alluvium in the valley bottom, but the greater part of this post-Roman linear earthwork lies predominantly on the shale landform and is discussed in Chapter 4.6. Two Anglo-Scandinavian crosses are known from Ilam Park which sits well with the potential school of sculpture based in this area and epitomised by the nationally important collection of sculpture housed in Bakewell Church.

6.1.1.7 Medieval (AD1066 – c.AD1700)

The vast majority of known sites on the alluvium are the ridge and furrow field systems, predominantly dating to the medieval period, though there are also significant amounts dating to the post-medieval period. Alluvial floodplain deposits are exceptionally fertile and the extensive medieval ridge and furrow remains are likely to conceal earlier archaeological features, particularly given the fact that potential Iron Age and Romano-British period cropmarks are known on this landform.

Most of the other medieval sites that stand on the alluvium relate to the topographic valley-bottom location of this particular landform. Principally these are farmsteads or mill sites such as Clifton Mill in the very south of the county, or Tutbury Mill on the River Dove, both of which are positioned to utilise the natural water power of the river valleys.

As noted in other chapters, deserted medieval villages and deer parks can overlap a number of landforms and this includes alluvial deposits. Examples of deserted and medieval villages include that of Bupton (Beresford 1954, 356) which lies near modern Longford on the Shirley Brook and extends over the Mercia Mudstone landscapes.

Figure 6.1.2 Extensive ridge and furrow remains on the alluvial floodplains of the Trent Valley west of Scropton. This image was taken in 1945, and a substantial amount of this is now ploughed flat. (RAF_541_215_3154 15-DEC-1948 © Crown copyright. NMR).

6.1.1.8 Post-medieval to Modern (c.AD1700 – present day)

As with almost all landforms, the post-medieval period accounts for the majority of known sites within the HER and NMR lists and the majority of this is due to the substantial contribution of the built heritage to the archaeological and historic resource. The importance of this for the alluvium is in those buildings that are positioned to particularly exploit the valley setting. These associations are broadly similar to the medieval period with farming activities taking advantage of the fertile alluvial soils and also water-powered mills and industry. The importance of these sites lies in the fact that there are often ancillary structures which may well be of archaeological interest in their own right.

As well as the water mills in the more rural areas of the county there are a substantial number of larger water-powered works and factories relating to the explosion of industrial activity following the earliest mills at Cromford, Matlock and Belper and further up the catchment such as at Cressbrook and Litton on the Wye. The Derwent Valley Mills have status as a World Heritage Site due to the importance of Derbyshire's industrial heritage – a heritage that influenced the industrialisation of other parts of Britain as well as many other parts of the world.

While the post-medieval field systems do not represent as large a portion of the overall sites than on some other landforms, they still form a considerable archaeological resource, and much development within alluvial settings is still likely to impact upon post-medieval farming and associated land use features. As with medieval ridge and furrow, there is a potential for it to mask and preserve earlier remains and land surfaces that could extend back into prehistory.

6.1.1.9 Unknown Date

The majority of sites listed within the HER and NMR as being of unknown date are cropmark enclosures and earthworks. It is likely that many of these date to the late prehistoric or Romano-British period in a similar pattern to those known from the sand and gravel terraces into which much of the alluvium is inset (see Chapter 5.3). The dating of cropmark enclosures is more problematic on alluvium due to the potential different ages of alluvial land surfaces, and this can only be resolved through site investigation involving excavation, dating and also palaeoenvironmental coring. The opportunity to obtain site-specific palaeoenvironmental data and understand the contemporary position of the river channel to archaeological sites is afforded by the abundance of in-filled palaeochannels and cut-offs along the course of the middle Trent valley. These are discussed in more detail in the following chapter.

6.1.2 Evaluation and Mitigation Implications for Alluvium (see table 7.12 for summary)

Cropmark formation is generally good on the alluvium, though as noted above there are a substantial number of cropmark sites which are of unknown date. Any development of reasonable size, particularly within the large expanses of alluvium towards the western extent of the Derbyshire Trent Valley, have a high potential of impacting upon cropmark sites, although in most cases their date and character remain unknown, and it is important that opportunities are taken to refine our knowledge of the morphology, character and date of such sites, as well as their potential for the preservation of different types of artefacts and residues.

All of the palaeochannels currently mapped for the Trent Valley and used as landform 3b for this analysis are inset within alluvium. A full discussion of the importance of palaeochannels is provided in chapter 6.2, but it should be noted that even where not mapped, there is the potential for palaeochannels to exist within or below the alluvium and sometimes these can only be identified by a systematic sediment coring programme across a potential development area (see also Research Agenda – Chapter 7).

Alluviation is a dynamic process and there is the potential within the sediment body of alluvium to preserve both archaeological remains and also land surfaces pertaining to different periods. On lower, and therefore younger terraces, where impacts from development will only be shallow, it is likely that only more-recent remains will be encountered, though this should not diminish the potential of such remains. On higher and older terraces where the alluvial surfaces may be as old as the beginning of the Holocene, the depth of impact is of key importance as it could remove sites of virtually any period. This is particularly pertinent in the case of sand and gravel extraction. In such cases there must be provision within mitigation works to investigate the full depth of alluvial sedimentation to record both the archaeological and palaeoenvironmental data contained within. This is especially key in light of the apparent pau-

city of evidence relating to earlier and middle-prehistory, periods which are well-represented across much of the rest of the county, especially on the neighbouring sand and gravel terraces. An understanding of the timing and nature of alluviation is itself very instructive for establishing earlier phases of human-induced clearance, soil erosion and so forth and particularly if such environmental records can be compared at the catchment scale.

6.2 Organic-rich Deposits – 3b Palaeochannels and 3c Peat

This chapter deals with two landform elements as they both share similar characteristics in respect of their potential for preserving organic artefacts and providing detailed palaeoenvironmental records.

6.2.1 3b – Palaeochannels (see table 7.13 for summary)

Palaeochannels are the remains of relict water channels inset within valley deposits. Within the scope of this study area, palaeochannels can be inset within glaciofluvial sands and gravels (2d) and also valley bottom alluvial deposits (3a). At the scale of mapping used for this project, all recorded palaeochannels are located within the Trent Valley alluvium, though the potential occurrence of older palaeochannel deposits within the sands and gravels must be noted, particularly as, where any such channels are encountered, they can be of key importance for understanding Late Glacial and earlier Holocene environments.

Palaeochannels typically host organic-rich deposits with the potential to preserve waterlogged remains. They are also of great potential as sediment traps as they can preserve long-term pollen sequences allowing for the re-creation of past environments over many periods. The pollen signature obtained from localised deposits such as these has the potential to inform on the vegetation of the immediate vicinity of the site as the small size of the wetland means that they have a small pollen rain catchment. This is in contrast to the signature obtained from upland peat bogs which tend to provide a regional vegetation sequence, and one dominated by wind blown tree pollen, as these larger wetland sites have a much larger pollen rain catchment. As well as palaeoenvironmental evidence there is a good potential for palaeochannels to contain archaeological remains as localised water sources are foci for activity during most periods of human habitation. Examples of this activity include their use as locales for fowling, fishing, hunting animals while watering, as well as water sources for human settlement and foci for discard of artefacts whether votive or otherwise. The channel belts may even preserve remains from when the channel was part of an active river system and such remains can be spectacular. Obvious examples include the historic log boats and a bone from a Mesolithic woman at Staythorpe (Davies 2001).

The only archaeological associations mentioned in the existing HER and NMR for the Holocene alluvial palaeochannels are two medieval osier beds which illustrate the continued use and management of these areas of low-lying and often standing water. Probably the most important find associated with palaeochannel deposits in Derbyshire though is the Shardlow log boat recovered from Hanson's Shardlow Quarry in 1998 and which has been dated to the middle Bronze Age c.1300 cal BC (Garton et al 2001). The boat was recovered from a sealed, waterlogged palaeochannel deposit, demonstrating the exceptional potential offered by such deposits, and contained quarried Bromsgrove sandstone blocks (Garton et al 2001, 198). Close to the logboat, a wooden structure was also preserved, most probably some kind of walkway or jetty. Radiocarbon samples dated this to 1430-1190 cal. BC (3060±50 BP, Beta-118363; 3070±60 BP, Beta-115407) (Garton et al 2001, 196). At the time of writing a second log boat has been discovered at Shardlow, though details, and publication, are still awaited (D. Barrett pers. comm.).

Finds of Bronze Age metalwork from the Trent Valley are well-attested and there are a significant number of hoards from throughout the East Midlands (Clay 2006, 82). Whilst the HER notes these as being from sand and gravel terrace landforms, these will have been recovered from buried palaeochannel belts representing old courses of the Trent and its tributaries. Within Derbyshire, the most substantial collection of bronzes has come from the Shardlow gravel quarry with 12 Middle Bronze Age artefacts including axes, spears and rapiers (Clay 2006, 83). Votive deposition of bronze artefacts is a well-known phenomenon (Bradley 1990) and the clear importance of the Trent in this regard (see the results of the University of Nottingham research projects into Bronze Age deposition in the Trent – M. Pearce pers. comm.) indicates that bronze artefacts could reasonably be expected, especially where the channels of the river may have meandered and such artefacts may be sealed within deposits such as those that were removed as part of the quarrying at Shardlow (D. Garton pers. comm.), or the Late Bronze Age sword which was found by a machine operator during gravel extraction at Church Wilne (Hughes 1999, 6).

There was no dedicated aerial photograph transcription targeted on this landform, though portions of landform 3b

are included in Block 4, discussed in Chapter 5.3. All landform elements are illustrated on the mapping of the aerial photograph transcription block included as Appendix A.

The area of landform 3b encompasses 1203.96ha which represents only 0.37% of the total area of Derbyshire and the Peak District, though the archaeological and palaeoenvironmental potential of these deposits is significant, and whilst apparently scarce, they are reasonably prevalent in the superficial deposits of the Trent Valley.

6.2.2 3c – Peat (see table 7.14 for summary)

Within Derbyshire and the Peak District, landform 3c is almost entirely confined to the expanses of upland gritstone moors and the adjacent gritstone and sandstone member of the upland portion of the Coal Measures. There is also a small amount of peat in isolated deposits on the higher points of the Sherwood sandstones in the area near Ravensdale Park. The significance of this landform in relation to aggregates and minerals extraction lies in the fact that it will be removed as a part of accessing underlying landforms, predominantly Millstone Grit (1f).

Peat bogs are incredibly organic-rich as the anaerobic conditions within the peat create an ideal environment for organic preservation. Pollen cores derived from the upland peats have the potential to inform on the palaeoenvironment of a large area as they represent substantial sediment traps. One of the key topics relating to the peat landform is that the date of formation of blanket peat is still poorly understood and any opportunity to refine this chronology through core sampling or even stratigraphic relationships with archaeological features should form part of any mitigation strategy for developments that encroach upon it. There was no dedicated aerial photograph transcription targeted on this landform.

The area of landform 3c encompasses 25,657.79ha which represents 7.79% of the total area of Derbyshire and the Peak District.

Figure 6.2.1 Heather-covered peat moorland above Saddleworth in the northern Peak District.

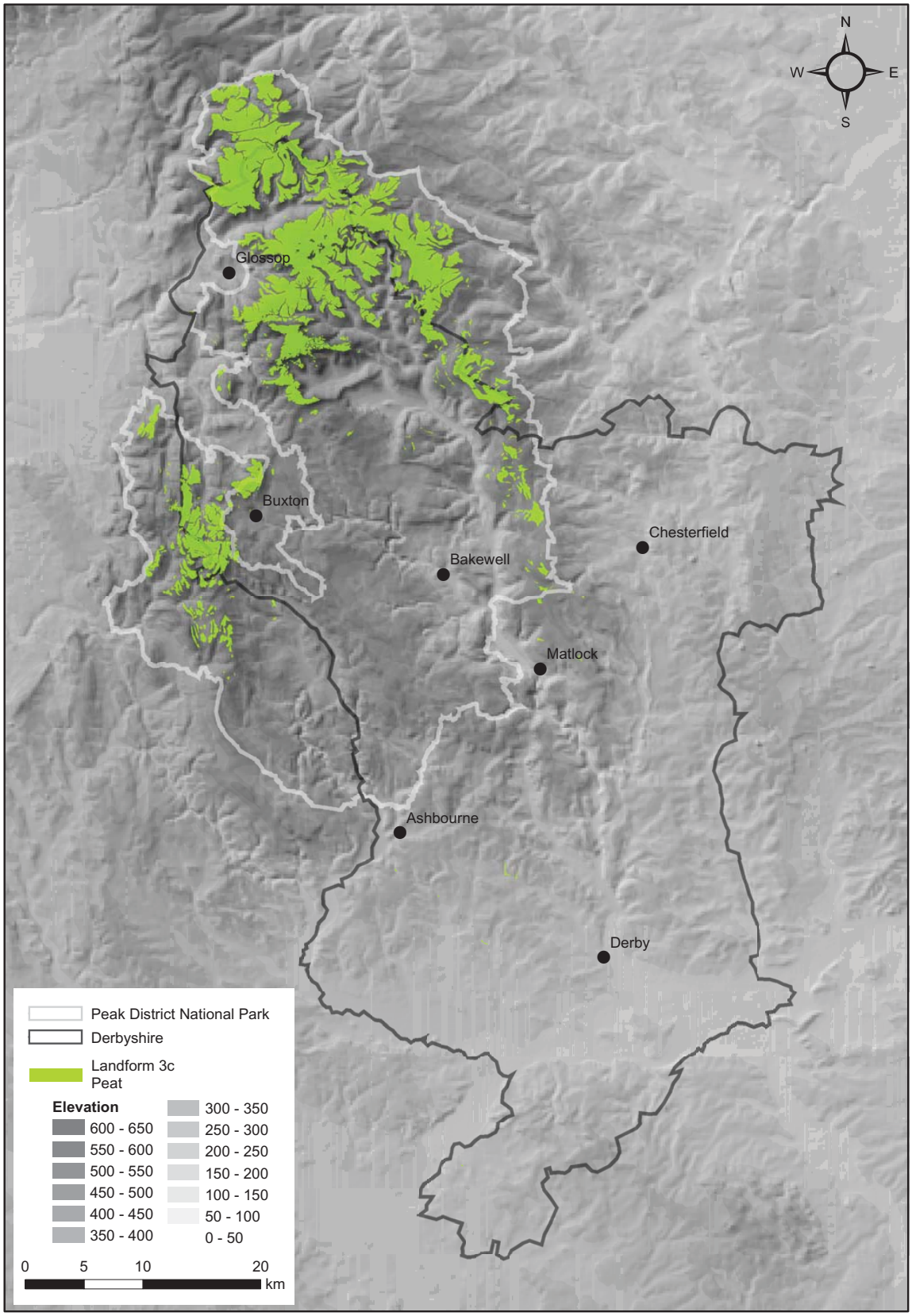

Figure 6.2.2 Location of landform 3c within Derbyshire and the Peak District.

6.2.3 Archaeological Associations for 3c (chronological)

The peat landform hosts 308 HER entries and 158 NMR entries of which 227 are duplicated giving a total number of known archaeological and historical sites of 239. The breakdown of the sites within this combined list is presented in Table 6.2.1 below, where the sites are also subdivided by site type and characterised with a count per 100 hectares (1km2) and as a percentage of total sites on this landform. The count of sites per 100ha is given in comparison to the mean density of sites per 100ha across the whole of Derbyshire and the Peak District. Landform 3c hosts a total site ratio of 0.93 sites per 100 hectares, which is the lowest ratio by some way. This is not surprising given the fact that the majority of known sites are found where the peat is thin or eroding and that the landscape is generally inhospitable, difficult to navigate and unsuited to most kinds of agriculture. However, perhaps the most important reason for this under-representation of archaeological sites is the fact that the peat masks archaeological remains resulting from human activity prior to the formation of the peat. More specifically, this implies that there is the potential for considerable and well-preserved earlier prehistoric remains below the peat, though prospecting for and accessing such material poses a significant challenge to archaeologists.

Period	No. of Sites	Sites per 100ha	Mean Sites per 100ha	%
Pal/Mes	**79**	**0.31**	**0.12**	**33.05**
Findspot	50	0.19	0.0611	20.92
Lithic Scatter	29	0.11	0.0456	12.13
Neolithic	**12**	**0.05**	**0.24**	**5.02**
Findspot	11	0.04	0.1216	4.6
Lithic Scatter	1	0	0.0173	0.42
Bronze Age	**27**	**0.11**	**0.4**	**11.3**
Barrows/Cairns	10	0.04	0.3019	4.18
Cairnfields/clearance cairns	5	0.02	0.0255	2.09
Findspots	10	0.04	0.1146	4.18
Lithic Scatter	1	0	0.0027	0.42
Standing Stone/Stone Circle	1	0	0.0155	0.42
Iron Age	**1**	**0**	**0.05**	**0.42**
Findspot	1	0	0.021	0.42
Romano British	**10**	**0.04**	**0.43**	**4.18**
Roads and associated sites	10	0.04	0.0945	4.18
Early Medieval	**0**	**0**	**0.08**	**0**
Medieval	**17**	**0.07**	**1.1**	**7.11**
Sculpture/Wayside crosses etc	4	0.02	0.0377	1.67
Deer Parks/Parks	2	0.01	0.0423	0.84
DMV's	2	0.01	0.0353	0.84
Enclosures/Field Systems	4	0.02	0.3329	1.67
Mill	1	0	0.0027	0.42
Quarrying/Mining Remains	1	0	0.0255	0.42
Roads/Tracks	3	0.01	0.017	1.26
Post Medieval-Modern	**64**	**0.25**	**3.39**	**26.78**
Aircraft Crash Site	3	0.01	0.0103	1.26
Military Sites	1	0	0.0471	0.42
Mills and Factories	1	0	0.1839	0.42
Quarrying/Mining/Clay Extraction	12	0.05	0.3566	5.02
Railway Lines/Buildings	12	0.05	0.3049	5.02
Reservoir	1	0	0.0058	0.42
Roads/Tracks/Boundaries	32	0.12	0.1918	13.39
Other Buildings	2	0.01	0.4207	0.84
Multiperiod Remains	**2**	**0.01**	**0.37**	**0.84**
Artefact Scatters	2	0.01	0.017	0.84

Unknown Date	**27**	**0.11**	**0.47**	**11.3**
Cairns	2	0.01	0.0416	0.84
Enclosures/Earthworks/Cropmarks	1	0	0.0061	0.42
Findspots	21	0.08	0.156	8.79
Standing Stone/Circle	2	0.01	0.0064	0.84
Quarry	1	0	0.003	0.42
TOTAL SITES	**239**	**0.93**	**6.54**	**100**

Table 6.2.1 Breakdown of all sites on peat by period and site type.

6.2.3.1 Palaeolithic (pre c.8000BC) and Mesolithic (c.8000 – 3900BC)

The majority of known entries within the HER and NMR for the blanket peat relate to the Mesolithic period. There is a significant historical fieldwork bias relating to lithic collection on the peat and gritstone uplands including artefact scatters and lithic findspots, but also through the work of local researchers, such as Jeffrey Radley, evidence for possible structures as at Deepcar (Radley and Mellars 1964). The relative ubiquity of Mesolithic flint continues across the landscape outside of the county and National Park boundaries merging with other well known southern Pennine Mesolithic gritstone sites such as Warcock Hill (Buckley 1924), Lominot and March Hill (Buckley 1924; Spikins 1995; 1996; 1999).

The large-scale collection of chipped flints from peat exposures on the moors by dedicated groups and individuals has a long pedigree from antiquarians (e.g. Buckley 1924) through to the present day, and includes the important collections of individuals such as Frances Buckley and Joseph and Percy Heathcote who established a small museum in Birchover, though his collection is now housed at the Sheffield City Musem.. Although it has been argued that the current distribution of Mesolithic material merely reflects the collection points and footpaths used by the individuals and groups who have found lithics in the uplands, a recent study by Garton (pers. comm.) has investigated the distribution of lithic material on the high moors. Whilst analysis is ongoing, the research has shown that there is an emphasis on material being found closer to the edges of the blanket peat but this can be at least partially explained as a product of the patterns of erosion and that it is very difficult to predict whether this represents a genuine pattern of land use or not (ibid.) This Prehistoric flintwork is continually exposed in the mineral soil at the base of the moorlands peats and is regularly reported by walkers, runners and cyclists who use the moors, suggesting reasonably intense activity across what are now peat moorlands. Flint collection by necessity focuses on the erosion scars either within the peat hags or close to the edge of the blanket peats - typically near gritstone edges. Such high locations with good visibility correspond in general with the locations of Mesolithic scatters on other landforms.

Given the vast expanses of moorland peats across much of the gritstones there are important opportunities to gain a highly detailed understanding of early, late and terminal Mesolithic activity across these uplands and to understand human activity in relation to the specific environment that existed around any given site and in relation to how the environment changed during this formative period of human settlement in Britain. The Mesolithic of the Southern Pennines has informed and contributed to national and international debates on the Mesolithic (e.g. Radley and Mellars 1964; Jacobi et al 1976) and further opportunities to study such remains in a modern context, with the advantages of modern scientific techniques, should be considered when development impacts take place.

6.2.3.2 Neolithic (3900 – 2200BC)

The few known Neolithic 'sites' within the HER and NMR all relate to single findspots with the exception of one lithic scatter from near the summit of Totley Moss. Due to the lack of definite provenance it is difficult to describe any nuanced patterns of location for this small dataset. There is one notable cluster of artefacts, with five separate findspots in the vicinity of the Broomhead Moor Mesolithic site (Switsur and Jacobi 1975), potentially suggesting continuity of activity in the area into the Neolithic.

6.2.3.3 Bronze Age (2200 – 700BC)

As with many of the periods, Bronze Age remains are in similar locales to those on the Millstone Grit which underlies almost all of the peat landform. Bronze Age cairn burials are known from easily visible highpoints, whether

they be summits of hills, such as the Middle Hills round barrow west of Longnor, or situated above the dramatic gritstone edges such as the Crow Chin barrows above Stanage Edge. Bronze Age single findspots follow the same patterns, generally being found from moortops close to known areas of Bronze Age settlement, such as the Bronze Age axe mould from just above White Edge off Big Moor. Where such remains occur above or even within the peat, the stratigraphic position within the soil and sediment body is of key importance as this can inform on the encroachment and development of the peat itself, as well as potentially sealing archaeological and palaeoenvironmental deposits from more recent impacts.

6.2.3.4 Iron Age (700BC – AD43)

There is only a single Iron Age findspot known on the peat – a possible quernstone from above Stanage Edge.

6.2.3.5 Roman (AD43 – 410)

All the Roman period entries within the HER and NMR relate to the Roman Road network which crosses the gritstone uplands from the Roman settlements in the Peak District to those on the west and east of the uplands. Where the lines of Roman roads are uncertain, further clarification will be an important aim of archaeological work as Roman roads can often be a focus for ancillary Roman period structures, though as yet none are known from this landform.

6.2.3.6 Early medieval (AD410 – 1066)

There are no known sites or finds from the peat relating to the early medieval period.

6.2.3.7 Medieval (AD1066 – c.AD1700)

The majority of known sites relating to the medieval period are sites covering a substantial area which overlap onto the peat from the landforms which underlie it. Examples of this include the deserted medieval village of Mercaston, which sits on the Sandstones (1e) but the edge of which encroaches onto the peat. The Ravensdale Deer Park (Wiltshire and Woore 2009) immediately to the north also lies in a similar topographic situation, encroaching onto areas of upland peat at its southern extent in the valley of the Mercaston Brook.

6.2.3.8 Post-medieval to Modern (c. AD1700 – present day)

The post-medieval remains are similar to the medieval period inasmuch as they mirror, and in some cases overlap, the underlying landforms. The majority of known sites are accounted for by extractive sites such as the Goyt's Moss Colliery below Axe Edge, as well as the roads and tracks and sites associated with the railways. There are a number of stoops, way markers and wayside crosses which fall on the peat moorlands, but within the HER and the scale of landform mapping used for this project, they are on the Millstone Grit and are discussed in that chapter.

6.2.4 Evaluation and Mitigation Implications for Organic-Rich Deposits

Where palaeochannels are known to exist in an area of potential, a programme of palaeoenvironmental sampling should be considered as this will not only allow for past environmental reconstruction but also shed light on facets of human activity and landscape exploitation that is not likely to be recovered from excavation alone. Though never fully tested by excavation under archaeological conditions, there is potential for waterlogged deposits to contain a series of archaeological remains in a similar way to the palaeoenvironmental sequence. Even where palaeochannel and other waterlogged deposits are not visible on the surface, there is the potential for them to exist sealed deeper within the sediment body as was the case with the deposits containing the Shardlow log boat (Garton et al 2001). The potential of such deposits should always be considered where development will impact deep into the superficial deposits, as is the case with mineral extraction.

Palaeoenvironmental sampling should also be a key feature of any work which will impact on the peat uplands.

The peat uplands are clearly a favoured locale for Mesolithic activity, although such activity is evidenced across most

of this landform and the current pattern may reflect the areas where archaeologists have been most active. In advance of development in these areas, the initial survey of a site should seek to take into account the areas of known prehistoric lithics as well as, where possible, providing for further systematic location and collection of material. This would then allow for a research-led strategy targeting any sites of high potential. The stratigraphic relationship between lithic finds and the sediment or soil layers in which they occur should be carefully recorded so that such sites can be considered in relation to potential dating samples from the surrounding peat/soil matrix and also so that such occupation can be linked to palaeoenvironmental samples that may shed light on the environment contemporary with, preceding or succeeding the human occupation of these sites. High resolution spatial recording is now possible with the advent of survey-grade GPS, and this will allow for greater accuracy over much of the featureless moorlands than has ever been possible before. The use of survey grade GPS to locate sites and finds is essential if; a) accurate survey and recording is to take place, and b) the sites are to be returned to and re-identified and, if necessary, protected in the future.

7. A Management Framework for Archaeology in Aggregate Producing Areas of Derbyshire and the Peak District

7.1 Landform Elements

As noted in the introduction, this project has synthesised the archaeological resource for all known landforms within Derbyshire and the Peak District and provides a comprehensive overview of archaeological associations for all landforms. The principal reason for this being that whilst extraction will focus on one or more particular landforms, the impact of such development can extend across many landforms, for example palaeochannels inset within sands and gravels, or shallow till cover above hard rock, such as Carboniferous Limestone. There are, however, a number of key landforms which are most likely to be impacted upon by modern extractive industries, and these largely mirror the landforms targeted by the aerial photograph transcription work: Carboniferous Limestone (1a), Magnesian Limestone (1c), Sherwood Sandstone (1e) and Sands and Gravels (2d). To this list can be added the Millstone Grit (1f), especially in relation to the substantial quarrying around Stanton Moor.

	Landform Element	Area (ha)	% of Total Area	Sites per 100ha
1a	Carboniferous Limestone	44941.52	13.66	11.68
1c	Magnesian Limestone	8232.56	2.50	7.06
1d	Lava, Basaltic etc	1990.73	0.61	16.73
1e	Low-Lying Sandstones	9302.88	2.83	7.89
1f	Millstone Grit	64372.94	19.57	3.17
1g	Shales and Siltstones	19242.02	5.85	7.07
1i	Coal Measures	59464.24	18.08	4.11
1k	Mudstones	26215.27	7.97	4.08
2a	Till	24056.88	7.31	4.70
2b	Undifferentiated Drift Deposits	14301.23	4.35	4.66
2d	Sand and Gravel Terraces	11940.71	3.63	7.15
3a	Alluvium	18021.87	5.48	5.85
3b	Palaeochannels	1203.96	0.37	0.10
3c	Upland Peat	25657.79	7.80	0.93
	Derbyshire and the Peak District	**328944.6**	**100**	**6.54**

Table 7.1 Density of archaeological and historical sites across Derbyshire and the Peak District by landform unit.

Table 7.1 above illustrates the density of archaeological and historical sites across Derbyshire and Peak District by landform unit. Whilst this may be a somewhat crude statistical measure, and there are a number of crucial caveats which must be considered when using this data, it nevertheless provides a quick reference as to the relative archaeological potential of each landform unit. There are a number of key points to note about this table. Firstly, the high density of sites on landform 1d is artificially inflated by the number of large sites, such as lead mining remains, which overlap both the Carboniferous Limestone and bands of igneous rock.

Secondly, and critically, this table only relates to currently known sites, and so as more sites are found, the densities will increase. With the Millstone Grit, for example, it is almost certain that the density in the table above is much lower than the real potential for the landform to host archaeological remains. Moorland peat and heather cover over much of this landform means that substantial numbers of archaeological features are masked, and lack of agriculture or other intrusive work means that sites can remain well-preserved yet undiscovered. The high density of sites on the Carboniferous Limestone is both a product of a genuine preference for past settlement and activity on this landform, and also a consequence of this landform being a focus for archaeological fieldwork since antiquarian times.

This landform also abounds in the remains of historic lead mining which contributes significantly to the number of recorded sites, and it also is the main area for cave formations, a distinctive landscape niche that has attracted human activity since Palaeolithic times.

7.2 The Wider Region

This study focuses on the historic environment within Derbyshire and the Peak District, but the landforms and heritage assets they host do not exist within a vacuum. Through the earlier chapters it has been discussed where key sites in other parts of Britain illustrate the potential of certain landforms, and this is perhaps most apposite when commenting on the archaeological associations of landforms in neighbouring counties and regions where the topographic settings can often be similar. A key example of this would be the sand and gravel terraces within the Trent Valley which span several counties across the East and West Midlands. It can be reasonably anticipated that archaeological associations are similar across county boundaries and this should be considered an important source of information when assessing the impact of development within Derbyshire and the Peak District. Attention should be drawn to the on-going aggregates resource assessments in Nottinghamshire and Leicestershire as these will provide important comparanda, as well as potentially highlighting gaps in the archaeological record for Derbyshire and the Peak District.

