

**SHEDDING LIGHT ON THE NORTH
PENNINES**

The Allen Valleys and Hexhamshire
Lidar Landscape Survey

Stewart Ainsworth

SHEDDING LIGHT ON THE NORTH PENNINES

The Allen Valleys and Hexhamshire Lidar Landscape Survey

This report presents the results of a community archaeology project, in which volunteers examined airborne laser scanning data (lidar) within an area of 285 square kilometres of the North Pennines AONB. As a result of the project, 1,027 new archaeological sites surviving as earthworks were identified. Significant discoveries of previously unknown settlements and enclosures of the prehistoric and Roman periods have been made along the river valleys in the upland area south of Hadrian's Wall. Also, for the later periods, large numbers of farmsteads and complex field systems and head dykes associated with them have been newly identified, as well as a wealth of remains associated with the extractive industries. The project was largely funded by the Heritage Lottery Fund, and run in collaboration with the North Pennines AONB Partnership, Durham County Council, and the University of Chester. The volunteer element of the project commenced in May 2013 and was completed in November 2015.

Stewart Ainsworth FSA, MCifA
Visiting Professor of Landscape Archaeology
Faculty of Humanities
Department of History and Archaeology
Binks Building
University of Chester
Parkgate Road
Chester
CH14BJ
Email: s.ainsworth@chester.ac.uk

October 2016

Acknowledgements

This project relied entirely on the energy and enthusiasm of the volunteers who spent many hours examining lidar images, maps and aerial photographs. They also conscientiously filled in the record forms and other documents which were a necessary part of the recording process. All of the volunteers at some stage saw some of their new 'archaeological' discoveries reclassified as drains, modern agricultural features, natural landscaping etc., but bore these disappointments with good grace. On the other hand, it is hoped there was an equal measure of excitement when other features they had identified were assessed as being of genuine archaeological interest. To all who contributed to the project, sincere thanks for all the work and support. Not only have the volunteers gained experience in how to interpret the landscape using lidar, they have also created a much longer-term legacy by contributing to knowledge of our historic environment, for which generations of future researchers, I am sure, would wish *in absentia* to say thank you. The contributors were; Andrew Collier, Andrew Curtis, Andy Lloyd, Angus Wheeler, Brian Stirk, Carol White, David Fruin, Dot Coe, Elaine Reedman, Gill Curry, Greg Finch, Helen Bilham, Hils Hawkins, Howard Forrest, Ian Reedman, Jane Hughes, Janet Stirk, Jennie Garrod, Joe Ridley, John Cross, John Day, John Henderson, Liz Pounds, Martin Green, Michael Hall, Michelle Arthy, Michael Powell, Phil Bowyer, Rosemary Zakrzewski, Roy Lawson, Ruth Brewis, Stuart White, Tony Metcalfe and Valeria Dunn.

The project was primarily funded by the Heritage Lottery Fund and would not have taken place without the support of staff at the North Pennines AONB Partnership and Durham County Council. Particular thanks go to Paul Frodsham, former Historic Environment Officer at the North Pennines AONB Partnership, who managed this project alongside all the other *Altogether Archaeology* projects. In this role, Paul has not only made a significant contribution to the archaeology of the North Pennines, but has also stimulated and engaged with the large numbers of volunteers who have participated in this and other projects. Thanks also to Andy Lloyd and Gearoid Murphy of the AONB Partnership for their GIS expertise. All involved with the project are grateful to the Environment Agency for donating the lidar data, which represented a significant 'in-kind' contribution to the *Altogether Archaeology* project budget. Although Environment Agency lidar data is now freely available, this was not the case at the time that this project was set up. Thanks also to Mark Kincey and Gary Duckers for processing the lidar data, Jonathan Ainsworth for assistance in testing the methodology and preparation of 3D models, and Liz Williams, Northumberland County Council Heritage and HER Officer for advice on the database and access to HER data. Finally, special thanks are extended to Dr Keith McLay, formerly Head of the History and Archaeology Department at the University of Chester and Professor Meggen Gondek for the provision of support and facilities throughout this project.

CONTENTS

Introduction.....	1
1. AIMS AND SCOPE OF THE PROJECT.....	2
2. LANDSCAPE OF THE PROJECT AREA.....	8
3. RECORDING METHODOLOGY.....	9
3.1 Digital records and documentation.....	10
3.2 Training.....	16
4. STAGES OF RECORDING.....	19
4.1 Volunteer recording.....	19
4.2 Validation and feedback.....	20
5. ARCHAEOLOGICAL RESULTS OF THE PROJECT.....	24
5.1 Prehistoric and Roman.....	25
5.1.1 Settlements and enclosures.....	25
5.1.2 Field systems.....	34
5.1.3 Cairns and mounds.....	35
5.2 Medieval.....	36
5.2.1 Settlements, farmsteads, steadings and related structures.....	37
5.2.2 Field systems.....	40
5.2.3 Routeways.....	43
5.2.4 Enclosures.....	44
5.2.5 Park Pales.....	44
5.2.6 Monastic and religious sites.....	45
5.3 Medieval/Post-Medieval.....	46
5.3.1 Settlements, farmsteads, steadings and related structures.....	46
5.3.2 Field systems.....	49
5.3.3 Routeways.....	50
5.3.4 Industrial.....	50
5.4 Post-Medieval.....	50
5.4.1 Settlements, farmsteads, steadings and related structures.....	51
5.4.2 Field systems.....	52
5.4.3 Routeways.....	58