7.3 Regulatory Framework

This document and guidance sits below the regulatory framework governing archaeology and the historic environment within the planning system and supports the national minerals and archaeology practice guide (MHEF 2008). The regulatory framework has undergone some change in recent years, and what follows is a brief discussion of this framework and where this report sits in relation to it.

7.3.1 Government's Statement on the Historic Environment for England 2010

The 'Government's Statement on the Historic Environment for England 2010' (DCMS 2010), whilst not policy, sets out the aspirational vision and aims for the Historic Environment in England as well as defining terms such as 'historic environment' and exploring its inherent values. The document also incorporates a series of commitments to meet the stated overarching aims and there are a number of ways in which this project and document feed into these commitments.

- "Ensure that relevant policy, guidance, and standards across Government emphasize our responsibility to manage England's heritage for present and future generations" (DCMS 2010, 21) – The overarching aim of this project is to provide guidance and a sound evidence base for the management of heritage assets and the historic environment, specifically in relation to aggregate extraction.
- "Ensure that all heritage assets are afforded an appropriate and effective level of protection, while allowing, where appropriate, for well managed and intelligent change" (DCMS 2010, 21). The protection noted in this commitment is principally represented by Planning Policy Statement 5 which is discussed below. This document sits within the framework provided by PPS 5, while also providing guidance on evaluation and mitigation techniques, specific to Derbyshire and the Peak District, which will provide the 'appropriate and effective level of protection' noted above.
- "Encourage structures, skills and systems at a local level which: promote an early understanding of heritage in the context of development; ensure that local decision makers have access to the expertise they need" (DCMS 2010, 22). The principal aim of this project is to assemble an evidence base and provide a management framework and guidance, based on that evidence base, to allow decisions made at a local level to be as well-informed as possible.
- "Promote opportunities to place people and communities at the centre of the designation and management of their local historic environment and to make use of heritage as a focus for learning and community identity at all levels" (DCMS 2010, 22). "Seek to promote the role of historic environment within the Government's response to climate change and as part of its sustainable development agenda" (DCMS 2010, 23). Both of these commitments feed into the theme of sustainability which is a key aspect of the modern planning process, the significance of which is discussed below.

7.3.2 PPS5

'Planning Policy Statement 5: Planning for the Historic Environment' (CLG 2010) is the policy statement which provides the overarching framework for conservation of the historic environment within the planning system and enshrines the historic environment as a material consideration within the planning process. This policy document draws together all historic considerations under a single unified policy and sets out the areas of responsibility for all stakeholders within the planning process.
There are a number of policy statements within PPS 5 to which this study directly contributes:

- HE2.1 – This document forms a major synthesis of the historic environment and heritage assets within Derbyshire and the Peak District and is intended to form part of the evidence base which is "proportionate and sufficient to inform adequately the plan-making process" (CLG 2010, 4).
- HE2.2 – This sub-policy states that "Local authorities should either maintain or have access to a historic environment record" (CLG 2010). HER enhancement and aerial photograph transcription was undertaken as part of this project to augment the existing knowledge base for Derbyshire and the Peak District.
- HE2.3 – This sub-policy essentially outlines the aims of this project and is worth quoting in full as it illustrates how this document relates to the planning process: "Local-planning authorities should use the evidence to assess the type, numbers, distribution, significance and condition of heritage assets and the contribution that they may make to their environment now and in the future. It should also be used to help predict the likelihood that currently unidentified heritage assets, particularly sites of historic and archaeological interest, will be discovered in the future" (CLG 2010, 4).
- HE3 – This policy states that "Regional spatial strategies and local development frameworks should set out a positive, proactive strategy for the conservation and enjoyment of the historic environment in their area" (CLG 2010). It is intended that the synthesis of data and approach outlined in this document can be used to feed into Regional Spatial Strategies (RSS), Local Development Frameworks (LDF) and Mineral Development Frameworks (MDF) as discussed below.
- HE6 – This policy sets out the key requirements of a developer in relation to projects which may impact on the historic environment. Just as the information and framework within this study serves as an evidence base for curators, so it is also intended to provide guidance and a framework for applications from the aggregates industry and feed into those areas of an Environmental Statement which deal with the historic environment.

7.3.3 Guidance to PPS5

Nested within the framework provided by PPS 5, there are a number of other documents, the first of which is the 'Historic Environment Planning Practice Guide' (CLG/DCMS/EH 2010) which accompanies PPS 5. This document provides guidance on the practical implementation of PPS 5 and is consequently a much more in-depth document than the policy statement itself. This practice guide "supports the implementation of national policy, but does not constitute a statement of Government policy" (CLG/DCMS/EH 2010, 6). This document has been presented by English Heritage as a 'live' document and is therefore intended to be subject to future changes as techniques and practice develop.

7.3.4 Mineral Extraction and Archaeology: A Practice Guide

A national guidance document for England specific to mineral extraction and archaeology has recently been produced by a cross-sectoral group, the Minerals and Historic Environment Forum, that has been widely consulted upon and endorsed by the Association of Local Government Archaeological Officers: England (ALGAO: England), the British Aggregates Association (BAA), Confederation of British Industry (CBI): Minerals Group, English Heritage, the Institute for Archaeologists (IfA), the Mining Association of the UK (MAUK), the Planning Officers Society (POS), the Mineral Products Association (MPA, formerly the Quarry Products Association), and the Federation of Archaeological Managers and Employers (FAME, formerly the Standing Conference of Archaeological Unit Managers). This document is referred to in the Historic Environment Planning Practice Guide (CLG/DCMS/EH 2010) for how to deal specifically with aggregate extraction. 'Mineral Extraction and Archaeology: A Practice Guide' (MHEF 2008) provides guidance for planning authorities, mineral planners, mineral operators, archaeologists, consultants and developers on dealing with archaeological remains within the minerals planning system. The evidence base and guidance resulting from the study reported here should be considered as nested within, and complementary too, this national guidance but with specific relevance for Derbyshire and the Peak District.

7.4 Applying the Landform Element Approach

Previous research (see Passmore et al 2002; Passmore and Waddington 2009) has shown that there is a direct link between certain types of landforms and certain types of archaeological and palaeoecological remains (e.g. sand and gravel terraces were particularly favoured areas for Neolithic-Bronze Age monuments and Anglo-Saxon settlements). As landforms of different age and origin have been able to be dated this means that certain types of landforms only have the potential to host archaeological and palaeoecological remains of certain age and type. In some instances they may overlie earlier sediment units that may contain earlier remains. This is important as it means that the planning response to proposed developments on different types of landform can take this into account. It also allows areas of higher and lower sensitivity to be identified.

The GIS detailing the landform elements that has been used as the basis for this analysis is held by the two local planning authorities covering the study area (DCC and PDNPA) and should be consulted at the earliest opportunity in order to identify the landforms within a proposed development area. Tables 7.2 – 7.14 below summarise the archaeological associations for each landform unit. The tables contain three columns with one detailing geomorphological associations, another the potential archaeological associations and the last archaeological evaluation and mitigation advice. Further, more-detailed, information relating to each landform can be found in the preceding chapters, and it is from these that the tables below have been summarised.

Table 7.15 illustrates the most applicable archaeological techniques by landform followed by a short summary of each technique with more information on specific applicability. It must be stated that every site has unique factors governing the specific archaeological associations and that the tables below should be considered a general guide to the potential of a site. Understanding the potential of any given site requires both informed interpretation as well as the exercise of professional judgement linked directly to the evidence base provided by this study and existing site reports and publications. All developments require open and continuous dialogue between stakeholders from as early as possible in the planning process to ensure that the most applicable and cost-effective evaluation and mitigation works are undertaken.

The evidence base provided by this work is intended to help inform all stages of minerals planning. This includes the Local and Minerals Development Frameworks, and also site-specific planning strategies and responses from the screening and scoping stages, through pre-determination evaluation, archaeological responses and post-permission mitigation measures, as well as sustainability measures through the life of a development and beyond. This work follows that of 'Minerals Extraction and Archaeology: A Practice Guide' (MHEF 2008) in stressing two key themes of minerals planning: a coherent and consistent approach that engages stakeholders through all stages of the process, and a question-led targeted approach to archaeological work with clearly defined research goals keying into local, regional and national research agendas.

The question-led targeted approach has been noted a number of times throughout the earlier chapters where landform-specific evaluation and mitigation techniques have been discussed. The importance of this is that it should prevent archaeological work being undertaken as a blanket measure or as part of a 'one size fits all' approach to evaluation, but rather provides a clear focus ensuring that the correct archaeological techniques are applied so as to evaluate the potential of an area and not to sample it. The question-led and targeted approach dovetails with the need for a phased programme of work where the earlier stages inform, and lead into, later stages.

7.5 Landform Element Tables of Associations

Table 7.2
1a – Carboniferous Limestone

Geomorphological Processes	Archaeological Associations	Evaluation and Mitigation Issues
• Potential burial and(or)reworking of multiperiod archaeological deposits in cave and rock-shelter settings by Quaternary physical processes (e.g. fluvial, aeolian, slope and rock failure processes), chemical processes (e.g. calcification) and human/animal activity • Potential reworking and(or) burial of Palaeolithic materials in plateau, hilltop and hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Potential burial of multiperiod archaeological deposits by Quaternary rockfall and talus deposits • Hilltop, hillslope and plateau settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Cropmarks can be identified, but the extent of pasture and amount of visible ridge and furrow cultivation inhibits cropmark formation so it is likely that the number of currently known cropmarks is under-representative of the amount of buried archaeological remains. • Soils on limestone parent material tend to have an alkaline bias which normally provides good conditions for the preservation of organic materials such as human and animal remains, snails and plant remains, as well as burnt organic material. This picture can be very localised however as the permeable nature of the rock also allows for a gradual leaching of the soil which means some upland settings can become increasingly acidic. It also means that waterlogged deposits can be rare and therefore difficult to identify sediments, from which palaeoenvironmental records based on pollens and botanical macrofossils can be obtained to reconstruct past environments. Some burial sites appear to have deliberately targeted local pockets of clay, such as Gib Hill and Liffs Low. • Mixed age earthworks, upstanding remains and cave sites which represent human activity ranging from the Palaeolithic (cave sites) through to the present day. Some upstanding monuments are very rare examples such as the bank barrow of Long Low. • Artefact assemblages and individual findspots from fieldwalking, test pits, cave sites and chance finds make up a large volume of the known archaeological resource for the Mesolithic and Neolithic periods • Extensive tradition of burial monuments (Neolithic-Early Bronze Age, occasional Early Medieval) – Neolithic-Bronze Age is the dominant period represented in the archaeological resource on this landform. Burial monuments tend to occur on, or just off, the crest of a hill or on scarp edges where they are easily visible. The 'Great Barrows' are positioned on high crests and are intervisible. 'Beaker period' activity appears to have focused on the Limestone geologies with the majority of sites known on the Carboniferous Limestone. • Bronze Age copper mining evidence can still be found in the caves and mines, as evidenced at Ecton. • Two hillforts, presumably Iron Age, along with a large number of smaller enclosures which may date to the Iron Age or the Romano-British period are known on this landform. • A Roman centre existed at Buxton and some sites in the Carsington area are linked by a network of roads with sites in the surrounding area. Potential for remains of Roman period mining to exist in more-recent mineworkings, as some is already known, and it is thought that the mineral wealth was a key reason for the Roman control of the area. • Romano-British sites are also well attested. These can be identified as artefact scatters, or in some cases as earthworks and upstanding remains. They can be located on hilltop sites close to previous Iron Age centres, or as an expanded form of vicus near Roman sites • There is evidence for early medieval activity, predominantly represented by a large body of sculpture now housed at various churches, but some of which was originally sited on moor tops by roadways; the place name evidence indicates many modern villages had early medieval origins; a number of burial monuments are known, some are Bronze Age cairns re-used in this period and others appear to be constructed during the early Anglo-Saxon pagan period. The barrows of early medieval date tend to be of earthen construction and are relatively small and low. • Medieval period represented by field systems, including ridge and furrow, and deserted and shrunken villages. Large amounts of the Carboniferous Limestone is enclosed land. Field morphology can be a key interpretational tool for charting land use from pre-Conquest through to enclosure period. • Lead mining and quarrying remains - multi-period industrial activity is widespread but predominantly post-medieval. Perhaps use of caves in earlier historic periods may represent industrial activity. Exploitation of natural resources normally very visible both on aerial photographs and also from ground observation. There is also documentary and archaeological evidence that lead mining was widespread through the Roman and medieval periods, though the majority of known sites today relate to the post-medieval period. • Quarrying was for a number of different purposes and industries, but a great deal was focused on lime-making which has a very distinctive archaeological footprint on the Carboniferous Limestone as visible from aerial photographs. • Sand extraction occurred from the 'pocket deposits' in the southern Carboniferous Limestone where the bedrock has become dolomitised in places. • The impact of the railway on the Carboniferous Limestone, primarily through the early Cromford and High Peak Railway, linked the industrial centres of Sheffield and Manchester with the heart of the Peak District and its mineral wealth.	• Close-spaced fieldwalking (2m linewalking intervals) can be very informative for characterising stone age activity across a wide area based on the recovery of stone tools which are virtually indestructible. Fieldwalking can also recover the archaeological remains of later periods, particularly Roman and medieval, based on the recovery of pottery sherds. The distribution of finds, and their freshness, can be used to understand where and whether sub-surface remains survive and where to target evaluation trenching or test pits. • Any development impacting upon potential cave sites requires a very specific archaeological approach, especially given their potential to contain remains from any period including the Palaeolithic. • Where upstanding remains exist, earthwork survey will provide an important baseline for understanding the monument and which can inform further fieldwork. • There has not been a great deal of geophysical survey on this type of geology, although the recent use of close-spaced magnetometry and resistivity at Fin Cop suggests these techniques may yet have some merit for finding sites that had substantial cut features or areas of burning. • Ridge and furrow cultivation can mask and preserve earlier remains and this should be taken into account as part of any archaeological investigation where such features are potentially impacted upon. Evaluation trenching and geophysical survey are two of the few techniques potentially suited to evaluating such areas. • Given that the preservation of organic remains is likely to be quite good on this type of landform schemes of work should include provision for palaeoenvironmental analysis of both unburnt and burnt organic remains.

Table 7.3
1c Magnesian Limestone

Geomorphological Processes	Archaeological Associations	Evaluation and Mitigation Issues
• Potential burial and(or)reworking of multiperiod archaeological deposits in cave and rock-shelter settings by Quaternary physical processes (e.g. fluvial, aeolian, slope and rock failure processes), chemical processes (e.g. calcification) and human/animal activity • Potential reworking and(or) burial of Palaeolithic materials in plateau, hilltop and hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Potential burial of multiperiod archaeological deposits by Quaternary rockfall and talus deposits. • Hilltop, hillslope and plateau settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Cropmark formation is potentially good on the Magnesian Limestone, as the lower altitude lends itself more to arable agriculture, as opposed to the more pastoral agriculture common on the Carboniferous Limestone which tends to inhibit cropmark formation. Cropmarks readily identified from aerial photograph transcription range from probable later prehistoric/Romano-British enclosures through to probable post-medieval industrial remains. Known cropmark formation on the Magnesian Limestone of neighbouring South Yorkshire and beyond into West Yorkshire is excellent with multi-period and extensive cropmark landscapes evident. • Soils on a limestone parent material tend to have an alkaline bias providing good conditions for organic preservation. • Mixed age earthworks, upstanding remains and cave sites which represent human activity ranging from the Palaeolithic (cave sites) through to the present day. The upstanding remains are not as extensive as on the Carboniferous Limestone, which probably reflects the differing intensity of subsequent land use on the two landforms. • The cave sites of the Magnesian Limestone host internationally important cave art, and talus deposits within the caves have the potential to preserve deposits undisturbed. The formation of 'tal' within caves can seal Palaeolithic remains ensuring it is well protected but at the same time making it hard to access archaeologically without recourse to highly destructive activity. The alkali limestone means that there is also the potential for organic material to be preserved. While the cave sites host Palaeolithic remains, there are few known open sites from this period. Where ploughing has taken place on surfaces little modified by Holocene geomorphological activity, fieldwalking may be able to identify stone tool assemblages and use their distribution to locate sites. • Artefact assemblages and individual findspots recovered from the ploughsoil make up a large volume of the known archaeological resource, representing the majority of known 'sites' in almost all periods, which is possibly a product of the large amount of arable cultivation and therefore exposure of artefacts in the ploughsoil. • The Whitwell Long Cairn could represent a similar tradition to the 'Great Barrows' of the Carboniferous Limestone and to other known Neolithic burial monuments on the Magnesian Limestone of South and West Yorkshire and County Durham. The Long Cairn was positioned below the summit of a ridge line to the north of Creswell Crags and this mirrors the topographic position of many of the other long cairns in the aforementioned areas. • Wooded areas have the potential to host upstanding remains as they have not been levelled by later agriculture. On the Magnesian Limestone in Derbyshire this is known from the remains in Scarcliffe Park which include potential Bronze Age barrows and Roman industrial features. Survey of wooded areas within largely cultivated landscapes has the potential to demonstrate the level of survival of upstanding remains and give an indication of the type and density of sub-surface deposits. • The lowland landscape of the Magnesian Limestone perhaps was more accessible during the Roman period and therefore more conducive to settlement than the uplands. The promontory fort at Markland Grips is sited on a naturally defendable promontory between two gorges or 'grips'. Activity spanned from the Iron Age through to the Roman period. Hillforts such as this may exist on naturally defendable spurs of land or above scarp edges defined by the natural limestone gullies, though subsequent agriculture may have reduced any original ramparts. • While the associations are broadly similar to landform 1a, the topographic setting is different, and there are other differences (e.g.the tradition of cairn/barrow burial is not as evident), though this may represent the greater level of destruction on the Magnesian Limestone through more intensive agricultural regimes. • There is a major post-medieval industrialised landscape on the Magnesian Limestone due to the proximity of the mineral wealth associated with the Coal Measures. The large-scale industrial impacts on the landscape are relatively focused around individual sites.	• Any development impacting upon potential cave sites requires a very specific archaeological approach, especially given the potential to host remains from any period including the Palaeolithic. • Ridge and furrow remains can mask and preserve earlier remains beneath the ridges and this should be taken into account as part of any archaeological investigation where such features are impacted upon. • There has been greater agricultural and industrial impact on this landform than on the Carboniferous Limestone which means that there may be more unknown archaeological remains removed by later industrial activity or sealed beneath ridge and furrow or ploughed areas, but that now only exist in a truncated form. • Given that the preservation of organic remains is likely to be quite good on this type of landform, schemes of work should include provision for palaeoenvironmental analysis of both unburnt and burnt organic remains.

Table 7.4 1d – Lava, Basaltic etc.		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Potential burial and(or)reworking of multiperiod archaeological deposits in cave and rock-shelter settings by Quaternary physical processes (e.g. fluvial, aeolian, slope and rock failure processes), chemical processes (e.g. calcification) and human/animal activity • Potential reworking and(or) burial of Palaeolithic materials in plateau, hilltop and hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Potential burial of multiperiod archaeological deposits by Quaternary rockfall and talus deposits. • Hilltop, hillslope and plateau settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Very small total area represented by this landform. Exists as bands within the Carboniferous Limestone and therefore may have similar associations, however its significance archaeologically is that it provides a junction with the Carboniferous Limestone that may have been attractive for early human groups. • Often found as outcrop on the steep scarp edges as at Matlock Bath. Where the basaltic lava does exist, the differences in permeability between the lava and the Carboniferous Limestone mean there is the potential for cave formation (e.g. Hob's House, Monsal Dale which produced Bronze Age and Romano-British evidence and human remains. • Lava beds can sometimes form spring lines due to the difference in permeability with the Carboniferous Limestone. Potential that settlement sites may cluster near to these. The lava beds may be a good indicator of original spring lines, as it is uncertain to what level the spring lines have dropped following medieval and post-medieval lead mining activity etc. • Where the lava has outcropped it has been the focus of quarrying, known as 'toadstone', as at Black Rock Corner, Ashford.	• Any development impacting upon potential cave sites requires a very specific archaeological approach, especially given their potential to host remains from any period including the Palaeolithic. • Whilst only existing generally as small bands, the presence of this landform should be noted as being of importance due to the potential for old spring lines and therefore a potential attraction for past settlement.

Table 7.5 1e – Sherwood Sandstones		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Potential burial and(or)reworking of multiperiod archaeological deposits in cave and rock-shelter settings by Quaternary physical processes (e.g. fluvial, aeolian, slope and rock failure processes), chemical processes (e.g. calcification) and human/animal activity • Potential reworking and(or) burial of Palaeolithic materials in plateau, hilltop and hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Potential burial of multiperiod archaeological deposits by Quaternary rockfall and talus deposits. • Hilltop, hillslope and plateau settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• No Palaeolithic and Mesolithic sites yet known and Neolithic period only represented by two findspots. It appears that the low-lying sandstones were not an attractive locale for activity during these periods. Regionally there is some early prehistoric activity known (Notts), though there is a strong fieldwork bias in the known locations. • Small amount of Bronze Age activity known, generally from the more upland parts of the landform and generally burial activity very similar in form and setting to the Bronze Age funerary monuments of the Carboniferous Limestone. • Potential that the sandstone 'bluffs' along the sides of major river valleys may host Iron Age activity in a similar way to the lowland hillfort of 'Borough Hill' on the Mercia Mudstones. Other Iron Age remains relate to the 'enclosed landscape' known from the sands and gravels of the Trent Valley, in particular the known pit alignments. This mirrors a pattern from Nottinghamshire where sites are known around the fringes of the sandstone 'plateau' and overlooking watercourses. • Very little Roman activity known in comparison with the other landforms. The Roman road network crosses the landform, but no definite sites are known. The known Roman small finds cluster along the sandstone 'ridge' which forms the southern side of the Trent Valley in the area east of Repton and Willington. This is in stark contrast to Nottinghamshire, where there is a movement of agriculture into the higher grounds away from the Trent, with an intensification of agriculture, most notably illustrated by the extensive brickwork field systems. Potentially marginal land is brought into usage, but this does not appear to be the case from the archaeological evidence in Derbyshire. • Early medieval activity is represented by a few key sites. The Anglo Saxon centre at Repton, the later Viking enclosure and mass grave on the same site, and the burial complex of the Great Army at Ingleby, all sit on the same sandstone ridge which defines the edge of the superficial valley bottom deposits, positioned to control the river. • The medieval period is defined by a large number of field systems and a few known deserted medieval villages. Quarrying is also known, and was probably more widespread, but a large amount of post-medieval and modern quarrying has impacted upon large swathes of the landscape. As with many of the lowland landscapes, there are a substantial number of deer parks and parks and gardens associated with large houses. Although these areas have been 'landscaped' they also have the potential to preserve earlier features in areas divorced from post-medieval and modern industry and development. • The post-medieval and modern archaeological record is dominated by the quarrying of sandstone.	• Aerial photographs have the potential to identify archaeological remains on the landform, as known from previous work, but the current aerial photograph transcription for this area emphasizes the extent of quarrying activity that has taken place on this landform. • Where sandstone bluffs form the high ground above river valleys, application of fieldwalking and topographic survey may reveal early and late prehistoric remains respectively. • Evaluation techniques relating to large linear features such as Roman Roads might include the following: fieldwalking if the conditions are suitable, geophysical survey to test for the presence of structures associated with the road line and also the course of the road line itself, targeted evaluation trenches to test fieldwalking and geophysical results, and targeted excavation based upon the results of the prospection techniques employed.

Table 7.6
1f – Millstone Grit

Geomorphological Processes	Archaeological Associations	Evaluation and Mitigation Issues
• Potential reworking and(or) burial of Palaeolithic materials in plateau, hilltop and hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Hilltop and hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity • Potential burial of multiperiod archaeological deposits beneath localised (presently unmapped) Holocene peat deposits	• Soils tend to be acidic which leads to poor preservation of unburnt organic materials. • Largely unimproved upland - leads to good preservation of upstanding stone-built remains. The low density of sites indicated in the HER and NMR is a product of the lack of development and investigation and also the masking effect of both blanket peat and heather. • The quality of preservation of remains resulting from the lack of intense land use allows for a landscape-scale approach to archaeological work which is not possible on other, more heavily-developed landforms. • Unimproved moorland does not indicate a lack of industry, as in the past the Millstone Grit was heavily quarried, particularly for the production of mill stones, and was also subject to coal mining, as well as hosting ore smelting sites amongst others. • Large amount of Mesolithic sites are known from the gritstone uplands, both in the form of flint scatters and single finds (commonly within peat – see below), and also as excavated sites. Activity appears to focus toward the exposed edges and near springs. Some sites in adjoining areas have produced evidence for Mesolithic structural remains. • Vast majority of Neolithic activity is represented by findspots and lithic scatters with a notable preponderance of stone axe heads suggestive of woodland clearance. • The Millstone Grit forms the southern extent of the known focus of later prehistoric rock art, predominantly in the style of cup-and-ring marks. The heavy quarrying of so many Millstone Grit surfaces has meant that the volume of rock art is now undoubtedly under represented and this is compounded by the fact that the Millstone Grit, having an open and coarse structure, is subject to considerable weathering from wind and freeze-thaw action which has also degraded surfaces to the extent that prehistoric rock art is either eroded away or barely visible. • A considerable amount of Bronze Age activity is known giving the appearance of an explosion in activity during the Later Neolithic-Early Bronze Age period. The remains predominate on the East Moors and consist of extensive farmstead settlement remains with associated field systems, and also over 200 known 'barrow' or cairn sites. The two types of site are broadly intermingled and appear to represent complete settlement landscapes. • With the extensive Bronze Age remains, as well as those of other periods, there is a pattern of settlement which focuses on the 'shelves' above the gritstone edges, visible in positioning of monuments such as Gardom's Edge and also in the distribution of artefact scatters, among others. • There are a number of hillforts on the gritstone which most likely date to the Late Bronze Age – Iron Age, though further investigation is needed. Carl Wark is undated but potentially dates to this period. There is a clear preference for promontory and scarp edge enclosures, often overlooking water courses, fitting in with the overall pattern of the Peak District hillforts. • Roman activity is represented predominantly by the infrastructure of the Roman occupation and also smaller, probably 'native', farming settlements and also small fortlets, with none of the larger settlements known from the Carboniferous Limestone, the shale valleys or the lowland areas of south Derbyshire. • Medieval remains include farming settlements – indicating the presence of post-Bronze Age agriculture on the moors, though there is definitely a contraction after the intense settlement and agriculture of the Bronze Age which mirrors the evidence from analogous areas of Britain, such as Dartmoor or the Cheviot Hills. • Medieval settlement, as determined by location of known medieval structures such as churches, castles etc, tends towards the lower-lying areas of the gritstone as would be expected. Whilst there are still remains from the higher moors, the medieval usage of the uplands appears similar to that during the Roman period, where unimproved pasture land may predominate. • The remains of medieval deer parks are an important landscape association, as in other landforms, but especially on the Millstone Grit where the preservation of upstanding remains is generally very good. They are important both in their own right as historical monuments, but also in the preservation they offer to earlier remains. • Industry on the gritstone moors is reasonably extensive in both the medieval and post-medieval periods, with the Millstone Grit in demand for both the millstones which gave the rock its name, and also as building stone. Processing of raw materials also makes up a significant part of the 'industrial' remains of the gritstone moors including lead and lime processing. • Harnessing power from the fast flowing streams that drain off the gritstone moors has created great change in the landscape, with not only the construction of mills and associated structures in the lower reaches, but most notably the reservoirs and dams which are abundant across the uplands and valleys. Linked to these are the extensive canal remains on the western gritstones which link to the industrial centres of the North West. • Post-medieval remains are extensive including the industries noted above. Large numbers of shooting butts, access roads, packhorse tracks, waystone markers, clapper bridges, turnpikes and toll buildings are known • The impact of the railway on the Millstone Grit is principally from the two tunnels (Totley and Woodhead) which linked the industrial centres of Sheffield and Manchester with the heart of the Peak District and its mineral wealth. • Modern military remains across the eastern moors relating principally to WWI and WWII include practice trenches, gun emplacements, decoy sites. As well as these, there are a number of known plane crash sites such as those on Kinder Scout and Bleaklow.	• Landscape setting should form a key part of preliminary analysis of the site, as the preservation of features within a landscape is better on the high moors than on any other landforms. • Prevalence of upstanding remains means that earthwork survey is a key tool for recording archaeological remains on this landform. This may either form the principal record where the impact is deemed to be not great against the significance of the monument, or can provide baseline data for a continuing and progressive programme of works. • Where vegetation is low and light conditions are favourable, upstanding remains can be clearly visible through aerial photography, though lack of arable agriculture means that cropmark formation is poor to non-existent. • In advance of development in areas with potential for Mesolithic remains, the initial survey of a site should seek to take into account the areas of known prehistoric lithics as well as, where possible, providing for further systematic location and collection of material. The stratigraphic relationship between lithic finds and the sediment or soil layers in which they occur should be carefully recorded so that such sites can be considered in relation to potential dating samples from the surrounding peat/soil matrix and also so that such occupation can be linked to palaeoenvironmental samples that may shed light on the environment contemporary with, preceding or succeeding the human occupation of these sites. The use of survey grade GPS to locate sites and finds is essential. • Any development on the Millstone Grit of the East Moors may well impact upon known or unknown archaeological remains of Neolithic-Bronze Age date, and in this case, a preliminary survey should be followed with targeted investigation where a site would otherwise be impacted upon adversely. Evaluation strategies that could be usefully employed on the gritstones includes close-spaced geophysical survey, evaluation trenching, test pits and potentially ground penetrating radar depending on the type and scale of a proposed development. • The preservation of upstanding remains in particular lends itself to widespread application of topographic survey as a rapid way of acquiring a large amount of data through non-invasive means. As activity locales can be identified due to the survival of upstanding remains, this allows for the targeted use of test pits and evaluation trenches around such locales.

Table 7.7
1g – Shales and Siltstones

Geomorphological Processes	Archaeological Associations	Evaluation and Mitigation Issues
• Potential reworking and(or) burial of Palaeolithic materials in hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• The valleys sit between the two predominant upland landforms of gritstone and Carboniferous Limestone. This may be an attractive settlement locale as it is sheltered but within close distance of a number of landforms allowing for a wide variety of exploitable resources. The predominantly valley locales of the shale landform means that these will have formed natural routeways through the landscape throughout human history. • The valleys were potentially heavily wooded for a long time, and clearance may have happened later in the valley bottoms than in the upland environments, suggesting that this may have been a less-heavily settled landscape in earlier periods. • Due to valley bottom locales the landform hosts a great deal of industrial remains including water-powered mills, steam-powered mills and associated sites such as weirs and goits. • Very few Palaeolithic or Mesolithic finds are known from the landform suggesting that the upland areas were more attractive for settlement activity at least during the hunter-gatherer periods. • Substantially more Neolithic activity is known than for earlier prehistory. There is a potential long cairn near Lismore Fields, which lies adjacent to the shale landform. A very high ratio of polished stone axe heads is known from this landform, and their locations suggest a preference for activity near to water courses. A 'midden' pit found at Big Lane, Hognaston, is possibly indicative of Early Neolithic settlement activity. • Continuation of the 'barrow' tradition of the Carboniferous Limestone with many burial monuments known from similar topographic settings. Also possible burial monuments known from lowland valley bottom settings, similar to the ring ditches known from the lowland areas of south Derbyshire. A large amount of Bronze Age metalwork is known as individual findspots and these are located near to water sources generally. • Mam Tor represents the only major Iron Age site with a geological link to the shales. • Intensification of land-use of the shale valleys during the Roman period, with substantial activity focused on the fort and vicus at Brough, and also along the lines of the Roman roads leading on to the plateau to Buxton and along the lines of the major valleys. Significant concentration of finds around the known Roman industrial sites at Lumb Brook near Hazelwood. With a lack of natural resources immediately available on other geologies, it is possible that the Roman activity on the valley shales relates to access to fresh water, processing of raw materials, control of movement and also to the agricultural underpinnings of the Roman occupation in this region. • The early medieval period is poorly represented with the Grey Ditch earthwork being the major monument known. • The valleys were a clear focus for settlement and agriculture during the medieval period as illustrated by the ratio of known field systems etc. Preservation of ridge and furrow is particularly good on the heavy soils of the shales, so this may account for some small bias in the data. A large number of deserted medieval villages is known, and these tend to be sited near to existing settlements, though some are known to have been flooded during the creation of reservoirs. • Medieval deer parks and hunting estates represent a reasonable portion of known medieval land-use across the landform. These enclosed areas, as well as being of historic interest in their own right, have the potential to preserve archaeological remains away from post-medieval and modern industry and development. • Substantial amounts of post-medieval and modern archaeological remains relate to the railway, road and canal systems which formed an integral part of the economy in this area. As well as the actual routeways themselves, there is a huge volume of associated industrial sites.	• As a relatively well-developed agricultural landscape, the shales present good opportunities for the use of fieldwalking as an evaluation technique. Almost 10% of all the known sites on the landform are single finds or artefact scatters which suggests that this would be a fruitful technique for prospecting for archaeological sites, as well as compiling a record of artefacts within the ploughzone which may otherwise go unrecorded. • Evaluation and mitigation relating to large linear features such as Roman Roads might include the following: fieldwalking if the conditions are suitable, geophysical survey to test for the presence of structures associated with the road line and also the course of the road line itself, limited evaluation trenches to test fieldwalking and geophysical results, and targeted excavation based upon the results of the evaluation techniques employed. • Ridge and furrow can mask and preserve earlier remains beneath the ridges and this should be taken into account as part of any archaeological investigation where such features are impacted upon.

Table 7.8 1i – Coal Measures		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Potential reworking and(or) burial of Palaeolithic materials in hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• The Coal Measures are geologically very similar to the Millstone Grit, comprising interbedded sedimentary, conglomerate rocks and coal beds. Theoretically the archaeological associations should be very similar to those of the Millstone Grit, and this is demonstrably the case on the interface between the two landforms in the uplands, where there are, as an example, a large amount of Bronze Age remains. • Known Mesolithic sites on the Coal Measures are few but illustrate a clear fieldwork bias. The largest concentration of known sites is around Unstone, as a direct result of the fieldwork undertaken by the North Derbyshire Archaeological Trust. While there are few Mesolithic sites known overall from the landform, where fieldwalking has been employed, early prehistoric sites have been identified, and the actual number of sites is probably far higher than currently suspected. The Mesolithic sites show a clear topographic preference for valley sides and raised points above water courses, which echoes sites in the Trent Valley, and also in the uplands such as at Deepcar on the Millstone Grit. • Known Neolithic and Bronze Age sites are predominantly found on the interface with the gritstone on the Eastern Moors and the associations are almost identical to those of landform 1f. Extensive field systems and settlements occur along with funerary 'barrows'/cairns. • In the lower lying areas of the Coal Measures, Bronze Age occupation has been demonstrated through the excavation of Bronze Age activity defined by a boundary ditch at Tibshelf. • The Roman-period activity is centred on the remains at Chesterfield which was a short-lived fort later occupied as an industrial centre. There are also cropmark enclosure sites known, which may be Iron Age or Romano-British in origin, but illustrate the potential of the Coal Measures, where undisturbed, to host good visible cropmarks. • From the medieval period onwards, the archaeological resource of the Coal Measures is dominated by the industrial remains associated with ridge and furrow, which will mask, but also protect, underlying remains • The scale of post-medieval and modern industrial activity has undoubtedly had a detrimental effect on the archaeological remains of earlier periods, but the limited fieldwork undertaken on this landform has illustrated that there are surviving remains. Rapid landscape-scale prospection techniques such as fieldwalking and aerial photography have been proven to be effective on this landform.	• The application of fieldwalking at Unstone has illustrated that this is a fruitful technique for this landform, where conditions are conducive. • Where arable land remains on the Coal Measures, and has not been impacted upon by later industry or development, there appears to be both good formation of cropmarks, and also reasonable survival of artefacts within the ploughsoil. • As well as the industrialised landscape, there are also significant remains of medieval and post-medieval agriculture across the landform. Ridge and furrow can mask and preserve earlier remains beneath the ridges and this should be taken into account as part of any archaeological investigation where such features are potentially impacted upon. • Aerial photographs have the potential to identify archaeological remains on the landform, as illustrated by the mapped cropmarks to the west of Bolsover which may be late prehistoric in date.

Table 7.9 1k - Mudstones		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Potential reworking and(or) burial of Palaeolithic materials in hillslope settings by Quaternary periglacial, hillslope and mass-movement processes • Hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Known Mesolithic sites are represented by lithic scatters, which tend to focus on and around the river bluffs and valley sides above active water courses. • Bronze Age cropmark remains are known. As with the sand and gravel terraces of the Trent Valley that overlie this landform, there is good potential for cropmark formation, and aerial photography may be a very useful prospection tool. • The low yet pronounced river cliffs, which attract Mesolithic activity, also host the lowland river valley fort of Borough Hill on this landform. This is a presumably Iron Age site which is suggestive of the riverine forts of Northumberland and the Scottish borders that line the bluffs along the course of the river Tweed and may represent the continuation of the upland 'scarp edge enclosure' tradition seen in the Peak District, into the lowlands of south Derbyshire. • Roman-period sites are dominated by the two clusters around Little Chester and Ockbrook/Borrowash. There is a significant fieldwork bias in this data due to the excavations and fieldwalking around Ockbrook, but this does also illustrate the effectiveness of fieldwalking, and therefore also test pitting, as a prospection and evaluation technique for Roman activity, as well as prehistoric lithic scatter sites. • Significant medieval remains occur across the landform and illustrate the widespread agricultural and small-scale industrial activities that predominated. Multiple examples of ridge and furrow, deserted and shrunken medieval villages, castles with nucleated settlements, deer parks and also three of the largest monastic sites within the county are known on this landform. • In the post-medieval period, industrial sites are the principal archaeological association, with mills, factories and extraction sites being more prevalent than agricultural sites. Principal industries represented are corn processing, brick production, lime-working and silk production, with many of the sites utilising water power in a similar way to the Derwent Valley Mills further up the catchment.	• Where the landform forms the high ground and bluffs above river valleys, application of fieldwalking and topographic survey may reveal early and late prehistoric remains respectively. Targeted evaluation trenching may yield useful results in such locations. • Veracity of fieldwalking where conditions are suitable, illustrated by the amount of known Stone Age tools and also pottery, particularly Roman. • Ridge and furrow can mask and preserve earlier remains beneath the ridges and this should be taken into account as part of any archaeological investigation where such features are potentially impacted upon.

Table 7.10 2a - Till		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Recent work (Mills and Palmer 2007) has compiled research on clay landscapes illustrating greater potential for prospection and discovery and a greater amount of archaeological sites than previously suspected. • Potentially suffers from a fieldwork bias and is underrepresented in the archaeological record due to historical view that clay landscapes are an unattractive settlement locale. • For a number of the till deposits in Derbyshire and the Peak District, the associations tally well with those of the underlying hard rock landform, suggesting that in these areas, the till is not a major determinant for archaeological associations. • Few Palaeolithic, Mesolithic and Neolithic finds noted other than a few scattered lithic find spots and occasional scatter, though the substantial assemblage known from Lismore Fields (see below). This is a pattern borne out elsewhere in England, whereas later periods are better represented. • Lismore Fields site does not fit with the picture extrapolated from the other HER and NMR data. It is an Early Neolithic occupation site of national importance situated on the till at the junction of the Carboniferous Limestone and shale, with the Millstone Grit bordering close to the north-west. It is defined by dispersed cut features with midden pits producing artefacts and has a high potential for palaeoenvironmental remains. This locale is really a small pocket of till amongst Carboniferous Limestone, and the ability to cut foundations into the till more easily than into bedrock may be a factor in making this specific locale attractive for timber-built Neolithic buildings. • Bronze Age remains appear to marry closely with the archaeological associations of the underlying landforms. Bronze Age barrows/cairns occur on visible points such as false crests, breaks in slope and local high points. • Very few Iron Age archaeological remains known, with the only clearly dated site being a pit alignment similar to those known from the Trent Valley sand and gravel terraces. • Where there are significant Roman remains and artefact scatters, as with the Bronze Age, the associations are similar to those of the underlying bedrock landform and distribution of sites continues across the till landform. Two significant distributions of sites are known at Ockbrook and Borrowash based on the work of the local history society, and also in the area around Carsington Water. • Very few early medieval sites known, though the Anglian burial at Wyaston is the only known Anglian burial not on the Carboniferous Limestone proper. • Other than the built heritage, medieval and post-medieval remains are generally represented by ridge and furrow and other relict field systems, and also upstanding remains associated with a few deserted medieval villages. • The heavy clay soils over the till allow for a better level of preservation of upstanding remains such as ridge and furrow and this in turn indicates the potential for better preservation of earlier remains masked by medieval and post-medieval farming.	• Aerial photography has been demonstrated to be a viable technique on clay geologies. • Type site of Lismore Fields illustrates the occurrence of dispersed cut-feature archaeological remains. Due to the ephemeral and dispersed nature of the archaeological remains of post-built timber structures and various types of pits, conventional evaluation techniques are generally unsuitable as they are barely detectable by geophysical survey, are rarely seen on aerial photographs and are a chance discovery if they occur in evaluation trenches. These types of site are very important in terms of the archaeological information they can yield and they are typically discovered and recorded during fairly large-scale surface stripping, as at Lismore Fields, but this is also the case for Neolithic settlement sites on other landforms. Close-spaced fieldwalking or test pits, particularly targeted on areas of level ground, may be useful evaluation techniques dependent on current land-use. • Where upstanding remains are preserved due to the heavy soils, earthwork survey can be usefully employed.

Table 7.10 2a - Till		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Recent work (Mills and Palmer 2007) has compiled research on clay landscapes illustrating greater potential for prospection and discovery and a greater amount of archaeological sites than previously suspected. • Potentially suffers from a fieldwork bias and is underrepresented in the archaeological record due to historical view that clay landscapes are an unattractive settlement locale. • For a number of the till deposits in Derbyshire and the Peak District, the associations tally well with those of the underlying hard rock landform, suggesting that in these areas, the till is not a major determinant for archaeological associations. • Few Palaeolithic, Mesolithic and Neolithic finds noted other than a few scattered lithic find spots and occasional scatter, though the substantial assemblage known from Lismore Fields (see below). This is a pattern borne out elsewhere in England, whereas later periods are better represented. • Lismore Fields site does not fit with the picture extrapolated from the other HER and NMR data. It is an Early Neolithic occupation site of national importance situated on the till at the junction of the Carboniferous Limestone and shale, with the Millstone Grit bordering close to the north-west. It is defined by dispersed cut features with midden pits producing artefacts and has a high potential for palaeoenvironmental remains. This locale is really a small pocket of till amongst Carboniferous Limestone, and the ability to cut foundations into the till more easily than into bedrock may be a factor in making this specific locale attractive for timber-built Neolithic buildings. • Bronze Age remains appear to marry closely with the archaeological associations of the underlying landforms. Bronze Age barrows/cairns occur on visible points such as false crests, breaks in slope and local high points. • Very few Iron Age archaeological remains known, with the only clearly dated site being a pit alignment similar to those known from the Trent Valley sand and gravel terraces. • Where there are significant Roman remains and artefact scatters, as with the Bronze Age, the associations are similar to those of the underlying bedrock landform and distribution of sites continues across the till landform. Two significant distributions of sites are known at Ockbrook and Borrowash based on the work of the local history society, and also in the area around Carsington Water. • Very few early medieval sites known, though the Anglian burial at Wyaston is the only known Anglian burial not on the Carboniferous Limestone proper. • Other than the built heritage, medieval and post-medieval remains are generally represented by ridge and furrow and other relict field systems, and also upstanding remains associated with a few deserted medieval villages. • The heavy clay soils over the till allow for a better level of preservation of upstanding remains such as ridge and furrow and this in turn indicates the potential for better preservation of earlier remains masked by medieval and post-medieval farming.	• Aerial photography has been demonstrated to be a viable technique on clay geologies. • Type site of Lismore Fields illustrates the occurrence of dispersed cut-feature archaeological remains. Due to the ephemeral and dispersed nature of the archaeological remains of post-built timber structures and various types of pits, conventional evaluation techniques are generally unsuitable as they are barely detectable by geophysical survey, are rarely seen on aerial photographs and are a chance discovery if they occur in evaluation trenches. These types of site are very important in terms of the archaeological information they can yield and they are typically discovered and recorded during fairly large-scale surface stripping, as at Lismore Fields, but this is also the case for Neolithic settlement sites on other landforms. Close-spaced fieldwalking or test pits, particularly targeted on areas of level ground, may be useful evaluation techniques dependent on current land-use. • Where upstanding remains are preserved due to the heavy soils, earthwork survey can be usefully employed.

Table 7.11 2d – Sand and Gravel Terraces		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Potential reworking and(or) burial of Palaeolithic materials by fluvial and periglacial processes • Pre-Holocene fluvial terrace surfaces largely stable during the Holocene, but potential for localised colluviation and alluviation at valley margins • Localised burial of Late Quaternary (Devensian) fluvial deposits and associated archaeological material by Holocene alluvium in valley floor localities.	• Truncated cut features are often the principle expression of archaeological sites. Such features can often be ephemeral in nature and where small, such as with posthole-defined structures or pit features, difficult to prospect for. Open area excavation (strip, map and sample) has been demonstrated to be a more satisfactory method of recording remains of this type. • On the gravel terraces there is the likelihood that remains may be masked and preserved beneath an alluvial veneer. • Positioned along natural routeways, the free draining land, light, fertile, tractable soils and proximity to fresh water make the sand and gravel terraces attractive settlement locales through many periods of prehistory and history – see period notes below - and are particularly favoured in the Neolithic, Bronze Age and early medieval periods. • Gravel deposits are a secondary context for Palaeolithic artefactual evidence which may occur as derived material from further up the river catchment. Though such artefacts could potentially be found as in-situ remains, this would be exceptionally rare. • Though few Mesolithic remains are noted within the HER and NMR, Mesolithic tools and debitage are often present within excavated site assemblages, and this stresses the need for more close-spaced fieldwalking on these surfaces in advance of invasive evaluation. • Neolithic and Bronze Age settlement is well attested on the sand and gravel terraces with many site and monument types present in Derbyshire including cursuses, midden pits, ring ditches, enclosures, burnt mounds, post-built structures and cremation pits. • Localised high points can be a focus for ring ditches, burnt mounds and other monuments. High points may be visible on the surface today, or have existed in the past but the current ground surface appears level due to the effects of subsequent alluviation. Where alluvial veneers exist, a programme of sub-surface terrain modeling can be employed to map the sand and gravel terrace topography and this can aid in targeting evaluation works. • Neolithic settlement remains generally on the higher gravel terraces, with the later remains tending towards the lower, and younger, terraces. • Later prehistoric remains also well-attested with extensive linear boundary features and pit alignments ascribed a tentative Iron Age date. Recent evidence has shown that pit alignments have a much longer currency of use stretching from the Neolithic up to the post-medieval period. • Less Roman and Romano-British period sites known from the sands and gravels as a proportion of all sites than for other landforms. The majority of entries within the HER and NMR refer to the road networks. This pattern has been borne out in those large areas that have been subjected to strip, map and sample conditions. • The most significant early medieval remains within Derbyshire cluster to the south in the Trent Valley with the extensive remains at Willington Quarry representing the largest known single site in the county. • Whilst still the majority, the remains for the medieval and post-medieval to modern periods represent less of the overall percentage than for other landforms, with the majority comprising field systems and other remnants of the agricultural landscape. • In the post-medieval period, the extractive industries have had a significant impact on the landscape in both loss of sand and gravel terraces, but also in the impetus for archaeological work (e.g. Willington Quarry, Hill Farm, Willington).	• Due to the ephemeral and dispersed nature of the archaeological remains of post-built timber structures and various types of pits, conventional prospection techniques are generally unsuitable as such features are virtually impossible to detect by geophysical survey, are rarely seen on aerial photographs and are a chance discovery if they come up in evaluation trenches. • Close-spaced fieldwalking (linewalking at 2m intervals) can produce highly informative results in respect of the potential location of sub-surface Mesolithic, Neolithic and Early Bronze Age sites, as well as for those periods that produce robust ceramic material. Targeting evaluation trenches or test pits according to the results of fieldwalking provides a means of assessing these surfaces prior to determination. Large-scale evaluation trenching is a blunt tool for locating the above-mentioned types of remains and if they fail to land on archaeological deposits that may very well survive in the area of investigation it can potentially result in large areas being considered archaeologically sterile when this is not the case. Establishing the potential of such sites rather than the distribution of remains across the entire site is key at the pre-determination phase for this landform. This allows the back loading of works that could include strip, map and sample as a robust but economic post-permission mitigation method that ensures all archaeological remains, whether small, dispersed or post-built, are fully recorded in plan. • Ridge and furrow can mask and preserve earlier remains beneath the ridges and this should be taken into account as part of any archaeological investigation where such features are impacted upon. • There is significant potential for cropmark formation on this landform illustrating the great applicability of aerial photography. Future programmes of aerial photography could be commissioned during dry summers, focusing on areas included within the mineral plan or where future commercial interests lay.

Table 7.12 3a – Alluvium		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Potential for reworking and(or) burial of Holocene landsurfaces and sediments, including associated archaeological deposits and organic-rich deposits • Potential for localised erosion of archaeological deposits in alluvial settings	• Very few Palaeolithic-Mesolithic finds known from the alluvial surfaces, though it is likely that material of this age is sealed within the sediment body due to more-recent alluviation. Material of this age may also occur as secondary deposits from further up catchment. • Neolithic period is represented by a distribution of stone axe heads on the higher, and therefore older, alluvial terraces. In the county as a whole the distribution of these items tends towards rivers and is an indication of a preference for settlement during the Neolithic expanding along river valleys and streams. • Earliest cropmarks so far recorded on the alluvium are probable Iron Age pit alignments and field boundaries. Reasonably extensive cropmarks known from the alluvium are suggestive of an intensification and extension of farming land partitioning some of these terraces during later prehistory. • Known Roman sites cluster around major centres such as Derby, Melandra Castle near Glossop and a few in the vicinity of Bakewell, but few others so far known. • Anglian period cemetery at Derby suggests continuity of use from the Roman period through the early medieval but little else known. • Substantial amount of ridge and furrow agricultural remains known form both medieval and post-medieval periods. • Valley floor setting means there are many water-powered industrial and mill sites known. • Substantial numbers of undated cropmarks which are most-likely to date to the late prehistoric or Romano-British periods.	• Aerial photography a useful technique as large and/or contiguous features show well on this geology. Many of the cropmarks remain poorly understood and undated but most thought to date to late prehistory and the Roman period. • There is the potential for palaeochannels to exist within or below the alluvium and sometimes these can only be identified by a systematic sediment coring programme across a potential development area, although aerial photographs and field survey are the most common technique for mapping such deposits. • Where deeper excavations will take place, archaeological work should investigate a significant depth of the sediment body due to the potential for alluvium to contain deposits and finds of different ages and to conceal earlier land surfaces or structures • Fieldwalking is not a suitable technique on young, low alluvial terraces, although it could be very useful on old, usually high, alluvial terraces that have not experienced further alluviation since early-mid Holocene times. It may also be of some utility on low, young terraces on those areas where earlier landforms protrude above them as small 'islands', although in such cases fieldwalking only need be targeted to such features and their immediate environs. • Ridge and furrow can mask and preserve earlier remains and this should be taken into account as part of any investigation where such features are impacted upon.

Table 7.13 3b – Palaeochannel deposits		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Palaeochannels may remain stable or be reworked during the Holocene, with potential burial of some channel fills by Holocene alleviation.	• Considerable potential to preserve organic remains from throughout the Holocene and may also contain structures and/or artefacts lost or deposited within the original waterway (e.g. the Shardlow Log Boat) and the remains of a wharfs or piers as well as artefacts such as bronze objects or faunal remains such as bones or wetland burials	• Palaeoenvironmental sampling and coring can provide an invaluable means of recreating past environments and dating sediment sequences. • Excavation of palaeochannel deposits has the potential to recover well-preserved structures and artefacts though this may be achieved by careful machine excavation under strict archaeological supervision. • Use of a metal detector may be apposite given the wealth of bronze objects known to have been deposited in wetlands, and particularly along the course of the Trent

Table 7.14 3c – Upland Peat		
Geomorphological Processes	**Archaeological Associations**	**Evaluation and Mitigation Issues**
• Hilltop and hillslope settings generally stable during the Holocene, but potential for localised colluviation and mass-movement activity	• Substantial potential for preservation of remains beneath and pre-dating the formation of blanket peat. • Large volume of Mesolithic and some Neolithic chipped flint from erosion scars within the peat. These tend to be found near the gritstone edges, though this may be more a product of increased erosion and greater accessibility.	• Preliminary evaluation should take account of the potential of erosion scars to expose significant remains, for example the large volumes of Mesolithic flint. Site survey on this landform will require survey-grade GPS due to the lack of other extant features and survey control given the remote nature of the moorlands. This is especially important so that an exact site or findspot can be returned to on subsequent occasions. • Other areas where peat and the underlying mineral soil may be exposed include footpaths, groughs, dried streambeds, areas where the peat grades down to bedrock as at rock torrs and edges, and areas that have experienced moorland fires. • To gain a satisfactory level of evaluation and recording in and below blanket peat, there is a significant amount of extra manpower and time required than for accessible landforms with little drift cover. • Upstanding remains occasionally occur, such as the turf barrow known as Margery Hill, and such features require detailed field survey prior to further investigative works such as geophysics, test pits or evaluation trenching. • Where linear developments may run across this landform a combination of fieldwalking the area followed by test pitting may be appropriate for evaluation purposes. Although evaluation trenching may be useful this should be tempered by the practicality of getting heavy machines onto and across wet and boggy moorlands.

Technique	1a	1c	1d	1e	1f	1g	1i	1k	2a	2b	2d	3a	3b	3c
Desk-Based Assessment														
Geomorphological Mapping														
Pre-Determination Evaluation														
Aerial Photograph Transcription														
Archaeological Survey														
Evaluation Trenching														
Fieldwalking														
Geophysical Survey														
Sediment Coring														
Test Pits														
Post-Permission Mitigation														
Excavation														
Palaeoenvironmental Analysis														
Strip, Map and Sample														
Watching Brief														
Post-Fieldwork														
Post-excavation, archive and dissemination														

Table 7.15 - Applicability of Techniques by Landform

This table provides a score out of three for each technique in terms of general applicability for use on each landform. This score is expressed in three different shades of blue for ease of visualisation with the darker the shade, the more applicable the technique on a given landform. This table and the further explanatory text below cross-references to the guidance within 'Mineral Extraction and Archaeology: A Practice Guide' (MHEF 2008) and the two documents should be used in conjunction. This table is based on the preceding assessment and the summarised information in Tables 7.2-7.14 and provides a general indication of technique applicability. Any scheme of archaeological evaluation or mitigation should be targeted and directed to the specific needs and expectations of a given site. In some cases several techniques may be highly applicable on a given landform but it does not always follow that such techniques should necessarily be employed. The purpose of evaluation is to retrieve sufficient information to inform a planning decision, not necessarily to systematically sample a site.

Future versions of this table will continue to be modified in the light of advances in methodologies, techniques and the accumulation of knowledge of the different types of archaeology present on any given landform and its preservation potential.

7.6 Desk-based assessment and Environmental Impact Assessment

In the table above, desk-based assessment is marked as being fully applicable to all landforms. It is imperative that an understanding of the potential impact upon the historic environment and any specific or suspected heritage assets is factored in at the very beginning of the planning process. Detailed geomorphological mapping and analysis in relation to archaeological potential undertaken as part of the desk-based assessment would provide a sound basis for all following archaeological and palaeoenvironmental work, as detailed above. Appreciation of the wider context of the site and addressing the issue of setting of any heritage assets should take place at this stage as required by PPS 5 (DCLG 2010, 2). A field visit by an experienced archaeologist is an essential component of any desk-based assessment.

7.7 Pre-Determination Evaluation

Pre-determination field evaluation is required where desk-based research is insufficient to properly assess the archaeological interest of a particular site and the potential impact on heritage assets within it (DCLG 2010, 6). The Guidance to PPS 5 (English Heritage 2010, para. 62) states that pre-determination evaluation should "establish the extent, nature and importance of the asset's significance", and it is also stated that "evaluation is normally a rapid operation [and] it is designed to inform the decision-making process" (English Heritage 2010, para. 62). It is worth highlighting these points, as evaluation need not, and indeed should not, seek to sample all archaeological remains and deposits across a site, but rather to acquire sufficient information to inform decision-making.

Specific guidelines on rating the significance of heritage assets and their setting are currently being prepared by English Heritage. Currently assessment of significance can be related to the criteria used for assessing what was

previously termed 'national importance' for the scheduling of monuments, which sits within Annex 1 of the Scheduled Monuments Guidance (DCMS 2010a). This guidance identifies the following criteria upon which national importance should be gauged: period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity and potential. Over and above this English Heritage also apply the criterion of 'amenity value' which judges a heritage asset in terms of its visibility and physical and intellectual accessibility, and which can feed into the sustainability of a development, its restoration and aftercare (discussed more below).

7.7.1 Aerial Photography

Aerial photography can be seen as the most effective method for discovering new sites. It can provide a landscape-scale coverage while still being a rapid technique to employ, and can be used to prospect for sites which are represented by soil marks and cropmarks as well as subtle upstanding remains which can be ephemeral and difficult to see from the ground. Aerial photography is most productive in dry conditions when there is a high soil moisture deficit. With climate change bringing dryer summers there is potential for strategic commissioned flying over those areas identified within the mineral development framework for potential future aggregate extraction.

The transcription of photographed sites onto Ordnance Survey base mapping allows for an accurate location to be plotted and the resultant mapping can be quickly analysed to identify areas of particular sensitivity in and around a development area. Aerial photography will pick up large features and enclosures generally very well, dependent on soil conditions, but smaller features such as pits and postholes are less easy to identify. The extensive remains on the Trent Valley sand and gravel terraces illustrate this well, as many enclosures and linear features are known, but small pit and posthole features, for example like those excavated at Mercia Marina, Willington (Brightman and Waddington forthcoming) were not visible on previous aerial photography and only came to light during a strip, map and sample exercise.

Many archaeological sites have characteristic forms allowing for the classification of sites identified through aerial photography and in many cases a broad date can also be ascribed. As part of this project four blocks of aerial photograph transcription were undertaken focusing on four key aggregate producing landforms. This part of the project has identified 862 new sites and enhanced the records for a further 256.

As well as traditional aerial photography, it should also be noted that aerial LiDAR is also a useful tool in providing a baseline survey of an area where upstanding remains are prevalent, including obtaining digital terrain models through plant and tree cover.

7.7.2 Archaeological Survey

Archaeological survey is a non-intrusive technique for recording upstanding remains and can be useful for understanding constructional relationships. Survey is typically applied to earthwork sites and those sites where standing buildings or masonry form one or more of the heritage assets. If upstanding remains are to be excavated it is standard practice to accurately survey the site in advance of excavation. For example, a development which impacted upon the Millstone Grit may well encounter upstanding remains due to the quality of preservation on this landform, and in such a case archaeological survey would provide an invaluable record upon which any further archaeological works could be based.

7.7.3 Evaluation Trenching

This technique involves topsoil-stripping of what are usually linear areas in order to test for the presence and extent of buried archaeological remains on a site, as well as to obtain information on the character and condition of preservation to assist in establishing the significance of any such remains.

Linear evaluation trenching is not always the best evaluation technique to identify the survival of archaeological remains on a given site. However, targeted trenching can be an effective tool to sample potential remains identified by aerial photography, geophysics or fieldwalking for example. It can also be an effective tool for prospecting for large or linear features such as Roman roads, prehistoric field boundaries or enclosures ditches. Conversely, it is less well-suited to assessing landforms which may yield small, dispersed features such as Neolithic pits, hearths or the postholes of timber-built structures. In certain circumstances, however, it may be the only technique that can be

employed. When planning an evaluation trenching strategy it should be borne in mind that the purpose of evaluating a site is to provide adequate information to inform a planning decision and not to necessarily sample systematically across a site.

7.7.4 Fieldwalking

Fieldwalking involves walking in a straight line across ploughed surfaces collecting any artefacts observed. The closer together the walkers are placed the greater the coverage achieved. Finds are bagged, numbered and surveyed so that each find can be accurately located on a map. The most common finds within the archaeological record for the county are stone tools, though the programme of work around Little Hay Grange, Ockbrook (Palfreyman 2001) among others, has illustrated the effectiveness of fieldwalking in the recovery of pottery. Therefore, it is particularly useful for identifying Stone Age (Mesolithic, Neolithic and Early Bronze Age) sites, as well as Roman, medieval and post-medieval sites, that sometimes produce large quantities of well-fired pottery.

The applicability of fieldwalking and targeted test-pitting as a viable, cost-effective and rapid prospection and evaluation technique is a theme which has been touched on through a number of earlier chapters. Nearly 18% of all entries within the HER and NMR for Derbyshire and the Peak District represent lithic scatters and individual findspots, and where conditions are conducive to surface collection, fieldwalking can provide a key record of the distribution of finds, as well as being one of the few ways to sample the archaeological remains within the overburden which are likely to be lost once any invasive techniques are employed. Where dedicated fieldwalking has been employed, regardless of bedrock geology (landforms 1a-1i), finds have been recovered, for example at the Unstone sites on the Coal Measures (Hart 1981), a landform which otherwise has not yielded substantial quantities of pre-industrial archaeological remains (see chapter 4.7).

7.7.5 Geophysical Survey

Geophysical Survey represents a non-intrusive method of prospection aimed at locating and potentially categorising the archaeological resource within a given site. The main methods of geophysical survey are magnetometry and resistivity although magnetic susceptibility and ground penetrating radar also have potential.

Geophysical survey can offer a fairly inexpensive means of examining large areas for sub-surface remains. However, the results of geophysical survey can vary depending on the type of geology and soil-moisture conditions, and whether modern services, underground pipes and other disturbance cross the site which then affect the signal. Sandy soils, clays and alluvium can all return good results and recent work has suggested that the Millstone Grit may also represent a landform which is conducive to geophysical survey. The quality of results can also depend on the form, size and fill of archaeological features. Small features such as post holes and small pits are unlikely to be revealed and for those features with fills similar to their surrounding geology recognition is also hindered.

7.7.6 Sediment Coring

Analysis of the depth and nature of sedimentary sequences lying beneath landform surfaces provides an important means for understanding landforming processes and environmental history. Where sedimentary sequences are exposed, whether through natural processes or through man-made extraction, then this provides an opportunity to understand the formation processes. In areas that lack such exposure it is necessary to extract sediment cores using hand-operated or powered augers.

7.7.7 Test Pits

Test-pitting is noted above as it can often be adopted as an evaluation technique in conjunction with other forms of archaeological investigation to test for the presence of sub-surface archaeological remains. In areas where it is not possible to fieldwalk, such as fields under permanent pasture, regularly spaced test pits allow the ploughsoil to be sampled for the presence/absence of artefacts, while also allowing for the identification of buried deposits. Test Pits can vary in size from 1m and 2m squares to 5m squares. They are hand-excavated and finds recovery is normally maximised by sieving the fill as it is removed.

7.8 Post-Permission Mitigation

There are a number of post-permission responses available to a curator with regard to managing heritage assets on a site. These can range from no further work required, section 106 agreements, setting of a range of planning conditions to a refusal of application. Where the response stipulates planning conditions, this will normally require a programme of archaeological work to mitigate against the impacts of development upon any heritage assets. The key points to reiterate are that post-permission mitigation fieldwork should be question-led and targeted with a clear research focus and should build upon any pre-determination evaluation work.

7.8.1 Excavation

Full archaeological excavation results in the preservation by record of a site in its entirety, and although destructive, excavation is often the most informative field technique and is usually necessary when archaeology would otherwise be destroyed. The excavation process is also the most identifiable part of the archaeological process and can generate interest through engagement with the local community, feeding into the overall sustainability of a site in terms of knowledge gain and public interest.

Full archaeological excavation is labour-intensive and generates more post-fieldwork assessment and analysis than other techniques. It therefore tends to be the most-expensive archaeological technique employed. Excavation allows for the full recording of a site within a set time frame.

7.8.2 Palaeoenvironmental Analysis

Palaeoenvironmental remains are those which allow investigation of past landscapes and the interaction between humans and their environment, which may include preserved organic material. If the development will impact upon deposits of high palaeoenvironmental potential such as palaeochannels, planning conditions/obligations will normally require the investigation of such deposits. It is imperative that where sites have the potential to impact upon deposits rich in palaeoenvironmental remains, then suitable specialists are engaged early in the process to advise on the best sampling strategies.

Palaeoenvironmental analysis allows for a recreation of the past environment which would not be possible from archaeological excavation alone and can add significant contextual information to that gleaned from the investigation of the man-made remains on a site. Palaeoenvironmental remains can also be obtained from the fills of pits and postholes however, providing a more direct link to human activity. In such cases the palaeoenvironmental record may contain evidence for human activity such as deforestation, woodland management, pastoralism, cereal cultivation, mining and even climate change and hence it forms part of the archaeological record. Furthermore, in areas where the archaeological record is disturbed or absent, palaeoecological techniques may assume particular importance as the primary means for evaluating the presence and activities of past human groups.

7.8.3 Strip, Map and Sample

Strip, map and sample involves the monitored removal of all topsoil across a site, and any features encountered are cleaned, photographed and recorded in plan to generate a list of all known archaeological features and an assessment of their potential. A sampling strategy can then be formulated around clear research questions before excavation of archaeological features is begun.

One of the key points relating to post-permission mitigation is the application of strip, map and sample approaches on certain landforms. Where large areas have been opened, especially relating to sand and gravel landforms, these have generally revealed multi-period sites hitherto unsuspected. A substantial amount of the archaeological remains from sites such as Willington Quarry (Wheeler 1979; Beamish 2009) or Mercia Marina (Brightman and Waddington forthcoming) were dispersed individual cut features or post-built structures defined by postholes. Such archaeological deposits can be virtually impossible to detect remotely and are very unlikely to be encountered by employing linear evaluation trenching. In cases where there will be a significant impact across the whole area of a development, as with mineral extraction, a strip, map and sample approach may be appropriate as topsoil has to be removed anyway. This technique ensures a record of all archaeological features and allows for a considered, question-led approach to excavation with a coordinated specification for works. A further advantage of this technique is that once the initial

strip is complete and all heritage assets on the site are identified, the archaeological mitigation becomes a 'known cost', resources can be most effectively targeted and if large blank areas are encountered the technique could be potentially downgraded to a watching brief or vice versa.

7.8.4 Watching Brief

Watching briefs are most typically used in areas where the landform or setting suggests that archaeological remains will exist, but pre-determination desk-based and evaluation work has not located any features. A watching brief involves the monitoring of groundworks by a professional archaeologist who can halt works and record any remains that are uncovered during the course of the work. A watching brief can represent an inexpensive technique for dealing with an archaeological condition if few remains are found on site, as there will be little lost time and analysis and reporting will be minimal. However watching briefs deal with an unknown quantity and complexity of archaeological remains and so they can become expensive if unanticipated remains are encountered, as work can be slowed or stopped while the remains are recorded.

7.9 Post-Excavation Process

Following all archaeological fieldwork, there will be a phase of analysis, reporting, archiving and dissemination usually referred to as the 'post-excavation' phase. Post-excavation work follows an established set of standards that has been set out in MORPHE (English Heritage 2006), the IfA's various Standards and Guidance documents (2001) and those published as English Heritage's 'Centre for Archaeology Guidelines'.

Assessments are undertaken at this point of all recovered material including small finds, bone assemblages, palaeoenvironmental macrofossils, pollen samples and others. The output at the post-excavation phase will tie directly back to the archaeological and palaeoenvironmental strategies set out before and during fieldwork, and reinforces the importance of engaging with relevant specialists at an early stage in the process. Assessment of such material will determine the worth of full analysis and whether this should form part of the post-excavation process or whether the material has no further value beyond assessment.

All assessment and analysis will feed into a synthetic archive report in the first instance and in the cases of significant archaeology, this will normally form the basis for a published work. Publication may take the form of a short note in a journal through to a dedicated monograph or on-line publication. Dissemination of a site can take a variety of forms ranging from engagement with the wider public through a variety of media including talks, site visits (where applicable), leaflets and open days, through to features on television, radio and in popular magazines and the press. The final part of the post-excavation phase involves the compilation of a site archive which brings together all relevant documentation and digital files along with primary site documents and artefacts for deposition at an appropriate collections museum or other facility. Digital archives can be housed with the Archaeology Data Service at York University (ADS) who maintain the integrity of the digital data by keeping it compatible with the most recent software. Most local authorities will also stipulate that an online record and downloadable version of the archive report is made available through the OASIS website (Online Access to the Index of Archaeological Sites).

7.10 Sustainability

Sustainable outcomes against which a development can be measured are a key component of the planning process. All three of the overarching objectives of PPS 5, enshrine sustainability as a major issue for development affecting the historic environment. The "wider social, cultural, economic and environmental benefits of heritage conservation" (DCLG 2010, 2) are flagged early in the document, along with ensuring that "heritage assets are put to an appropriate and viable use" (CLG 2010, 2) and that "the positive contribution of…heritage assets to local character and sense of place is recognised and valued" (DCLG 2010, 2). The final stated objective within PPS 5, stresses the importance of dissemination, which is arguably the single greatest factor which can feed into the sustainability of a given site as only through imparting the story of any archaeological discovery can a sense of ownership and value in the historic environment be engendered. The objective states that development should seek to "contribute to our knowledge and understanding of our past by ensuring that opportunities are taken to capture evidence from the historic environment and to make this publicly available, particularly where a heritage asset is to be lost" (CLG 2010, 2).

Adopting an integrated and question-led approach throughout a programme of archaeological works means that a coherent story can be told about the archaeology of a given site, and this is key in both engaging people and also in the ways that archaeology can feed into a development, providing additional value and ultimately additional sustainability.

Sustainability of a development does not necessarily just include restoration of a site. Archaeological work offers opportunities to engage local communities in a way which is sometimes not otherwise possible. Archaeological and palaeoenvironmental work can provide information for later development and interpretation of a site, and such information can also be made widely accessible through traditional and new media.

7.11 Research Agenda

As is outlined above, all archaeological work undertaken as a part of the development process in relation to aggregate extraction should seek to have a question-led research focus. As has been noted throughout the individual landform chapters, the applicability of certain fieldwork techniques has perhaps not been recognised in the past. On most landforms, the usefulness of aerial photograph transcription has been flagged, along with rapid surveying techniques such as fieldwalking, which can yield substantial amounts of data. Within the uplands, away from improved farmland, the requirement for accurate baseline survey is key to any work undertaken, and this principle should be applied to any site where relevant. Another key issue which will aid the decision-making process is to ensure rapid publication and dissemination of archaeological and palaeoenvironmental data, especially where this relates to either key sites, or to landforms where there are significant gaps in knowledge (i.e. prehistoric sites relating to the Coal Measures or sandstone).

Based on the individual landform assessments, there are a few key areas where research should focus. Though these are largely reflected in the East Midlands Research Agenda, and though there is little need to re-invent the wheel, the key points raised in the earlier chapters are worth emphasising. In general terms, there is a clear need for a better understanding and tighter chronology for the Iron Age and early medieval periods. With the Iron Age, it is likely that many of the known enclosures both in the uplands, and as cropmarks within south Derbyshire are indicative of Iron Age settlement, and understanding of sites such as these may well transform our understanding of this period as a whole. In addition to the general research foci noted above, and the detailed breakdown of the East Midlands Research Agenda below, there are a number of specific questions which have been raised through the course of the individual landform assessments, and these are summarised below:

- What can account for the apparent difference in settlement and activity between the Sherwood Sandstones landforms of Derbyshire and other counties within the East Midlands.
- Does the lack of known prehistoric activity on the sandstone and mudstone landforms reflect a genuine lack of settlement, especially in comparison to the sand and gravel terraces which overlie these landforms in many places?
- Are there riverine 'hillforts' within the lower-lying reaches of Derbyshire which parallel the imposing positions of many of the upland hillforts? If so what role did these play and how did they interact?
- How does the corpus of prehistoric rock art relate to the wider picture of prehistoric rock art in the Pennine chain and beyond?

7.12 East Midlands Research Agenda and Strategy

The following paragraphs illustrate the key areas where archaeological investigations undertaken in Derbyshire and the Peak District tie into the East Midlands Research Agenda and Strategy (currently under preparation – Knight et al. forthcoming), and into the wider picture of the archaeology of this area as outlined above. The following are the key research objectives which are particularly applicable to Derbyshire and the Peak District and can form the focus of evaluation and mitigation work.

7.12.1 Palaeolithic

For the Palaeolithic period, there are a number of key strategy objectives outlined within the Research Agenda and Strategy which are of particular significance to aggregate extraction. These are:

- Analysis of the deep sand and gravel deposits in the Trent Valley for evidence of the earliest hominins, particularly in relation to the Bytham River deposits. Sand and gravel extraction is in a unique position to allow for archaeological monitoring and examination of deep sediment units, and this may be key in identifying such archaeological remains.
- Confirm the extent and nature of early hominin activity during the Mousterian period – principally relating to the assemblages and sites known from limestone caves.
- Investigation of Upper Palaeolithic open sites which may be best prospected for through fieldwalking.
- Investigate Upper Palaeolithic use of the limestone caves of Derbyshire and Nottinghamshire.
- Elucidate from terrestrial sources the changing Pleistocene environment. This is perhaps most apposite in relation to work which could be undertaken on old palaeochannel deposits, whether still visible, or buried within later sediment units.

7.12.2 Mesolithic

For the Mesolithic period, six fieldwork and methodological priorities are put forward to feed into general overarching research aims, and these are reproduced below as they are fully relevant to work investigating the Mesolithic period within Derbyshire and the Peak District.

- Increased chronological and typological detail from analyses of Mesolithic survey and excavation assemblages.
- Extend initial fieldwalking to areas that have not previously been surveyed or that have received little attention.
- Increased detail an assemblage scatter sizes and shapes through appropriate plotting of finds from known or suspected concentrations.
- Scatters defined by surface collection to be selected for research excavation in accordance with the research framework priorities. (Myers 2006, 67).

7.12.3 Neolithic – Middle Bronze Age

As is discussed above, there is a wealth of known archaeological evidence for this period within Derbyshire and the Peak District; due to the diversity of known sites there is the opportunity to focus work on any of the strategy objectives outlined in the research strategy:

- 3A - Compile database of scientific dates and extend application of Bayesian modelling for radiocarbon dating.
- 3B - Assess the fieldwalking resource – As is discussed through the landform element chapters, many of the landforms, including those most likely to be impacted upon through aggregates extraction, are fertile agricultural landscapes which lend themselves well to the application of fieldwalking as a prospection technique.
- 3D - Assess the regional air photographic and LiDAR resource – it is flagged up through the landform assessment chapters where aerial photograph transcription is a particularly fruitful evaluation technique dependent on landform.
- 3E - Target sites with Late Mesolithic and Early Neolithic stratigraphy and well-preserved organic remains – Transitional sites are very rare and when located they should be subjected to the highest standards of recording.
- 3F - Identify monument complexes and prioritise for curatorial action – This objective is perhaps most relevant to the sand and gravel terraces of the Trent Valley (Chapter 5.3 – landform 2d), where there are two known extensive Neolithic cursus monuments which both act as the focus for a monumental landscape. This is also relevant to the Carboniferous Limestone however, when investigating the areas around concentrations of burial monuments, or the henge monuments of Arbor Low and the Bull Ring.
- 3G - Conduct additional investigations of earlier Neolithic funerary traditions – As with the objective above, this is most relevant when applied to the funerary monuments of the Carboniferous Limestone and the Trent Valley sand and gravel terraces.
- 3H - Recover and analyse human remains.
- 3I - Investigate the development and intensification of agriculture.
- 3J - Foster relevant artefact studies.

7.12.4 Late Bronze Age – Iron Age

The known archaeological resource for the Late Bronze Age to the Iron Age is reasonably sparse in comparison to that of other periods, and this should be a factor of consideration if sites dating to this period are uncovered. The following are the research objectives set out within the East Midlands Research Strategy for these periods as they relate to Derbyshire and the Peak District.

- 4A - Compile audit of radiocarbon, dendrochronological and other scientific dates – where sites of this period are known, they are often poorly understood and dated and programmes of archaeological work should always seek to understand the chronology of a site both in terms of relative stratigraphic dating, and also in absolute terms using scientific methodology.
- 4D - Assess the regional resource of hillforts and analogous sites – The upland areas of the Peak District host a concentration of late Bronze Age – Iron Age 'hillforts' which are poorly understood. Whilst the monuments themselves are protected, any impact on the environs and landscape may provide important contextual information for these monuments.
- 4F - Investigate sub-regional variations in the development of field and linear boundary systems – cropmark evidence has illustrated that there are substantial amounts of linear boundaries on the sand and gravel terraces of the Trent in particular. These are often ascribed a late prehistoric date, but more work is required to investigate and understand this site type.
- 4I - Prospect for Iron Age settlement in upland areas of the Peak District – tying in to the investigation of hillfort environs, there is little known about the larger Iron Age settlement of the upland areas, and investigations targeting Bronze Age remains may yet yield evidence for a continuity of settlement, especially in light of the large-scale settlement and ritual activity on the East Moors for example during the Bronze Age.

7.12.5 Roman/Romano-British

The following are the research objectives set out within the East Midlands Research Strategy for the Roman period as they relate to Derbyshire and the Peak District.

- 5A - Create regional corpora of Roman pottery and publish information on key production centres – For Derbyshire and the Peak District, this is most relevant to the area around Belper on the River Derwent, where there are a number of known Roman pottery kiln sites representing a localised centre of industry.
- 5C - Promote the systematic application of scientific dating to sites of the Roman period.
- 5H - Investigate the landscape context of rural settlements.
- 5I - Support research and publication of landscape syntheses, especially for the major river valleys.
- 5J - Instigate regional scale characterisation study of industry – For Derbyshire and the Peak District, this relates to the mineral resources of the uplands, particularly lead mining, but also the smaller extraction of other minerals and precious metals.

7.12.6 Early Medieval

As with the Late Bronze Age and Iron Age, the known archaeological resource for the early medieval period is sparse and obtaining information to elucidate this period is a research priority in itself. The following are the research objectives set out within the East Midlands Research Strategy for the early medieval period as they relate to Derbyshire and the Peak District.

- 6A - Elucidate chronology and demography for Roman to Anglo-Saxon transition.
- 6B - Assess the landscape settings of Anglo-Saxon burials – whilst there is the potential for some of the ring ditches of the sand and gravel terraces to date to this period, the principal area of focus for this research objective is the uplands of the Peak District Carboniferous Limestone and Millstone Grit which host the remains of upstanding funerary cairn monuments.
- 6C - Review evidence for developing settlement hierarchies.
- 6D - Identify and examine nature and extent of Anglo-Scandinavian settlement – it is evident from the extensive Anglo-Scandinavian settlement and funerary remains along the southern edge of the Trent Valley (discussed in Chapters 4.4 and 5.3) that there is the potential for more archaeological remains of this period

to exist, most likely in the lower-lying areas of south Derbyshire.
- 6E - Undertake further research on Anglo-Saxon and Viking urban development.
- 6F - Define cultural boundaries in Anglo-Saxon and early Viking periods – the issue of defining boundaries is particularly apposite for Derbyshire and the Peak District as there is still no definitive chronology for the existence of the 'independent' kingdom of the Pecsaetna focussed on the Peak District. The liminal nature of the uplands during many periods is a deserving research theme in its own right.
- 6H - Assess evidence for extractive industries in late Anglo-Saxon and Viking periods.

7.12.7 Medieval

The following are the research objectives set out within the East Midlands Research Strategy for the medieval period as they relate to Derbyshire and the Peak District.

- 7B - Enhance record of urban secular standing buildings and subterranean structures.
- 7D - Investigate further the role of markets, fairs and ports.
- 7E - Investigate the morphology of rural settlements.
- 7F - Investigate development, structure and landholdings of manorial estate centres.
- 7G - Investigate castles, great houses and their estates.
- 7I - Investigate development of the open field system and woodland management.
- 7J - Research the regional communications infrastructure.

7.12.8 Post-medieval

The following are the research objectives set out within the East Midlands Research Strategy for the post-medieval period as they relate to Derbyshire and the Peak District.

- 8A - Identify and research the landless urban and rural poor.
- 8B - Further research the morphology and use of caves – the Derbyshire uplands has the greatest concentration of cave sites due to the natural geology of the Carboniferous and Magnesian Limestone. Whilst the most-important remains may relate to the earlier periods of prehistory, the multi-period nature of such sites is also an important research focus.
- 8C - Establish a typology of regional building traditions.
- 8D - Investigate developments in estate and garden design and their landscape contexts.
- 8E - Identify agricultural improvements of the 16th to 18th centuries.
- 8F - Research further the development of East Midlands [Derbyshire] industry – As briefly discussed above, the industrial heritage is one of the key facets of the post-medieval period in Derbyshire and the Peak District and is of national, and in some cases, international significance.
- 8G - Study post-Dissolution reuse of monastic structures and continuity of monastic estates.
- 8H - Investigate graveyards and other burial sites.

7.12.9 Modern

The following are the research objectives set out within the East Midlands Research Strategy for the modern period as they relate to Derbyshire and the Peak District.

- 9B - Examine early development of public utilities.
- 9C - Investigate the development of social and religious building types.
- 9D - Assess development of rivers for communication and power.
- 9E - Assess the role and landscape impact of woodland industries.
- 9G - Assess the landscape resource for the early industrialisation of agriculture.
- 9I - Investigate the industrialisation of the Derwent Valley.
- 9J - Explore evidence for continuing non-factory trades and industries.
- 9K - Research the urban infrastructure of war.

Appendix A - Aerial Photograph Transcription Plots

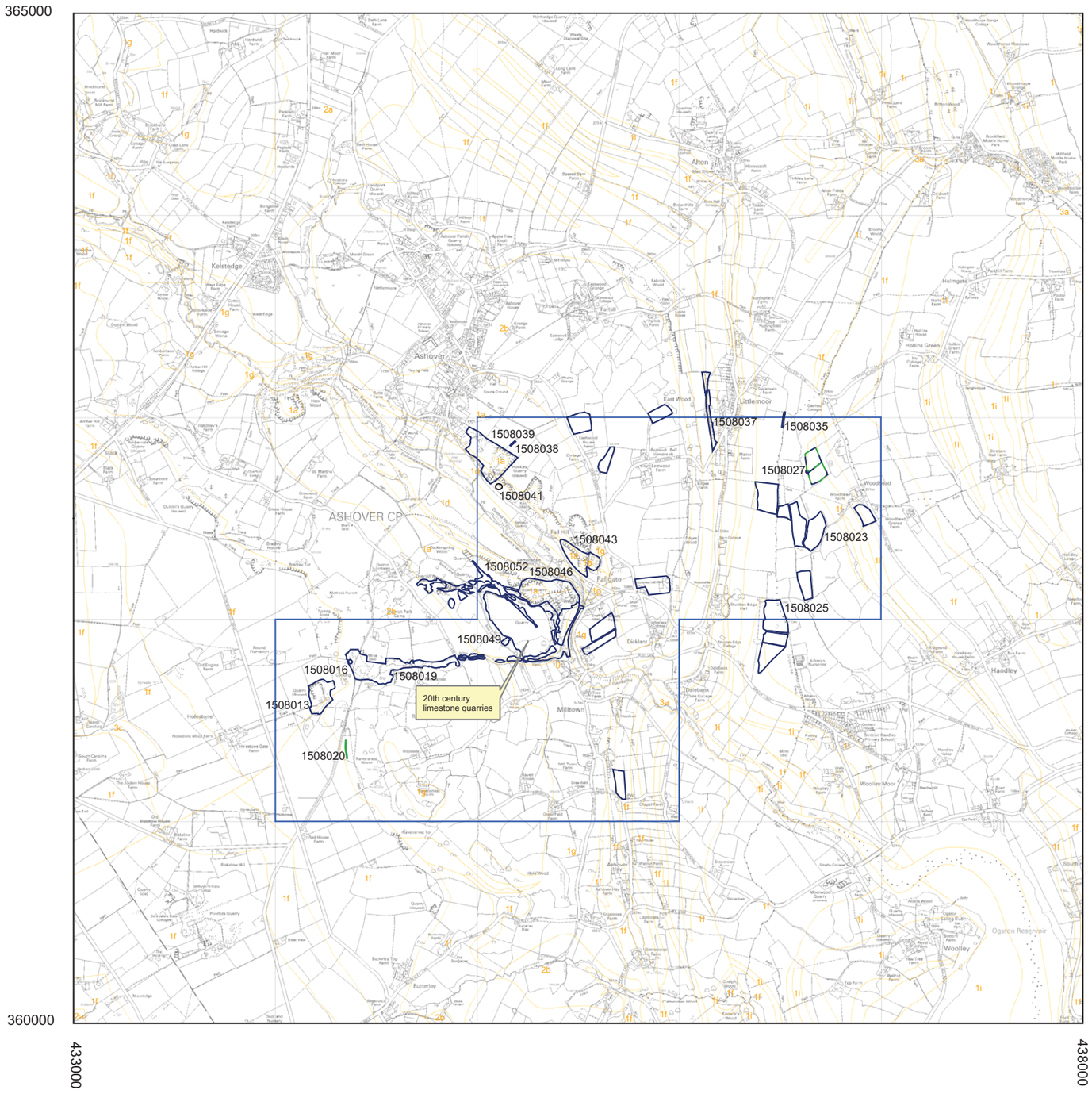

Fig. AP1.1
SK 36 SE-SW

Ashover and the Amber Valley

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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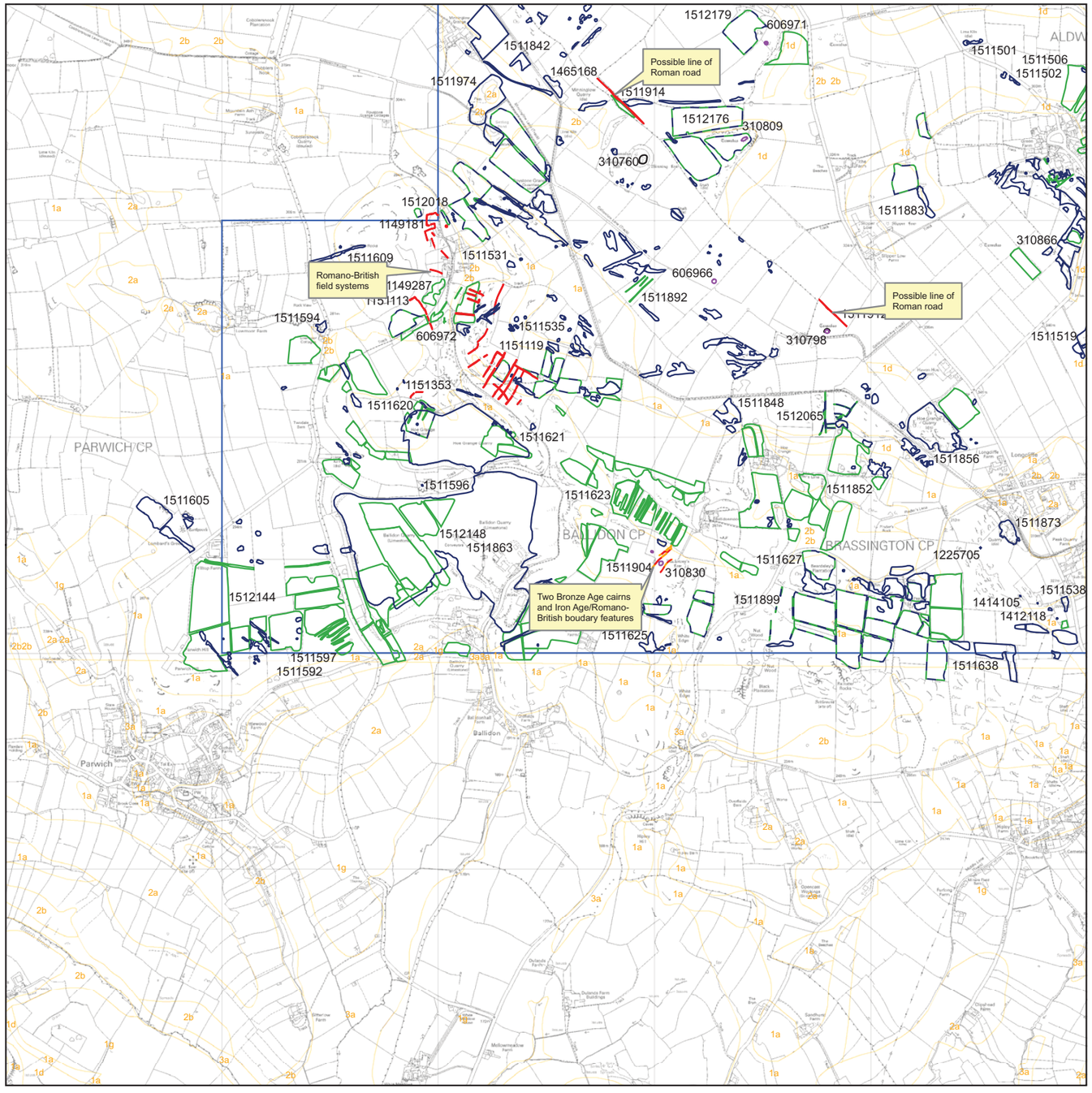

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Fig. A1.2
SK 15 - 25

Ashover and the Amber Valley

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Sand and Gravel Terraces

3a Alluvial Terraces
3b Palaeochannels
3c Holocene Peat Bogs

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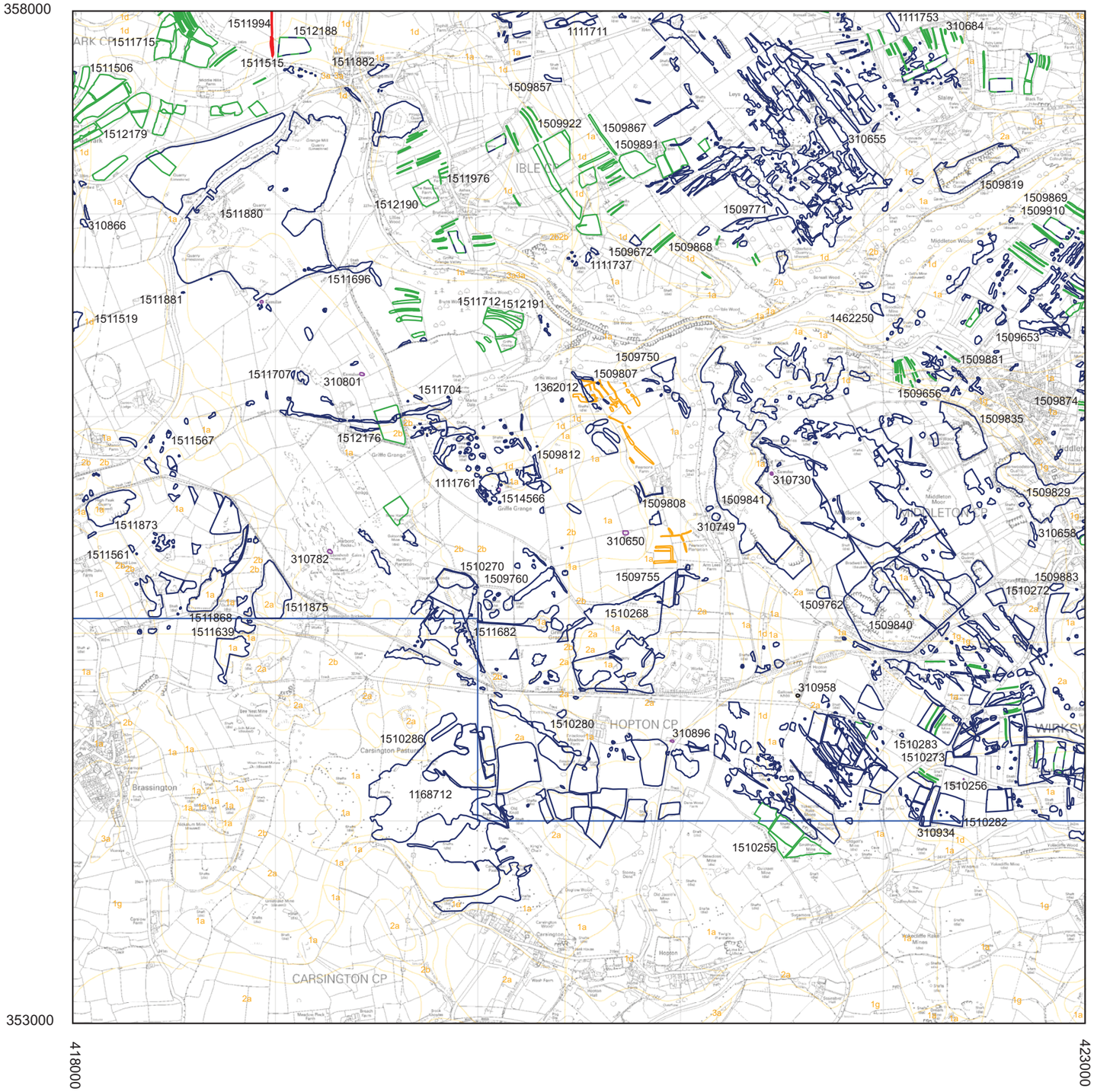

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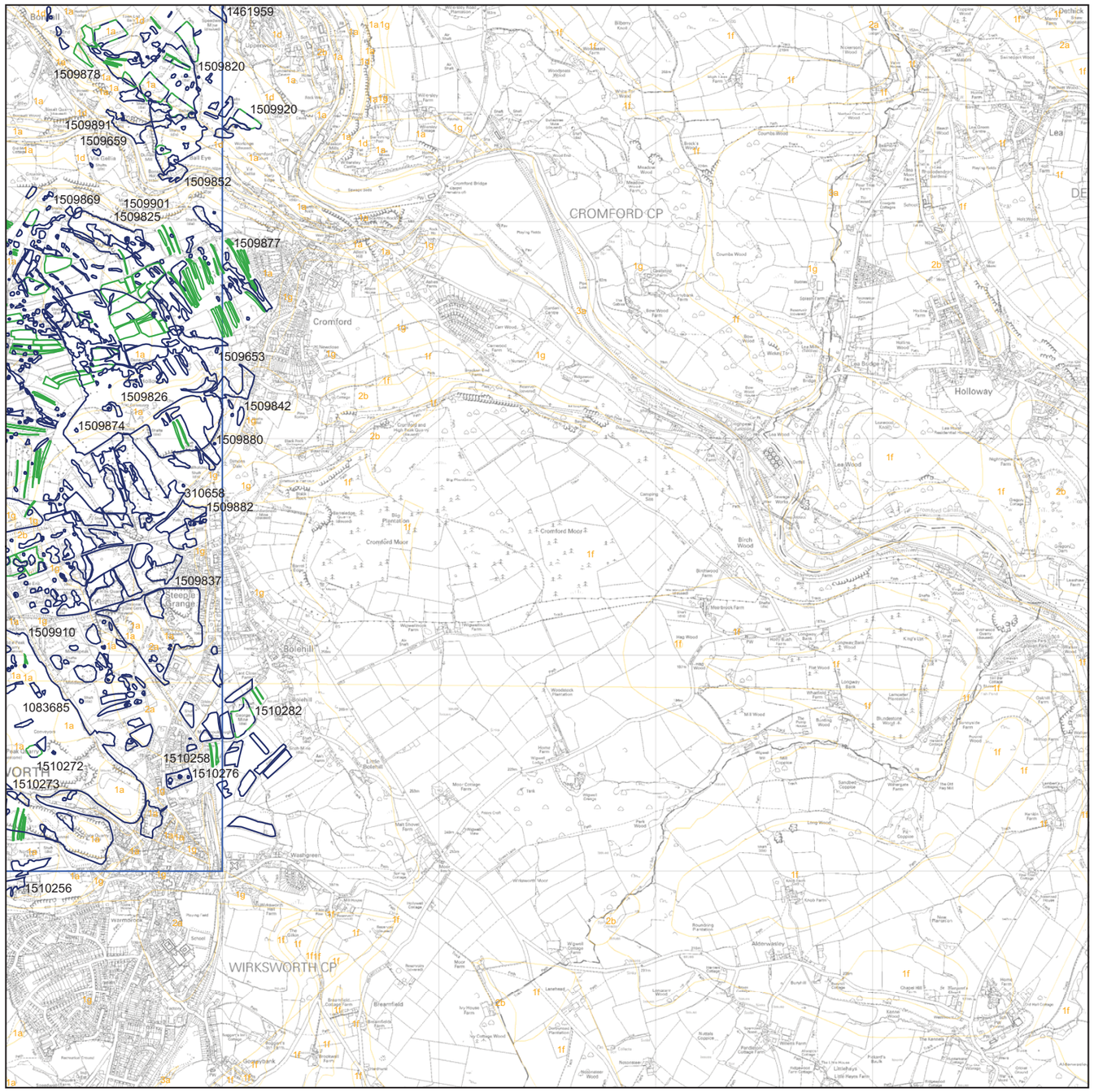

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Fig. AP1.4
SK 36 SE-SW

Cromford and Wirksworth

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

N W E S

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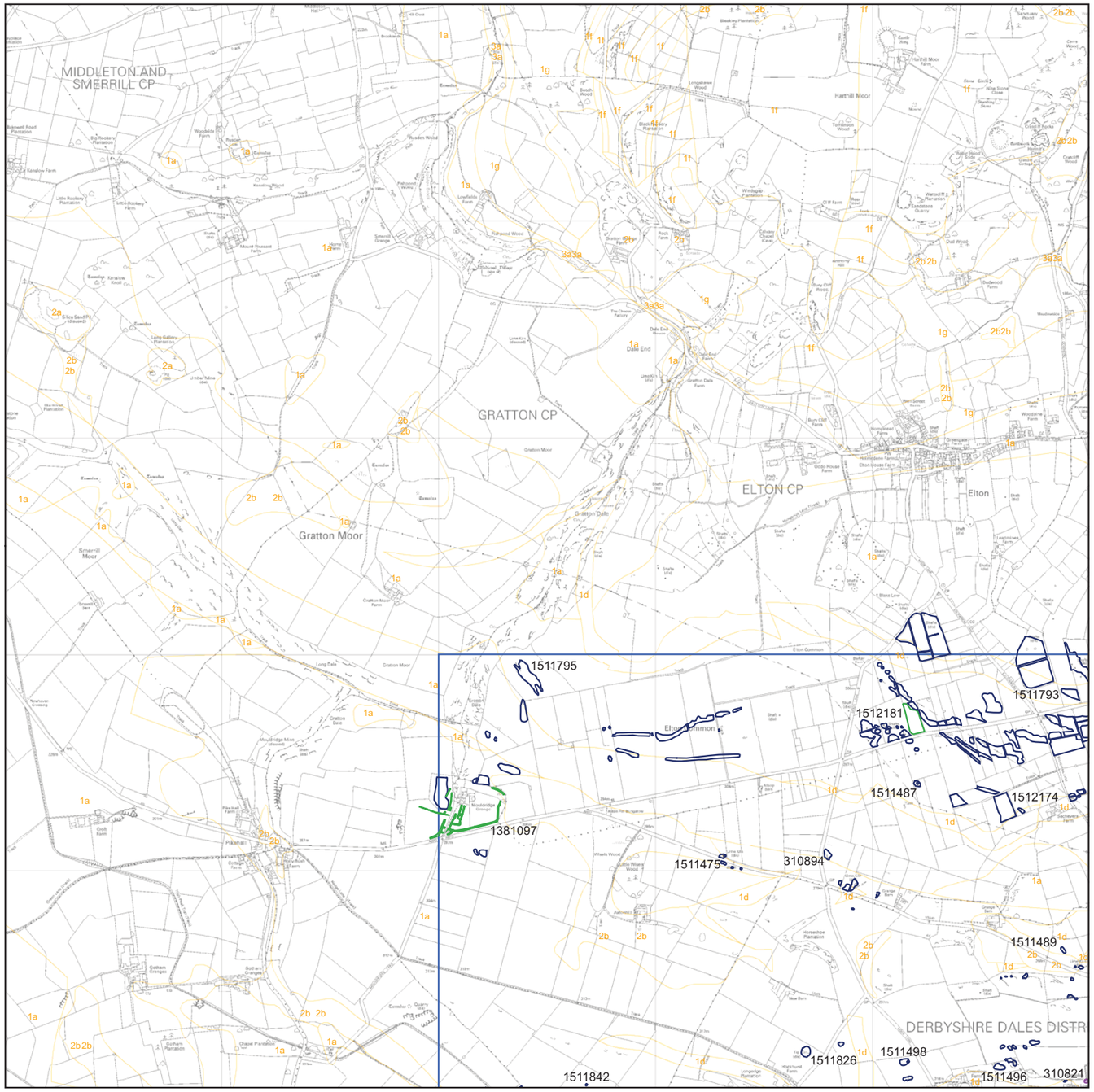

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Fig. AP1.5
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Gratton Dale and Harthill Moor

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
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1g Shales/Siltstones
1i Coal Measures
1k Mudstones

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2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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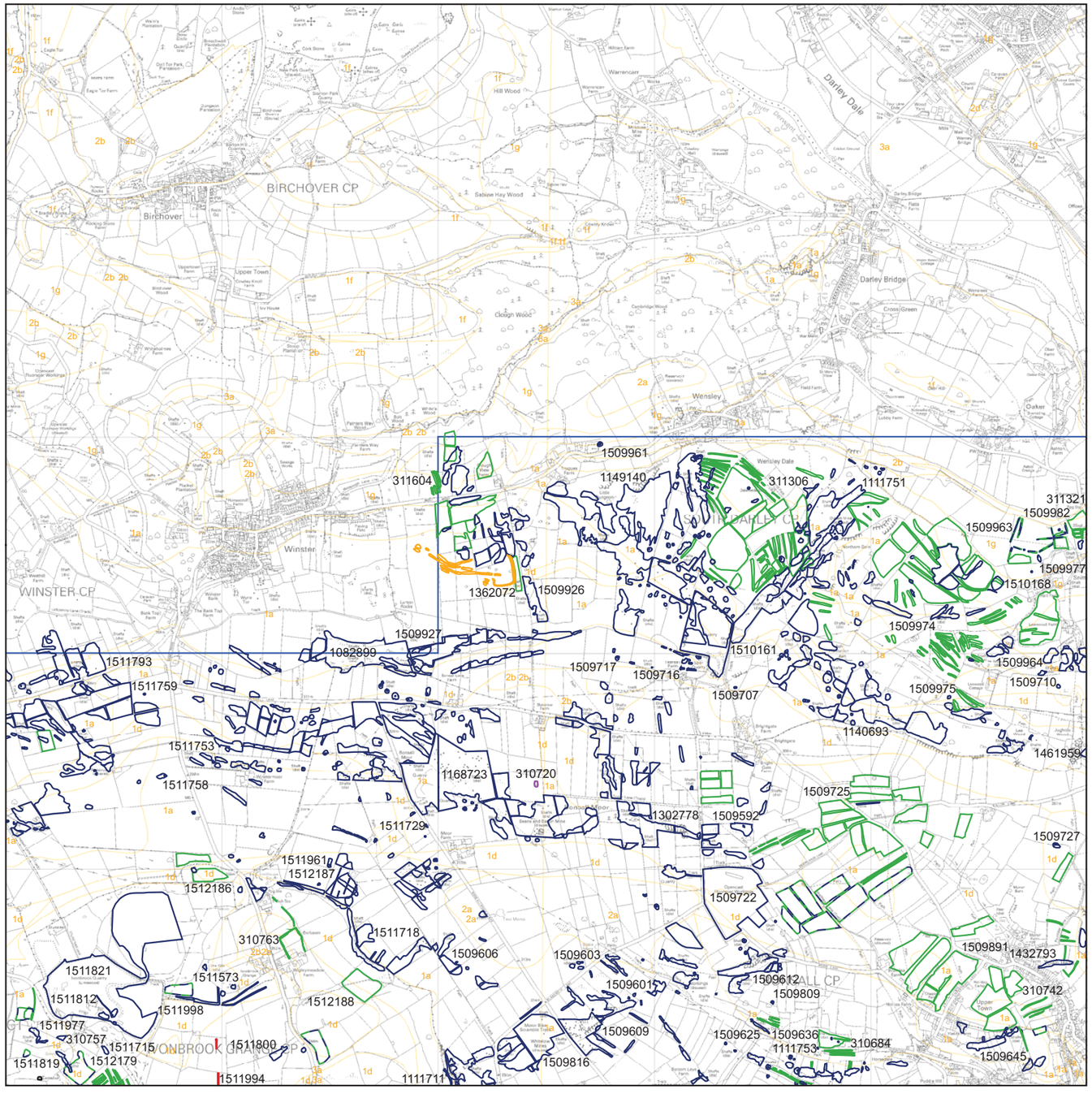

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Fig. AP1.6
SK 36 SE-SW

Birchover and Stanton Moor

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

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2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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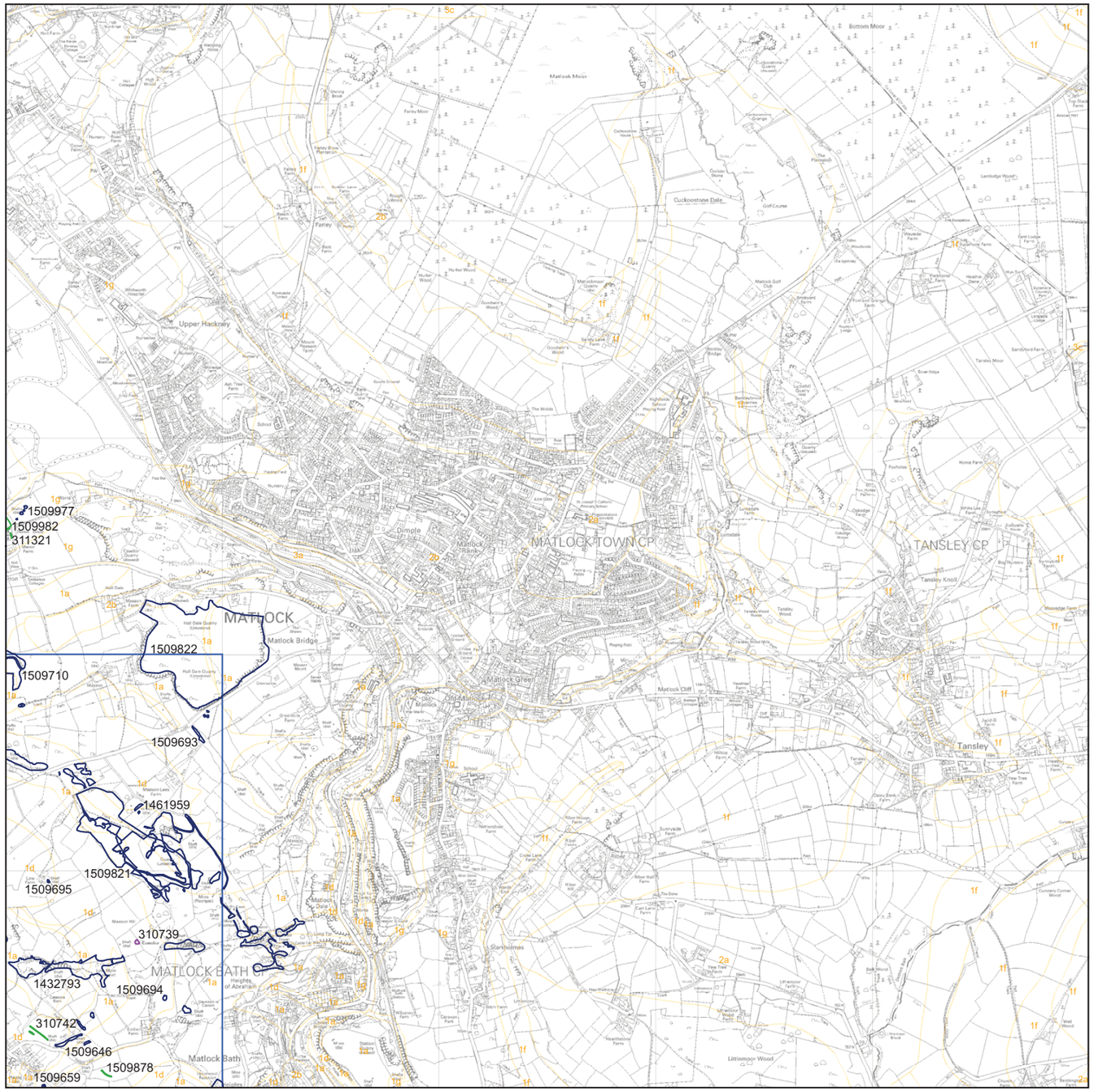

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Fig. AP1.7
SK 36 SE-SW

Matlock

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

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2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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0 250 500 1,000 m

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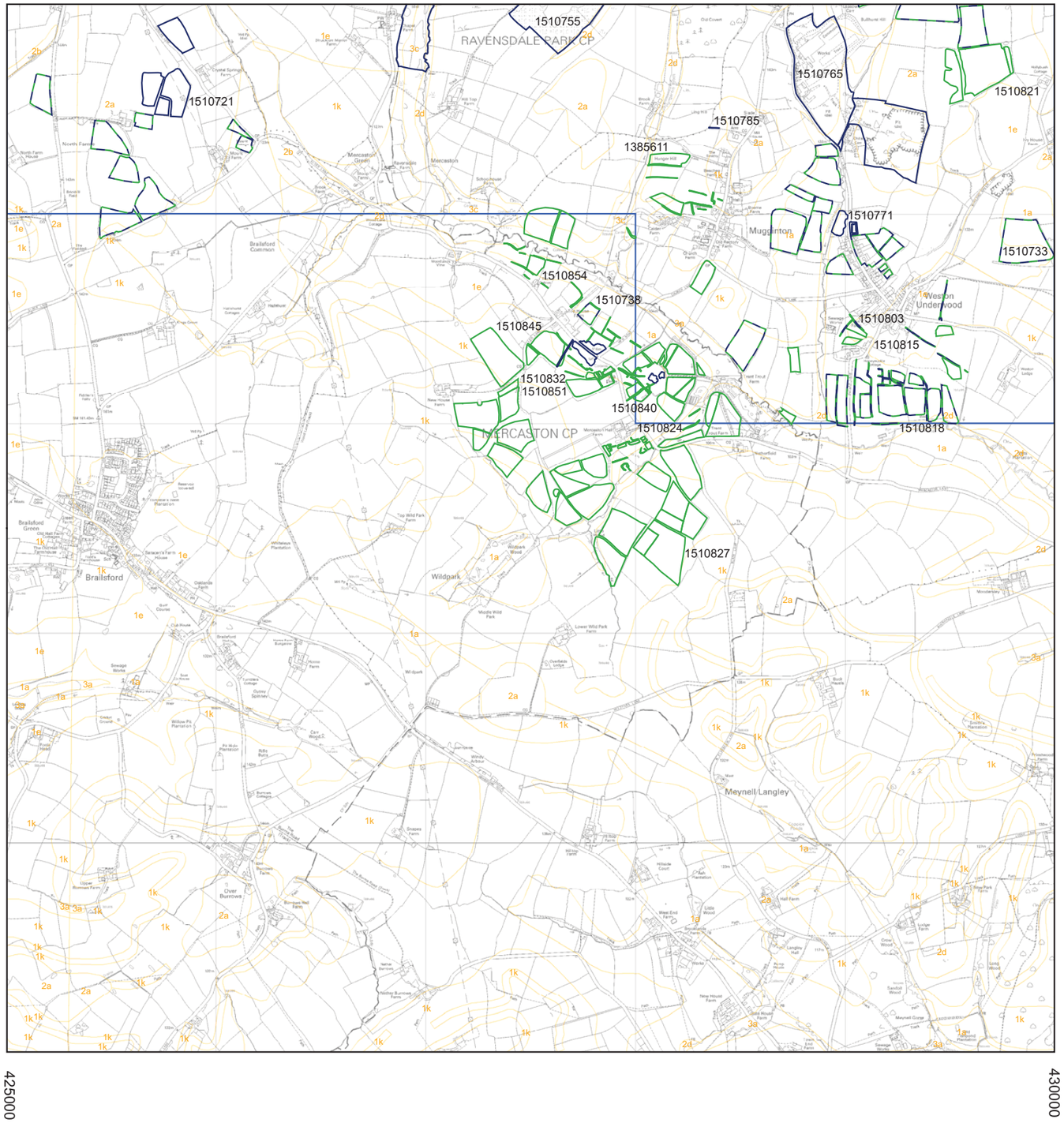

Fig. AP1.8
SK 24

Ravensdale Park and Mercaston

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

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2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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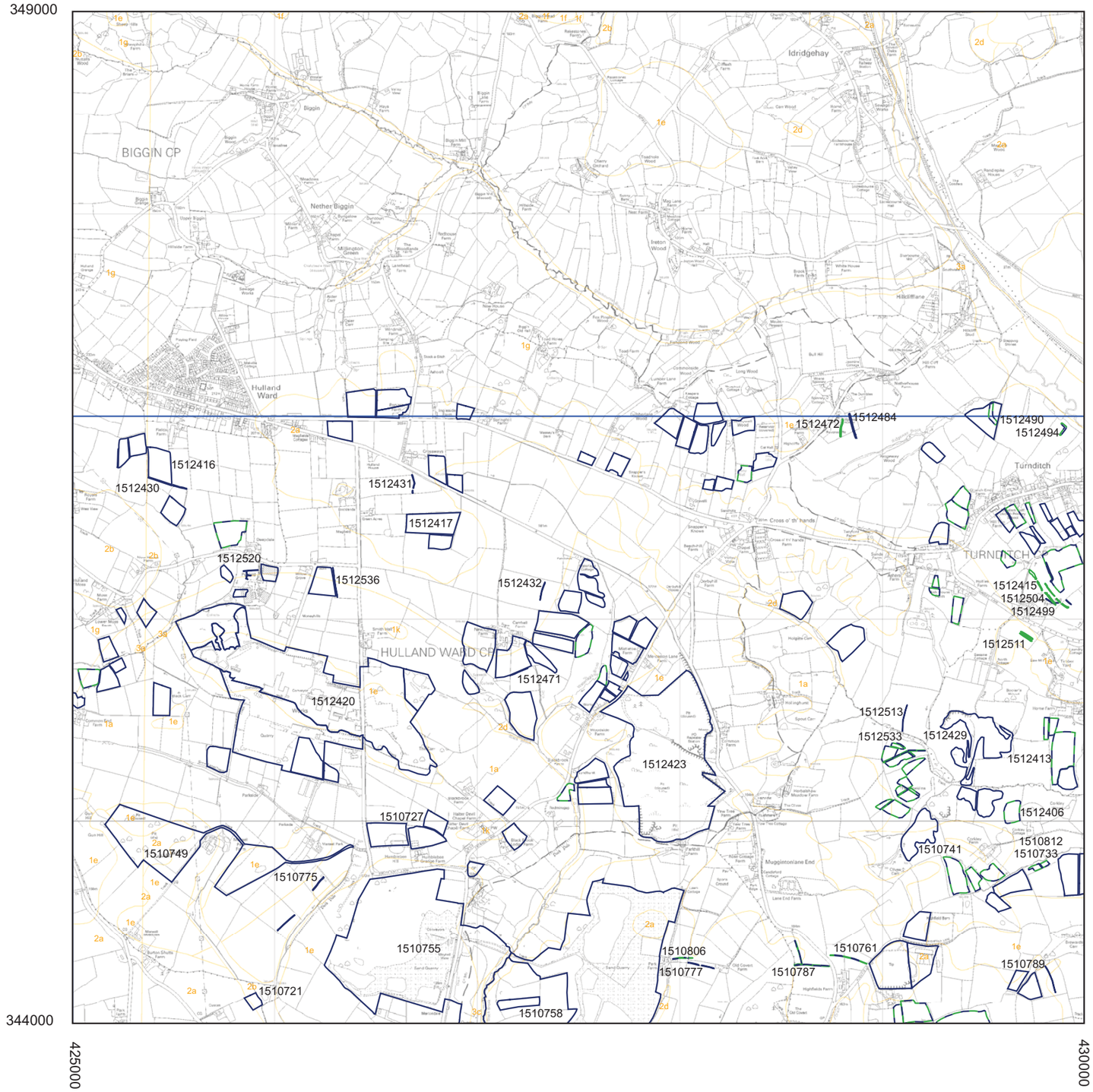

Fig. AP1.9
SK 24

Hulland Ward and Turnditch

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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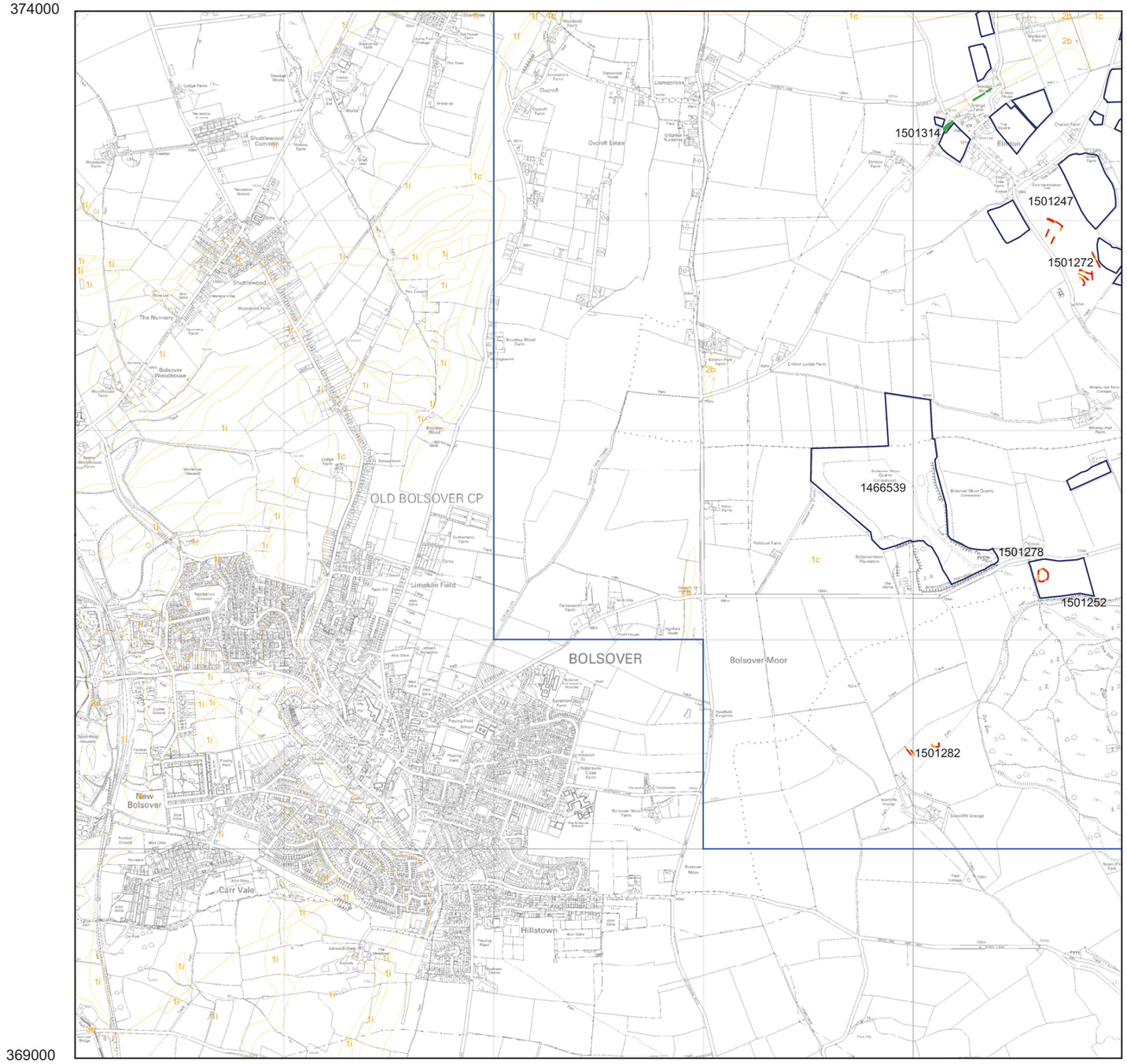

Fig. AP1.10
SK 46-47

Bolsover

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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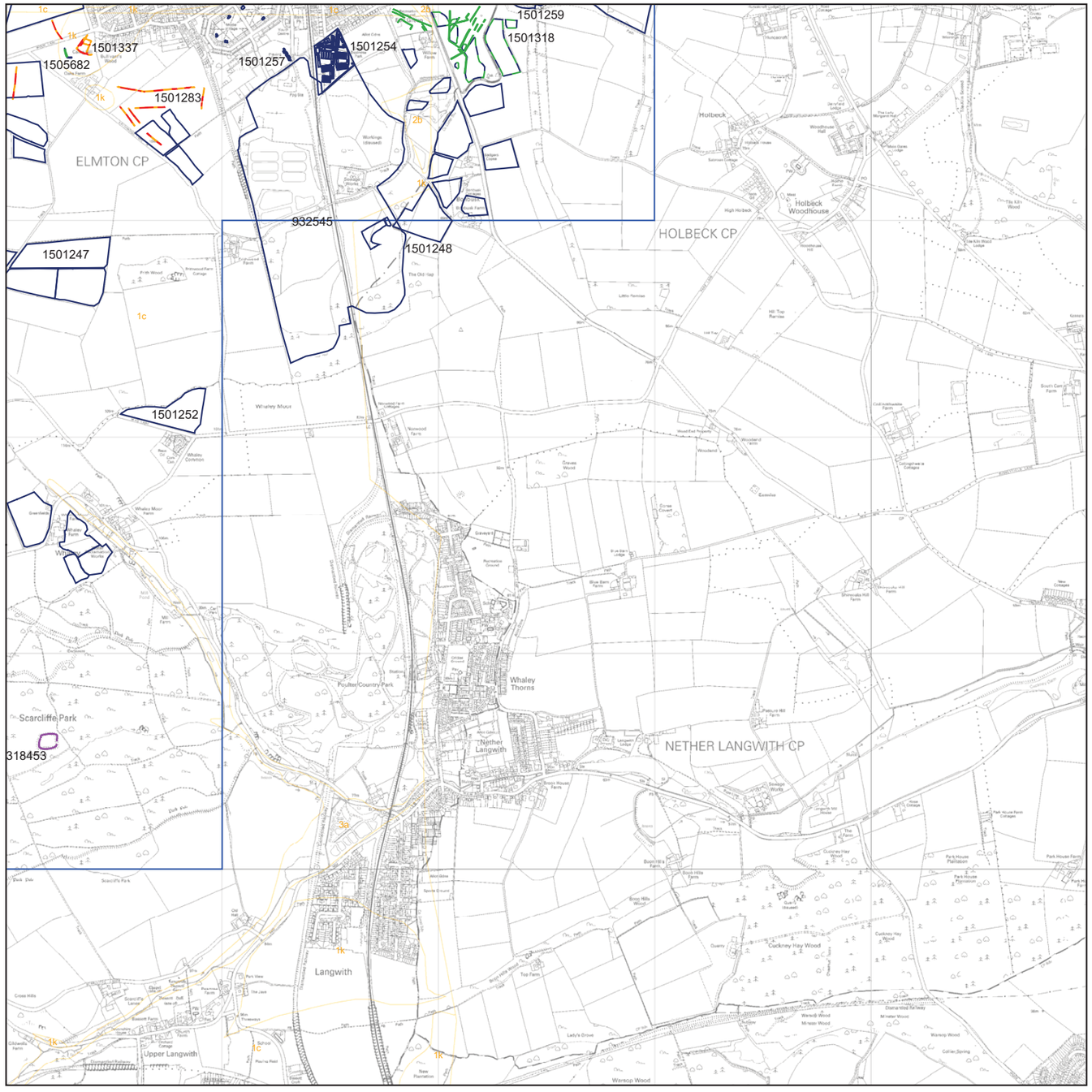

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Fig. AP1.11
SK 56-57

Scarcliffe Park and Elmton

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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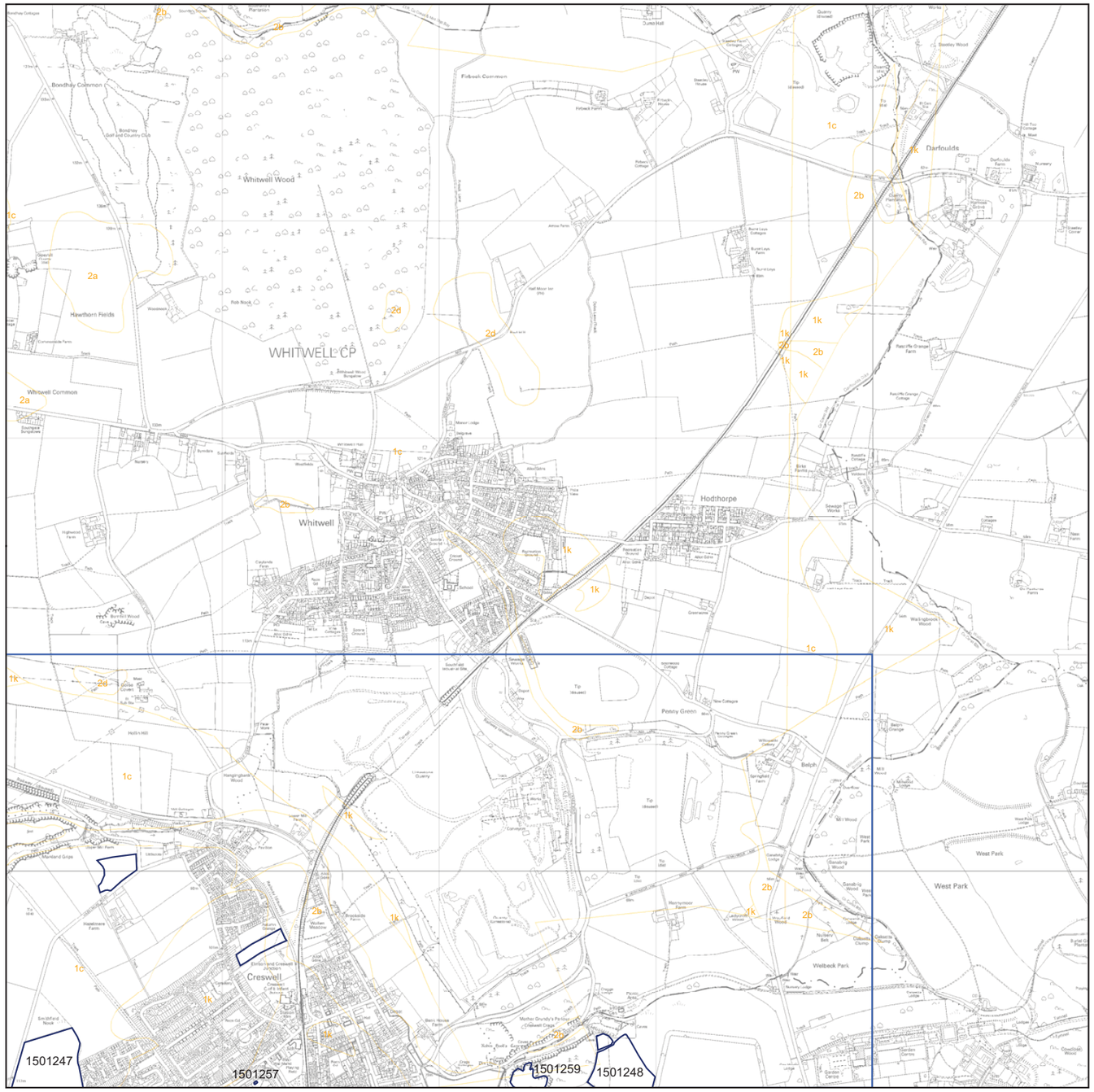

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Fig. AP1.12
SK 57

Creswell and Whitwell

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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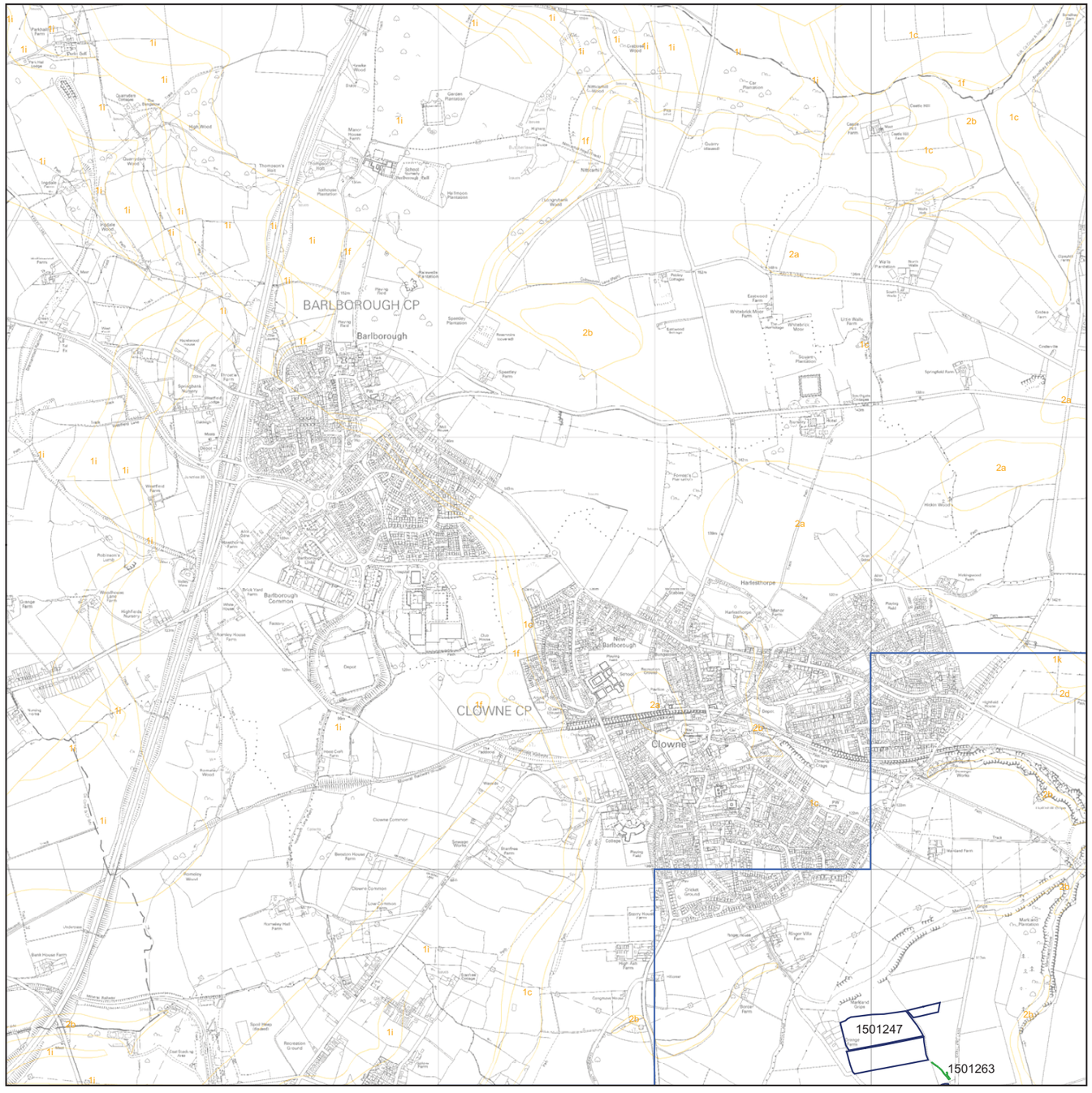

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Fig. AP1.13
SK 47-57

Barlborough and Clowne

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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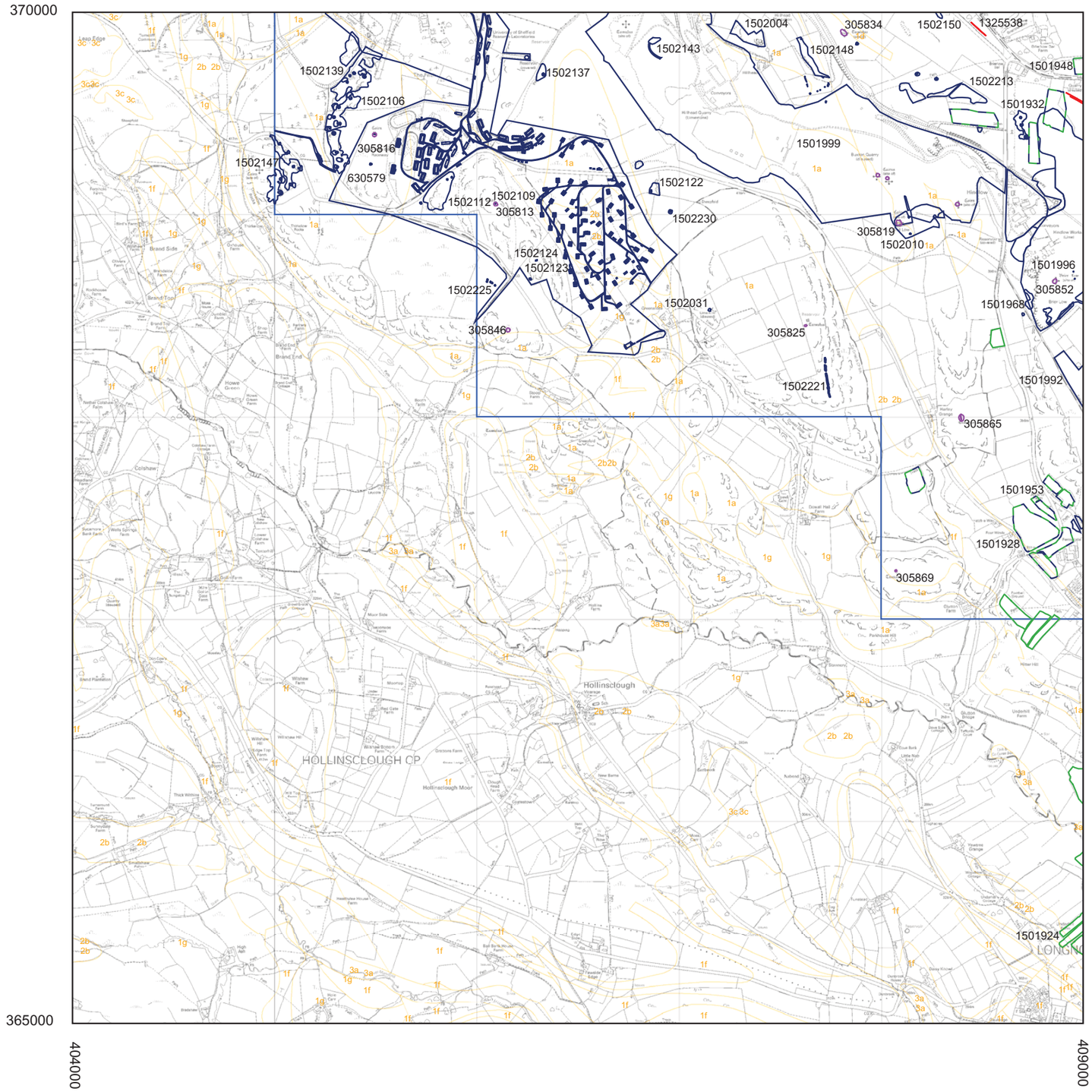

Fig. AP1.14
SK 06

Hollinsclough

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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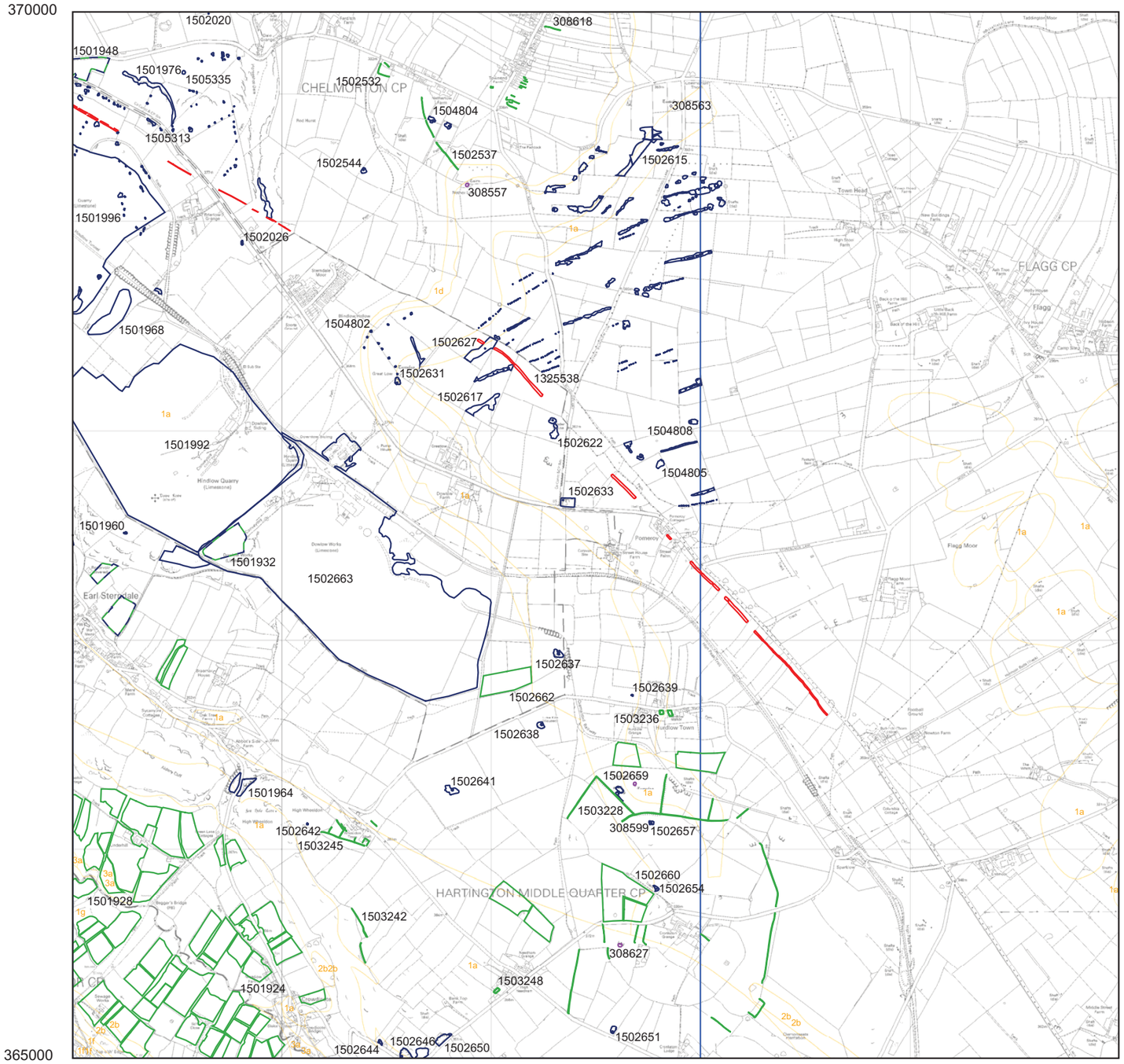

Fig. AP1.15
SK 06-16

Flagg and Chelmorton

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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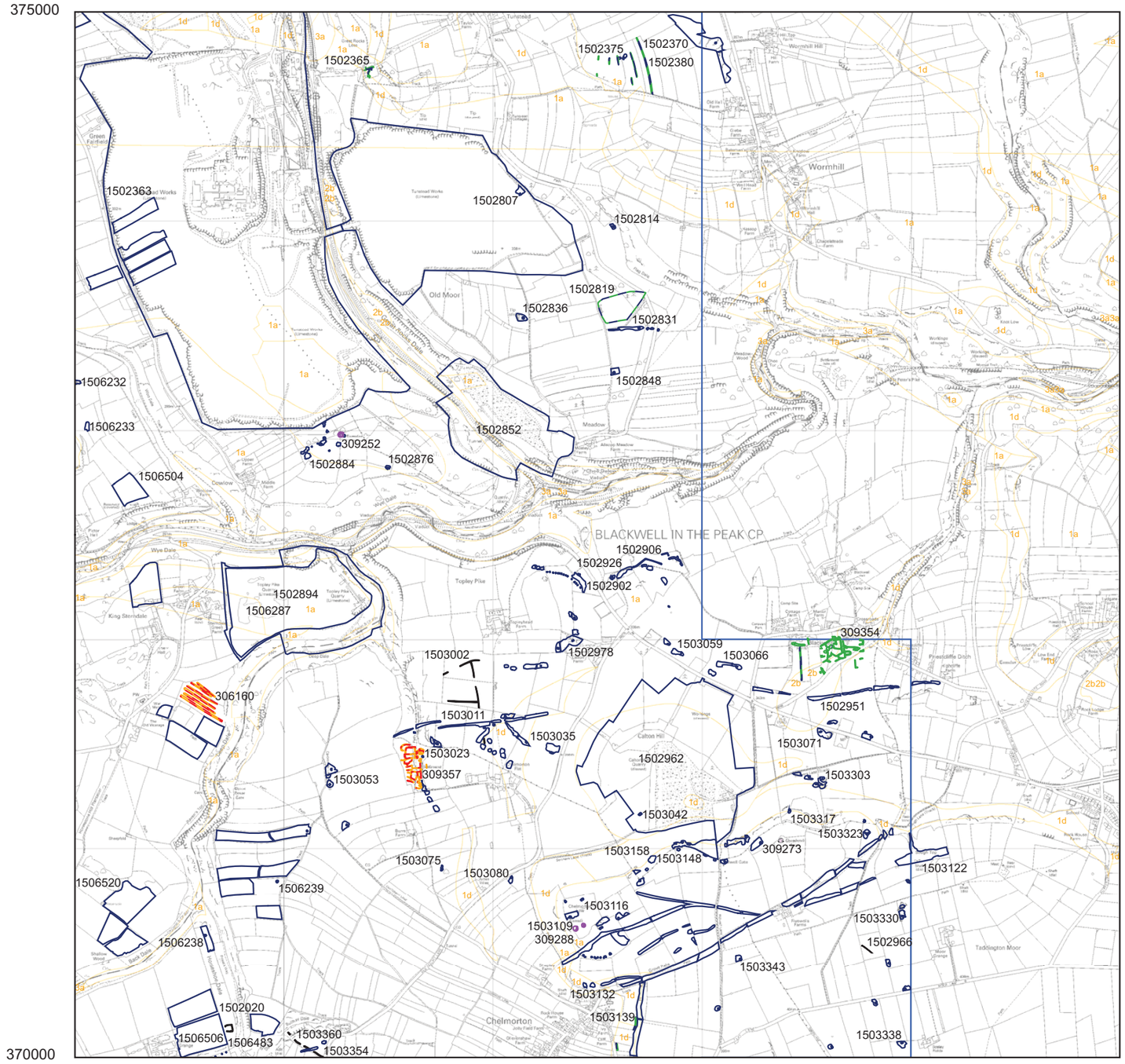

Fig. AP1.16
SK 07-17

Blackwell and the Wye Valley

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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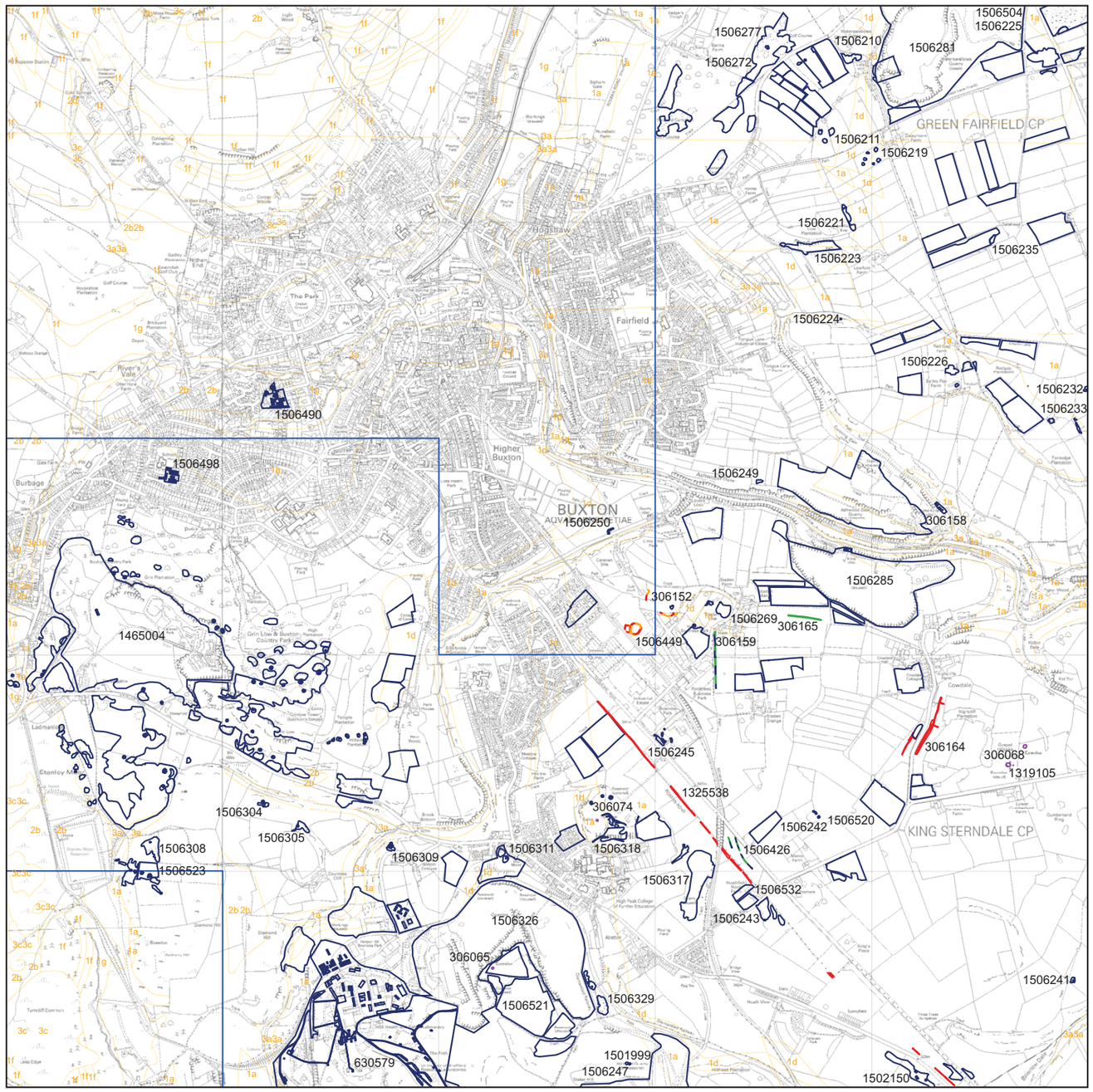

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Fig. AP1.17
SK 07

Buxton

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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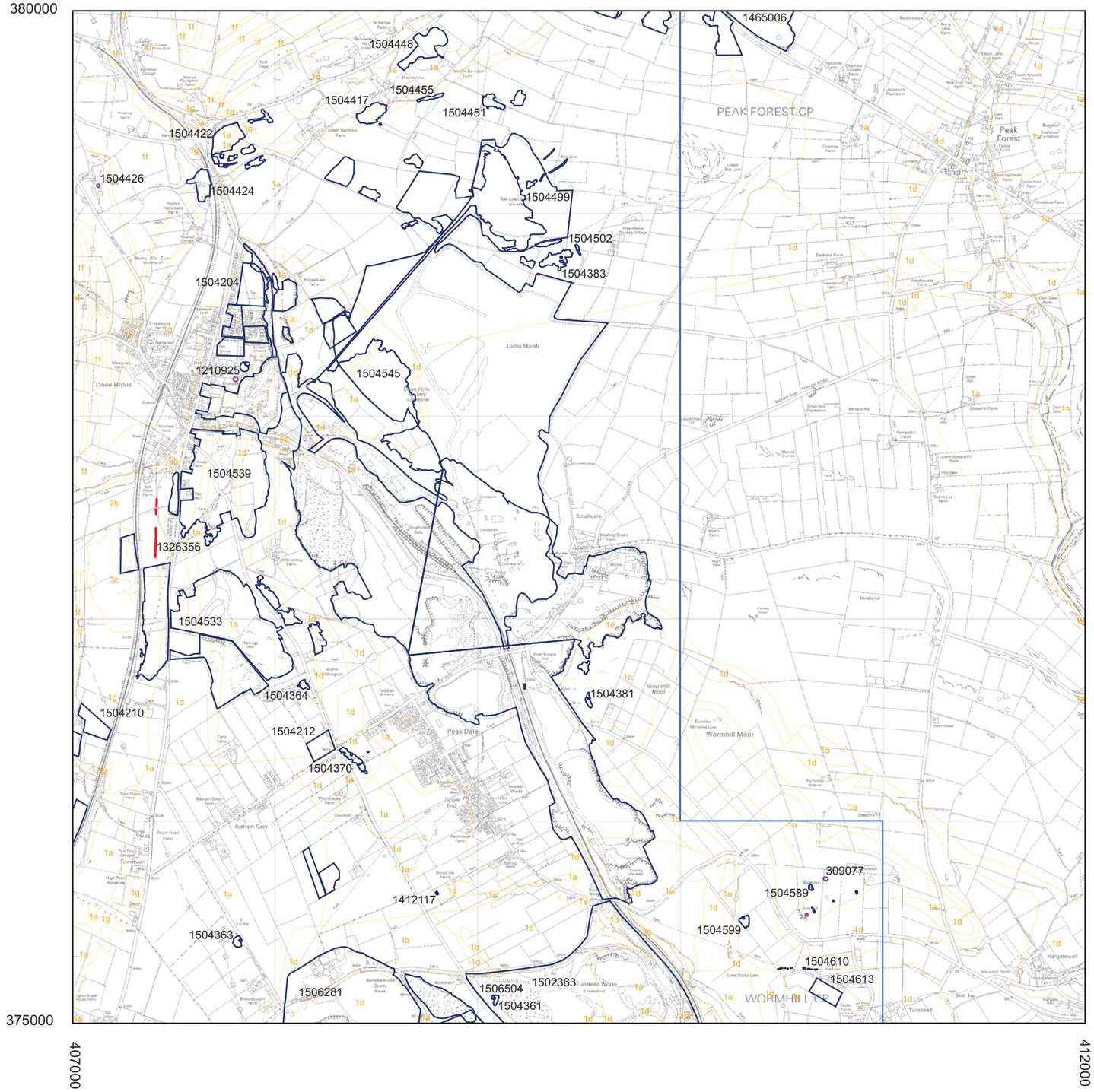

Fig. AP1.18
SK 07-17

Doveholes and Peak Forest

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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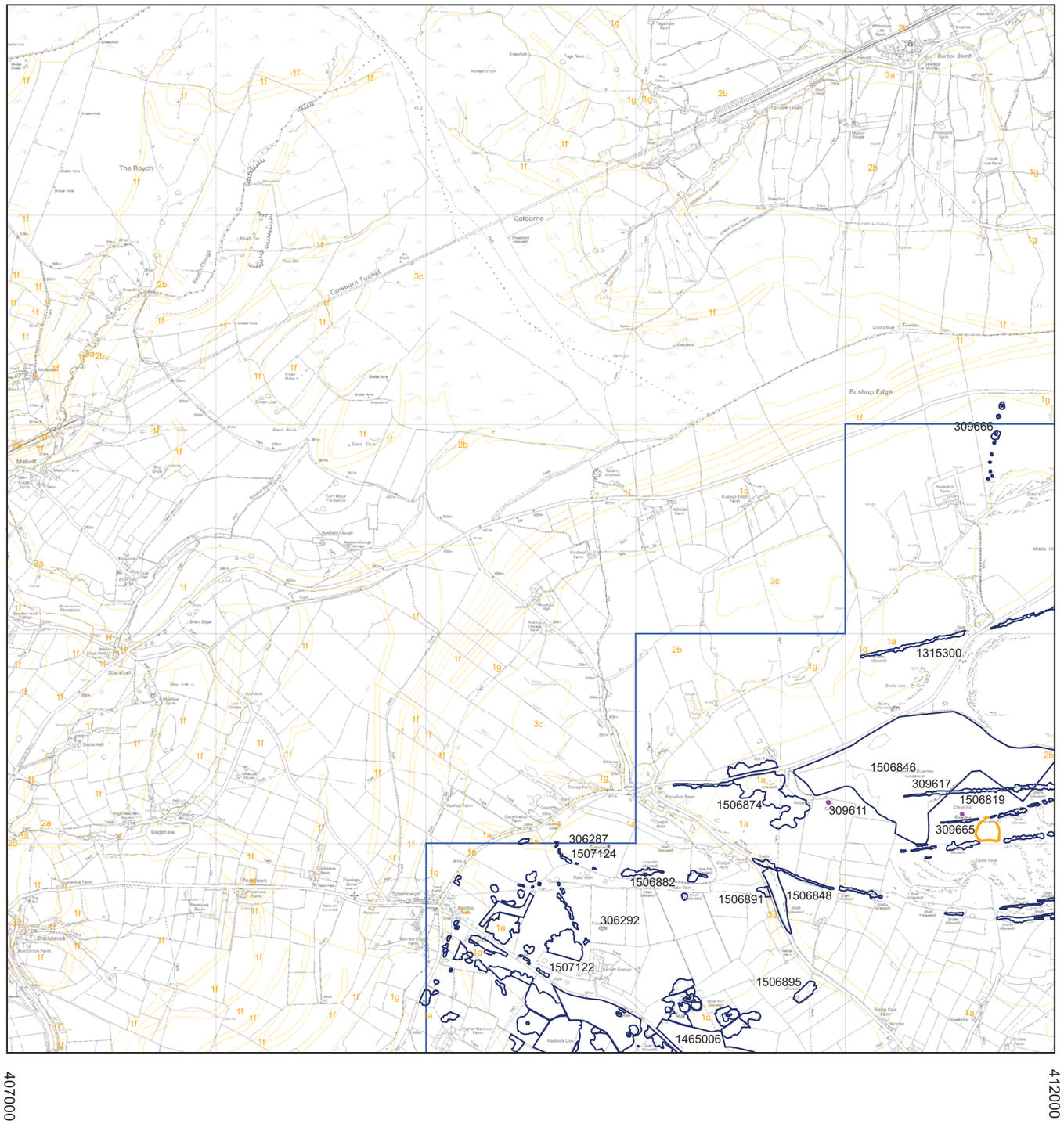

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Fig. AP1.19
SK 08-18

Sparrowpit and Rushup Edge

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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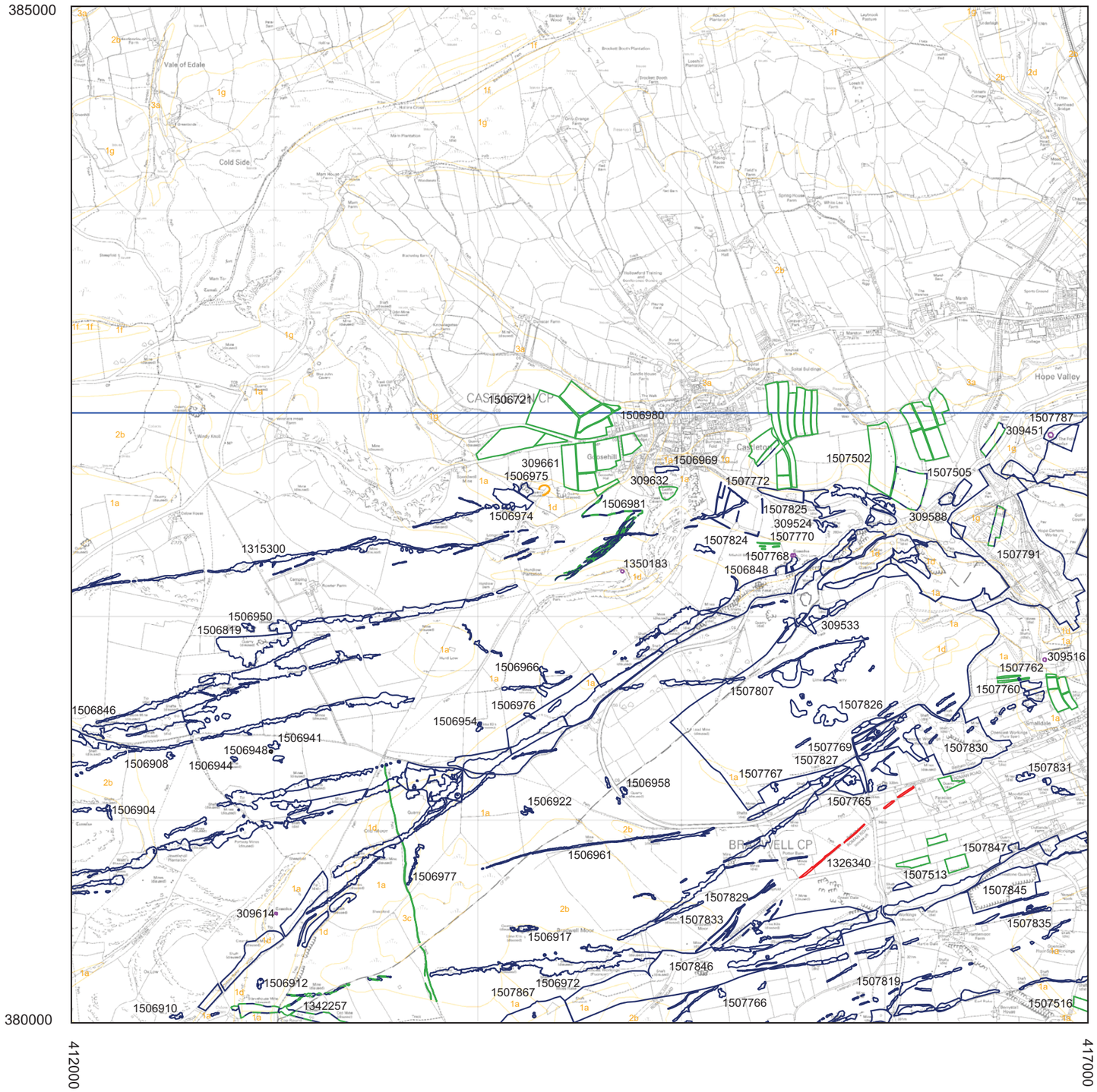

Fig. AP1.20
SK 18

Castleton and the Hope Valley

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

N W E S

0 250 500 1,000 m

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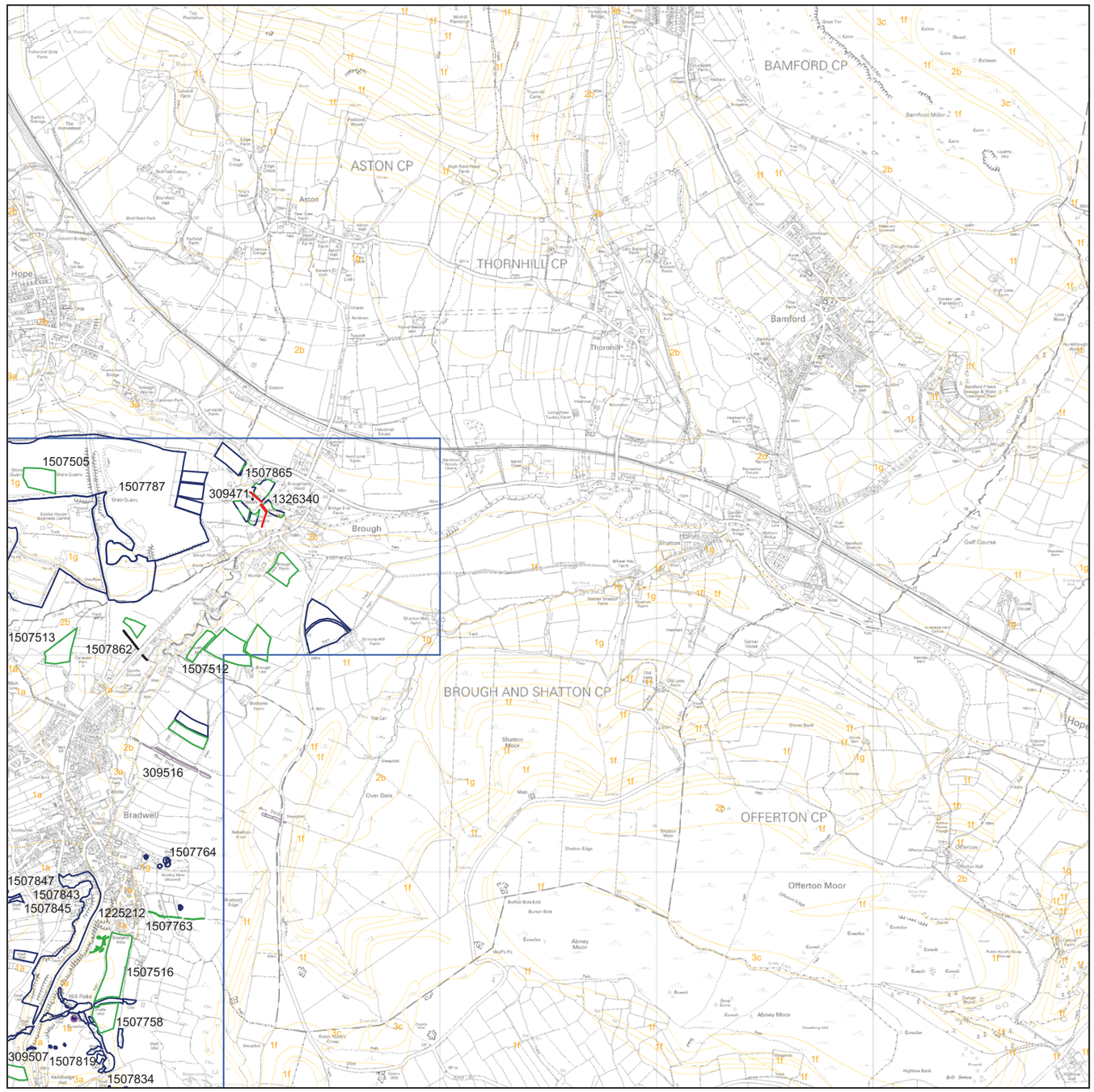

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Fig. AP1.21
SK 18-28

Bradwell and the eastern Hope Valley

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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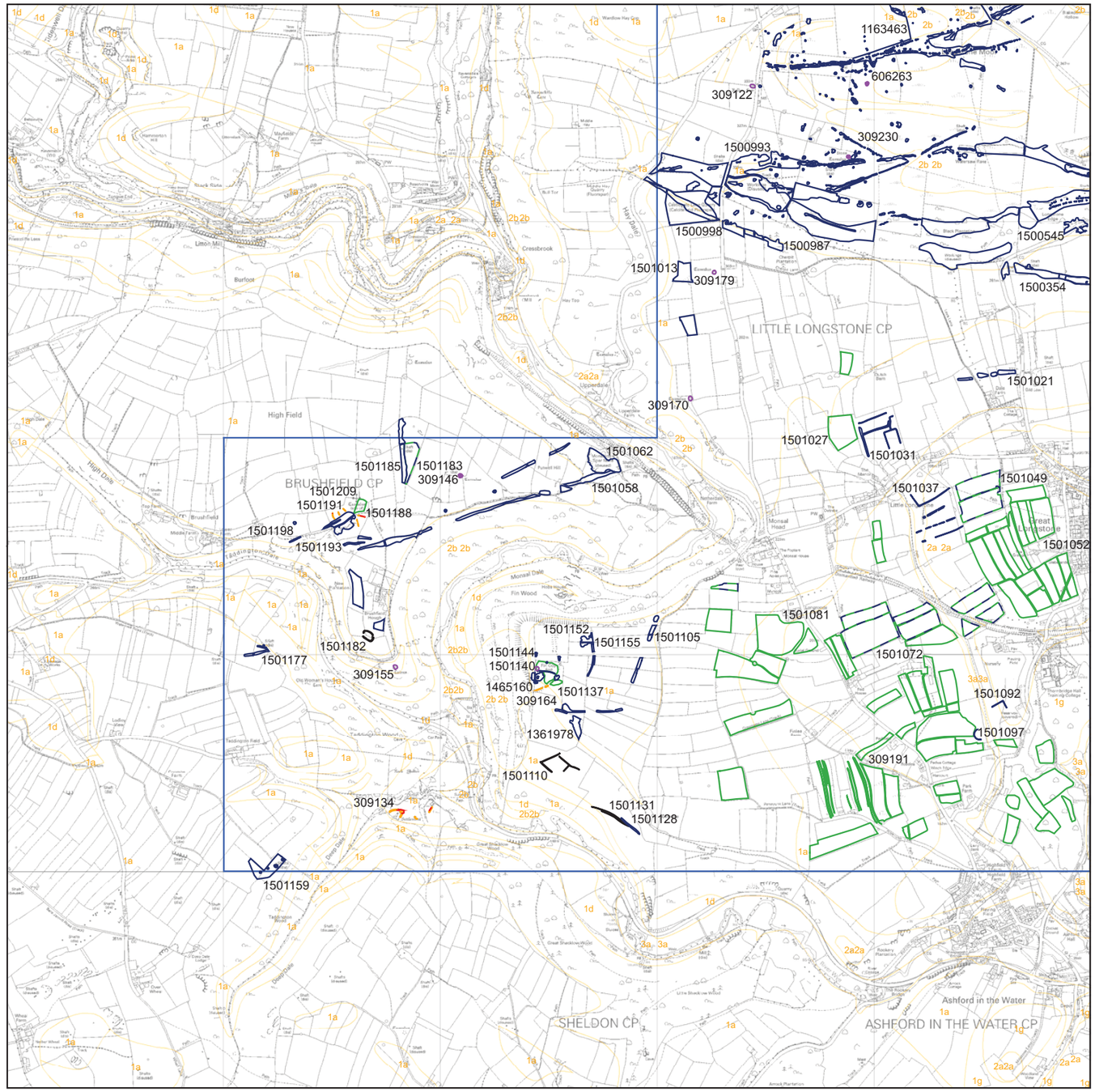

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Fig. AP1.22
SK 16-17

Ashford and Monsal Dale

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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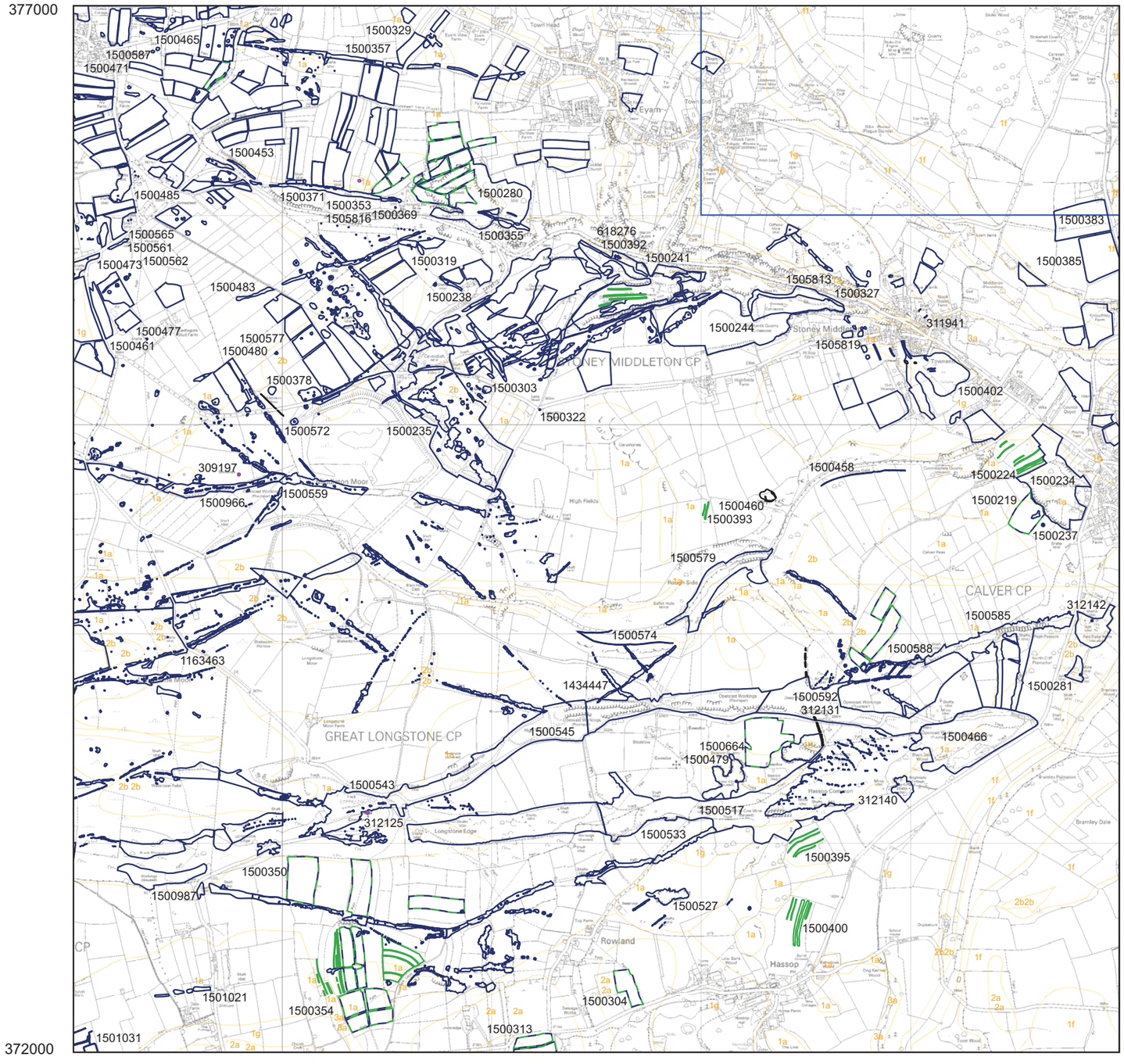

Fig. AP1.23
SK 17-27

Eyam and Stoney Middleton

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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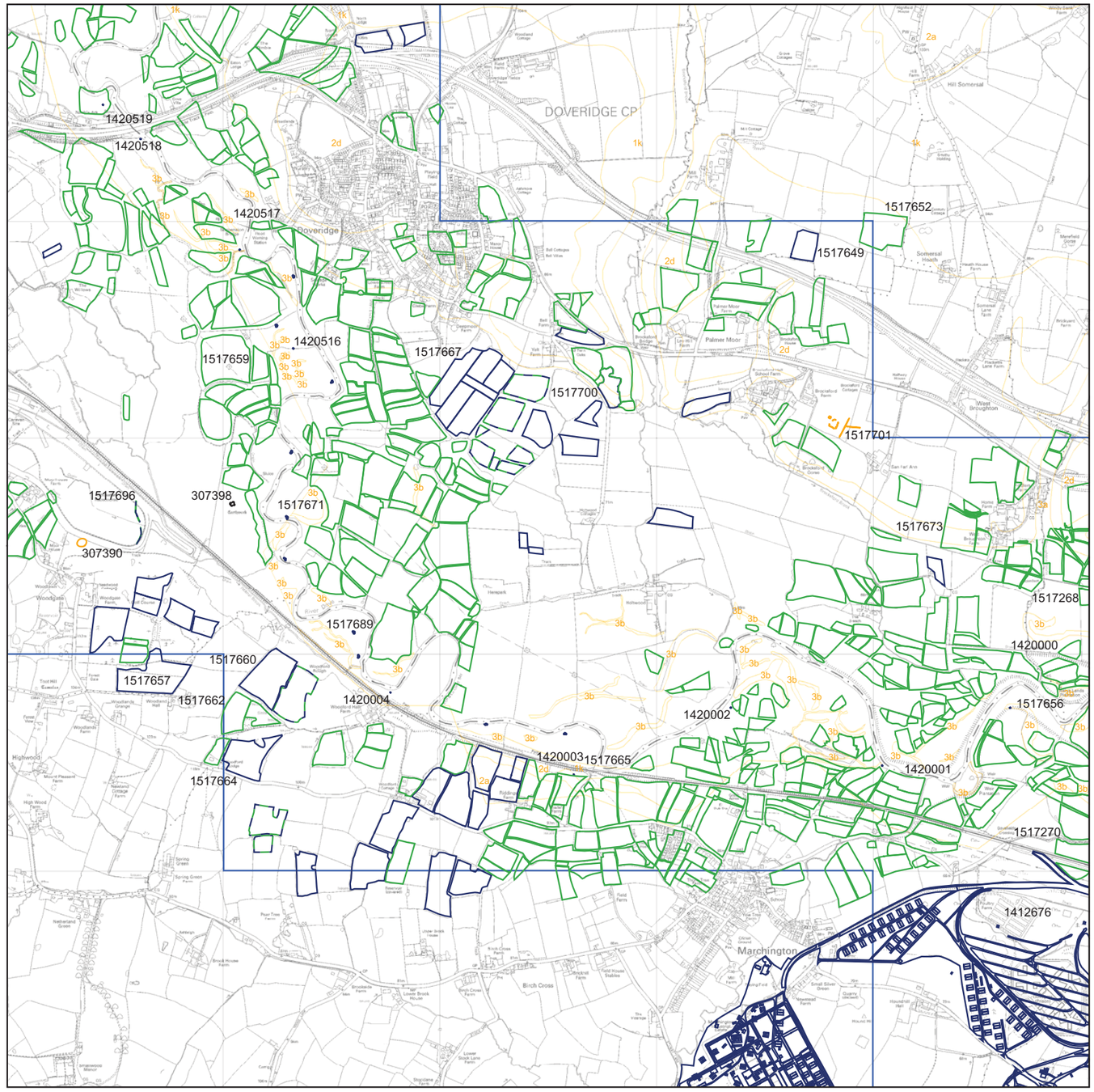

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Fig. AP1.24
SK 13

Doveridge and Marchington

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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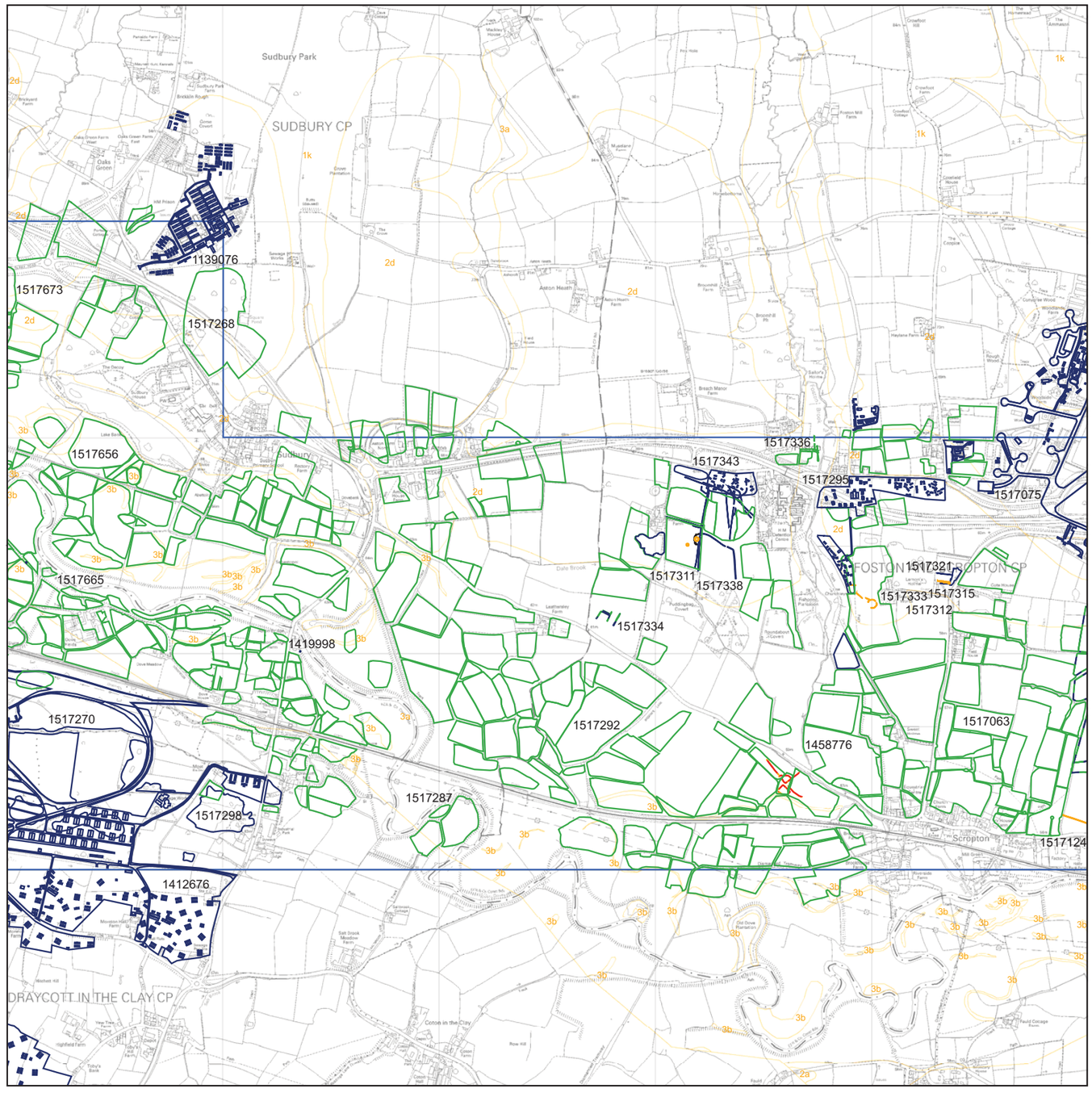

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Fig. AP1.25
SK 12-13

Sudbury

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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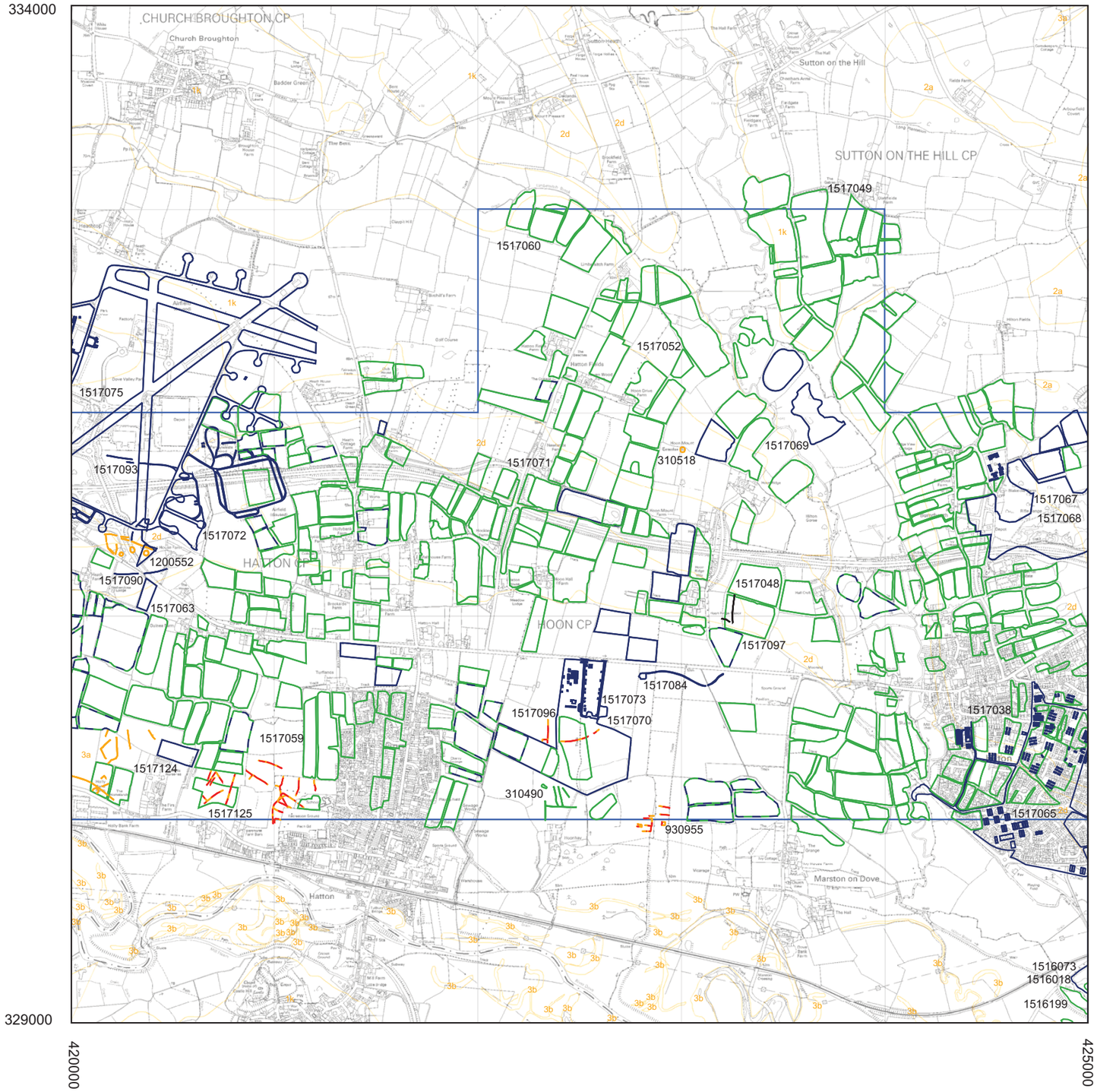

Fig. AP1.26
SK 22-23

Hatton and Hilton

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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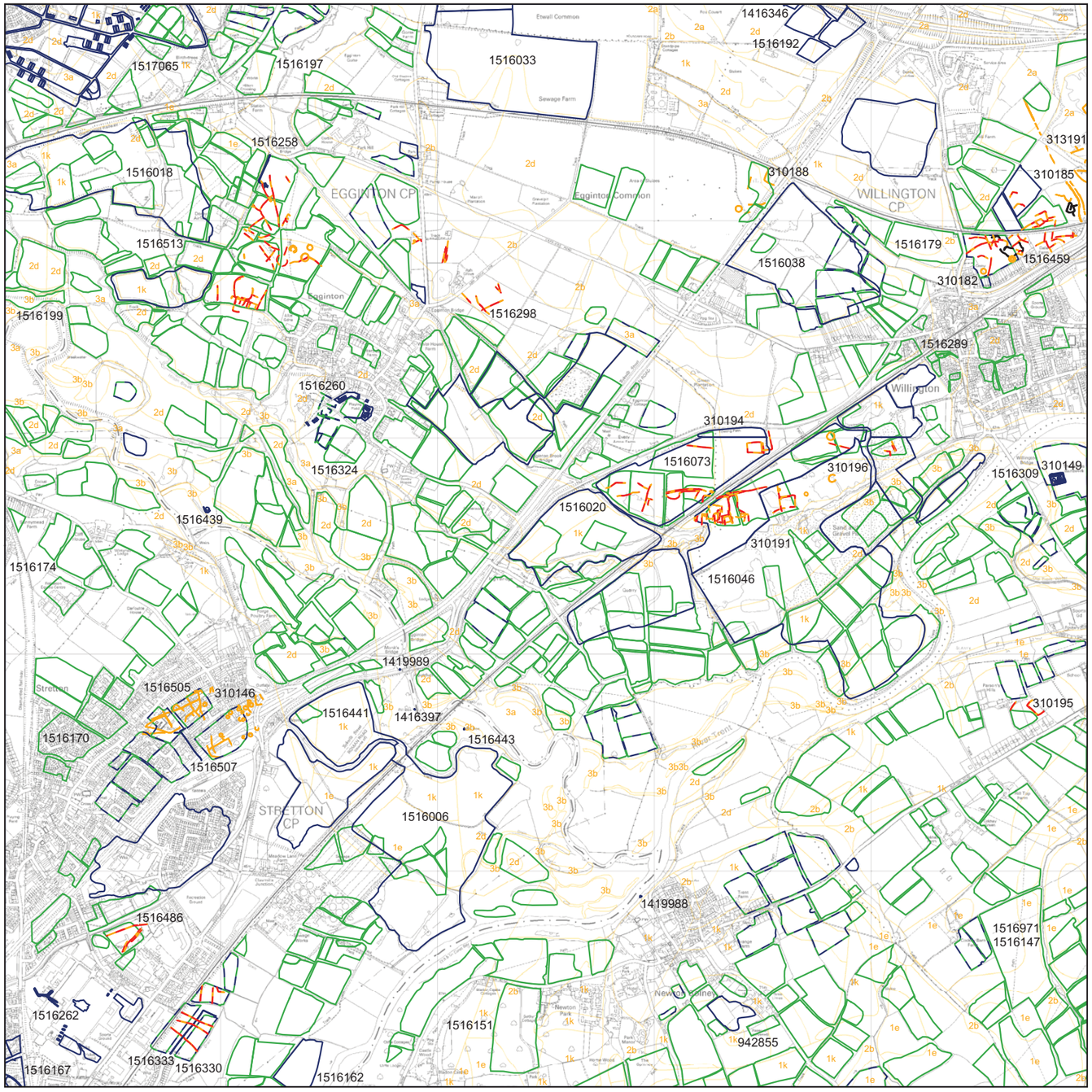

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Fig. AP1.27
SK 22

Egginton and Willington

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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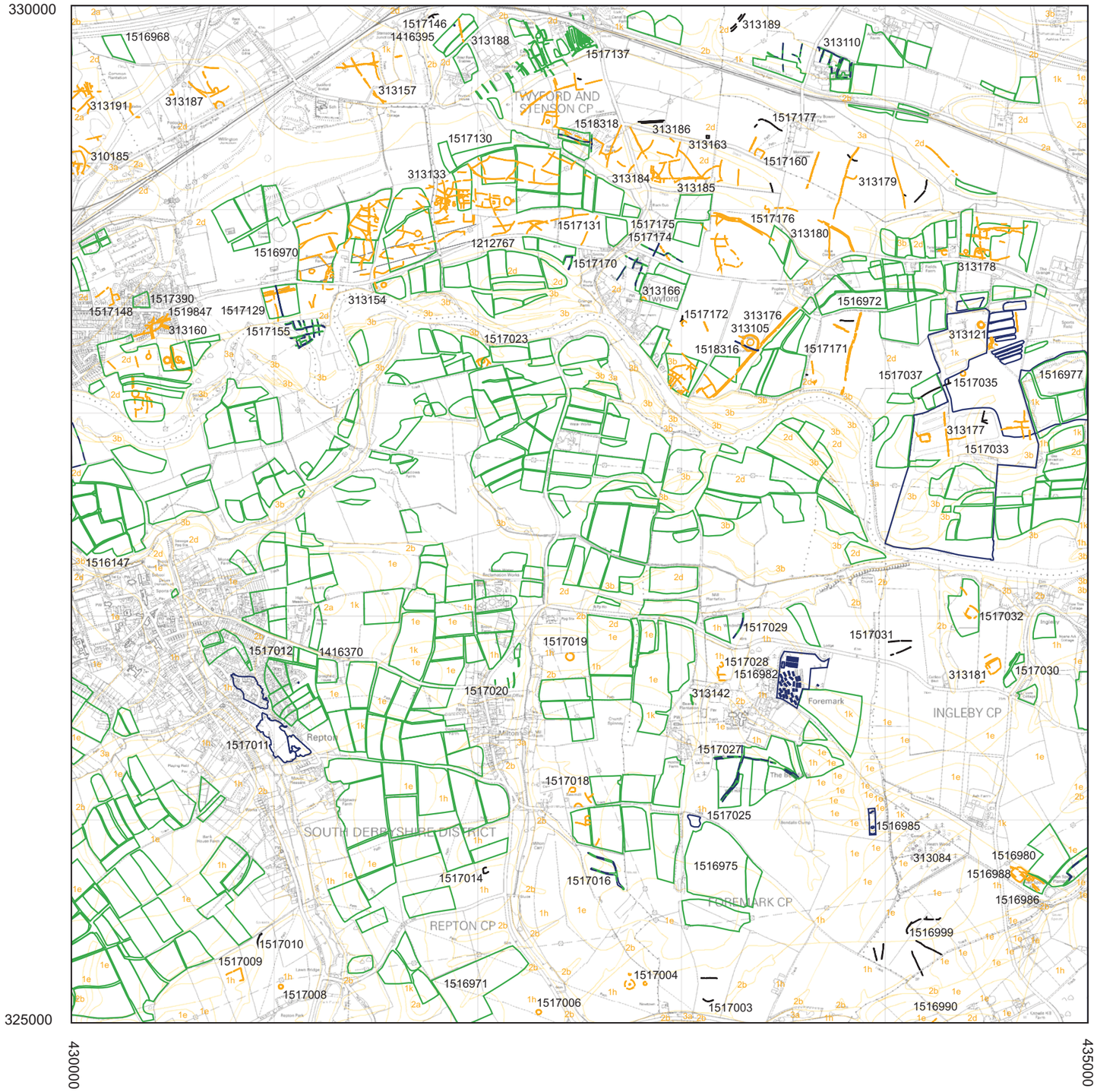

Fig. AP1.28
SK 32

Willington east and Twyford

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

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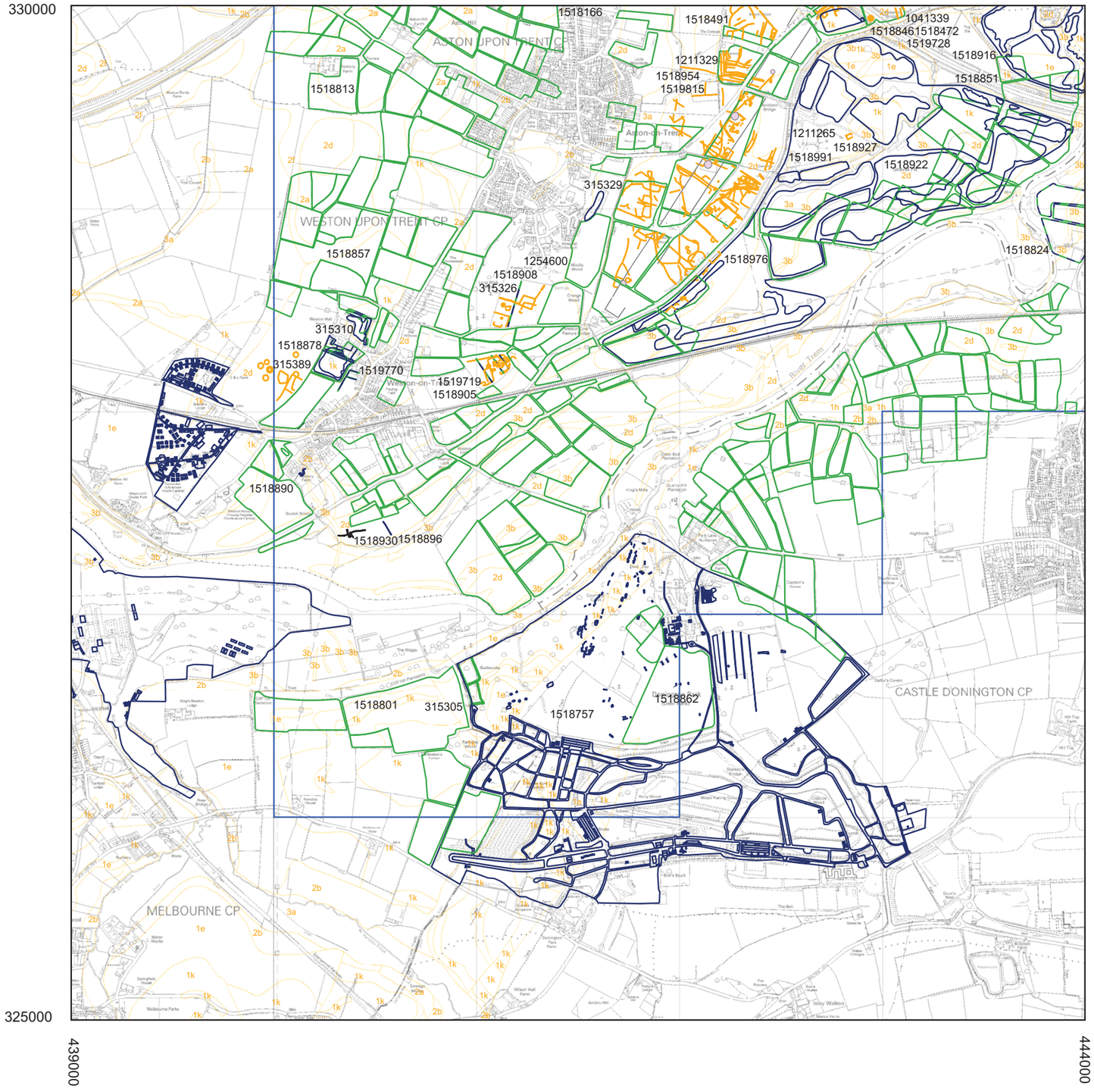


Fig. AP1.29
SK 32-42

Castle Donnington and Aston

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

N W E S

0 250 500 1,000 m

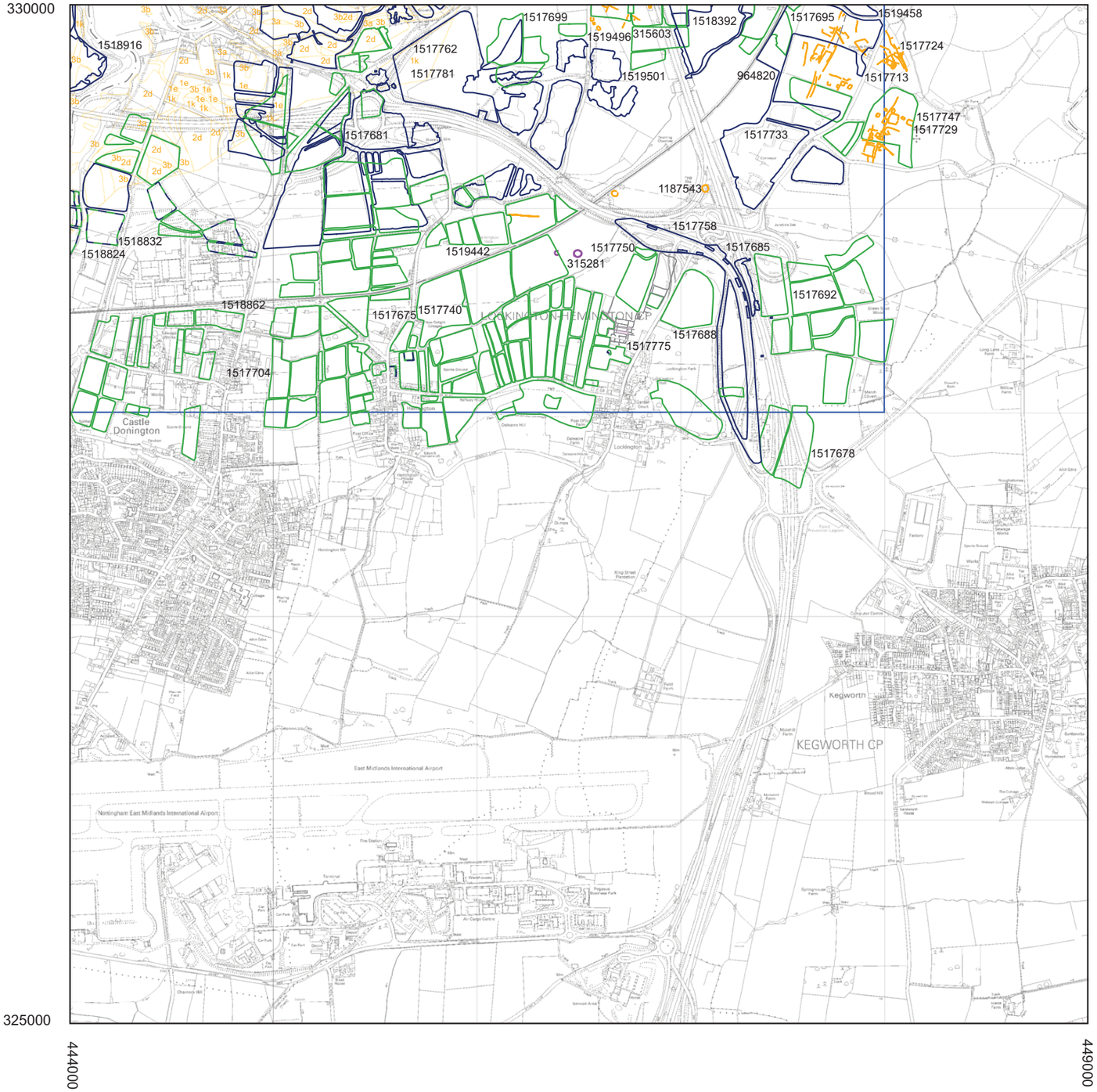


Fig. AP1.30
SK 42

Kegworth and Lockington

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

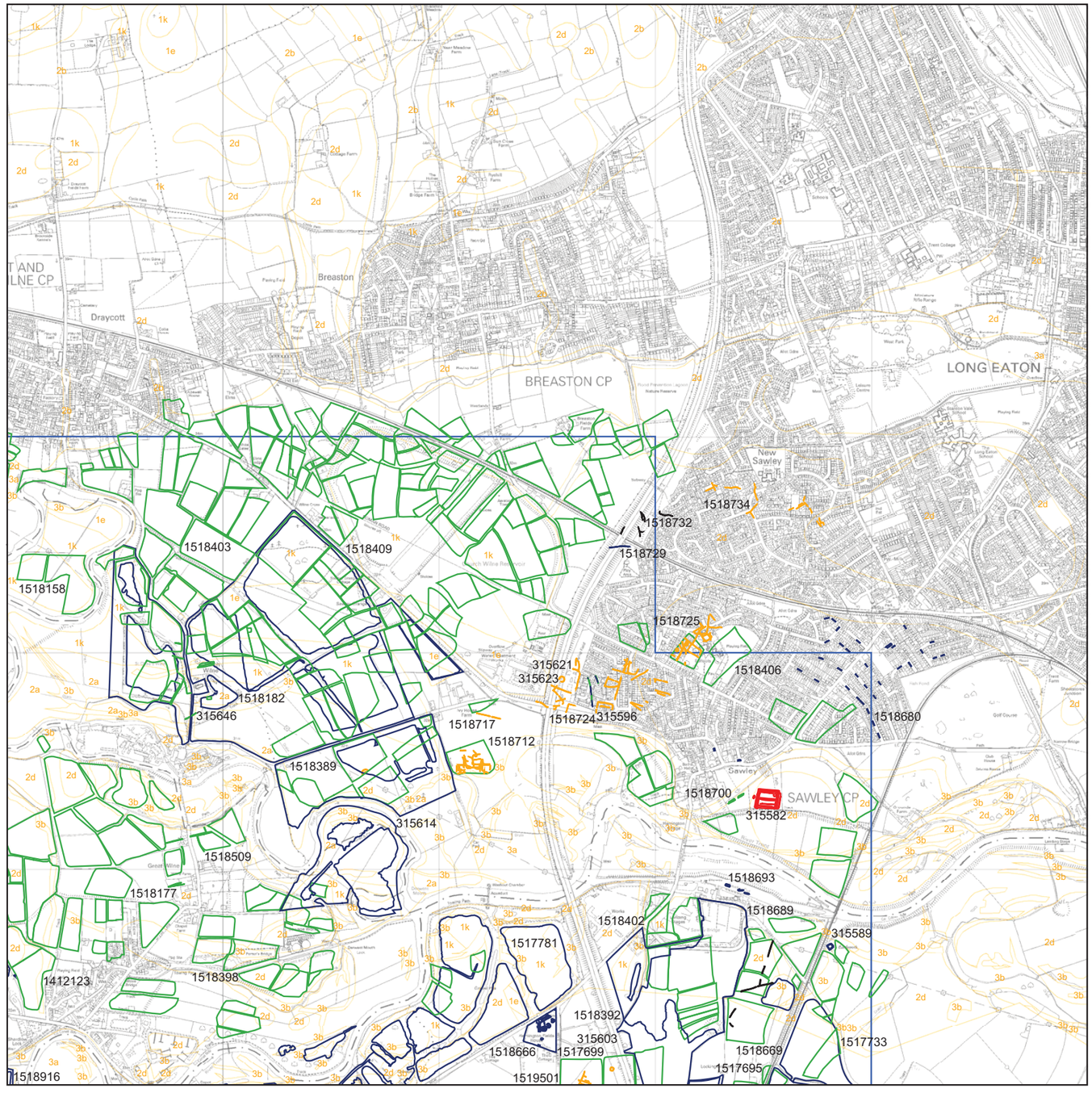
2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

N
W
E
S

0 250 500 1,000
m

335000



330000

444000

449000

Fig. AP1.31
SK 43

Breaston and Long Eaton

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

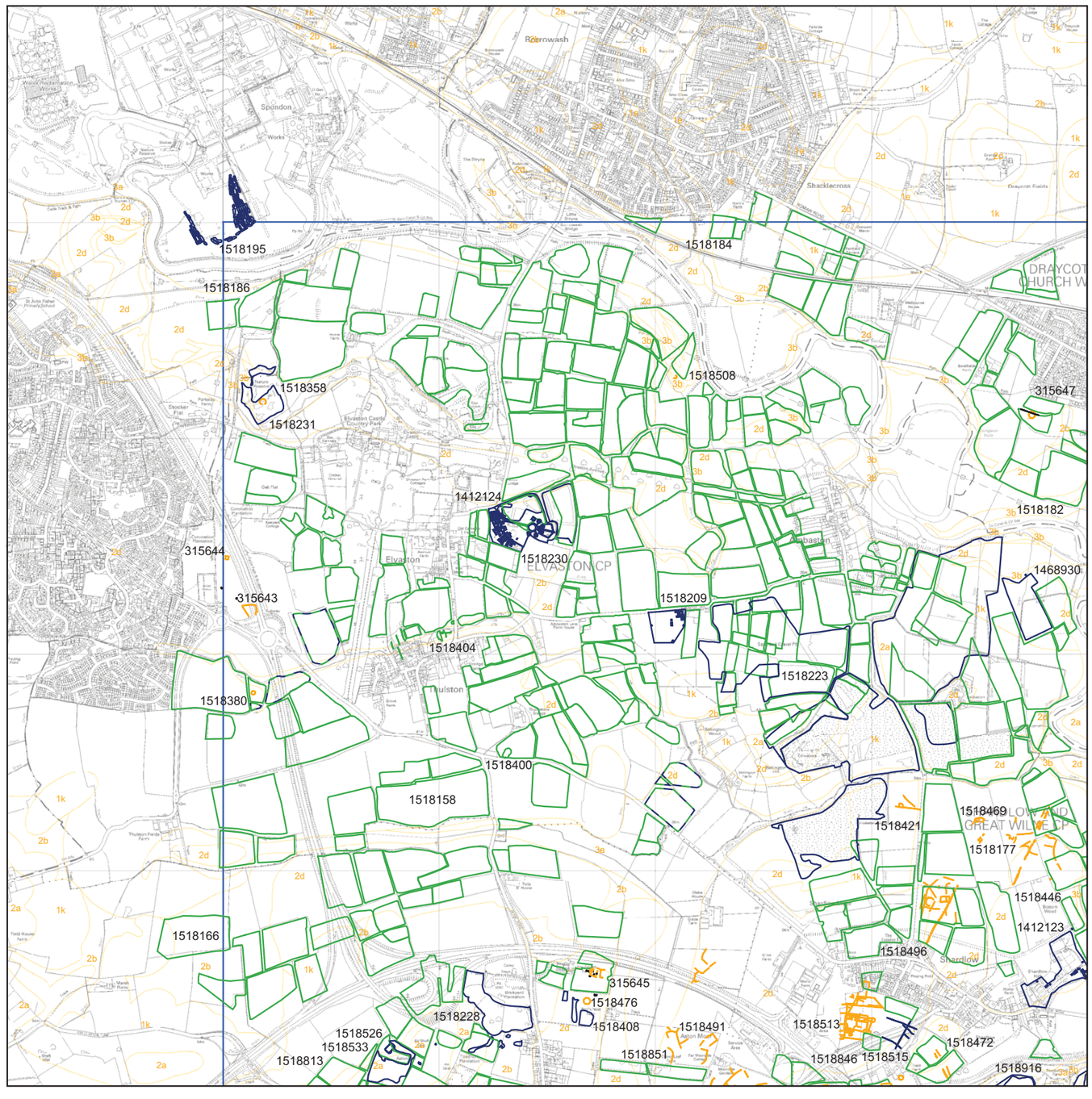
2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

N W E S

0 250 500 1,000 m

335000



330000

439000

444000

Fig. AP1.32
SK 33-43

Elvaston and Borrowash

Extent of Aerial Photograph Transcription Block

Features plotted by period

- Palaeolithic/Mesolithic
- Neolithic
- Bronze Age
- Iron Age
- Roman
- Early Medieval
- Medieval
- Post Medieval/Modern
- Uncertain

Landform Units

1a Carboniferous Limestone
1c Magnesian Limestone
1d Lava/Basaltic/Agglom.
1e Sandstones
1f Millstone Grit
1g Shales/Siltstones
1i Coal Measures
1k Mudstones

2a Till
2b Undiff. Deposits
2d Glaciofluvial River Terraces
2e Late Glacial Palaeochannels

3a Alluvial Terraces
3b Alluvial Palaeochannels
3c Holocene Peat Bogs

N W E S

0 250 500 1,000 m

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