5.4.4 Industrial.....	58
5.4.5 Miscellaneous earthworks.....	66
5.5 Sites not assigned to a specific period.....	66
6. SUMMARY AND CONCLUSIONS.....	70
6.1 Archaeology.....	70
6.2 Methodology.....	75
REFERENCES.....	79
APPENDICES.....	82
1. Altogether Archaeology modules.....	82
2. Lidar Landscapes recording form.....	84
3. Project database fields.....	85
4. List of sites submitted for inclusion in the HER.....	86
5. List of sites where interpretation would benefit from field inspection.....	103

FIGURES

Cover: Lidar showing the area north of Ninebanks in West Allendale
(parts of km squares NY7853 and NY7854)

Figure 1: Allen Valleys and Hexhamshire (AVH) project area.....	3
Figure 2: Lidar coverage.....	7
Figure 3: Example of a DSM lidar workmap (km square NY9550).....	12
Figure 4: Example of a DTM lidar workmap (km square NY9550).....	13
Figure 5: Example of an annotated DSM lidar workmap returned by a volunteer (km square NY8456).....	17
Figure 6: Location of sites by period.....	23
Figure 7: The topographic setting of two prehistoric/Roman period enclosures at the confluence of East and West Allendale.....	27
Figure 8: Possible prehistoric ditched enclosure at Low Broadwood Hall (km square NY8355).....	28
Figure 9: Prehistoric/Roman period rectilinear enclosure at Hindley Wrae (km square NY7958).....	29
Figure 10: Prehistoric/Roman period settlement, enclosure and field system at Holms Hill/East Garret's Hill (km square NY8452).....	30
Figure 11: Sub-rectangular prehistoric/Roman period enclosure on Embley Fell (km square NY9353).....	32
Figure 12: Two prehistoric/Roman period settlements or homesteads at Hesleywell and New House (km square NY9152).....	33
Figure 13: Enclosed settlement or homestead at Leadgate (km square NY7854).....	34
Figure 14: The prehistoric/Roman period enclosure and field system at Edge House (km square NY8959).....	36
Figure 15: Possible deserted medieval settlement at Kingswood (km square NY7961).....	39
Figure 16: Medieval and later field systems near Catton (km square NY8257).....	40
Figure 17: Medieval and later field systems near Catton (km square NY8257).....	41
Figure 18: Medieval and later field systems near Catton (km square NY8257).....	42
Figure 19: Head dyke to the north of Swinhope Burn (km square NY8347).....	43
Figure 20: Sites where the interpretation would benefit from field inspection.....	44
Figure 21: Blanchland Abbey (km square NY8356).....	46
Figure 22: Earthworks of more than one period of farmstead at Harwood Shield (km square NY9051).....	48
Figure 23: Field systems at Dewsgreen Burn (km square NY7657).....	49

Figure 24: Post-medieval field system at Newfield (km square NY8159).....	53
Figure 25: Intake at Cocker Shield (km square NY8954).....	54
Figure 26: Large enclosure-like field on a terrace above the River East Allen near Bearsbridge (km squares NY7855/7856).....	56
Figure 27: Example of a detached field enclosing ridged cultivation at Black Allotment (km square NY8557).....	57
Figure 28: Road running north-south for c.2km through km squares NY7752, NY7753 and NY7754.....	59
Figure 29: Area of lead mining earthworks at the former site of Reedings Mine, 2km west of Blanchland (km square NY9450).....	61
Figure 30: The landscape at Shield Crag (km square NY7749).....	62
Figure 31: Line of shafts near Shildon Mine (km square NY9551).....	63
Figure 32: An unusual enclosure above Ham Burn (km square NY9158).....	68
Figure 33: Area of pitting on Blanchland Moor (km square NY9453).....	69

TABLES

1. Percentage coverage of lidar per km square.....	11
2. Volunteers/km squares examined.....	19
3. Km squares in the project area.....	20
4. Archaeological sites recorded.....	21
5. Breakdown of sites sifted-out at validation stage.....	22
6. Archaeological sites by period.....	25
7. Prehistoric and Roman sites.....	26
8. Medieval sites.....	37
9. Medieval/Post-Medieval sites.....	47
10. Post-Medieval sites.....	51
11. Sites not assigned to a specific period.....	67

Introduction

The subject of this report, *The Allen Valleys and Hexhamshire Lidar Landscape Survey* (hereafter referred to as the AVH project), constituted Module 7 of *Altogether Archaeology*, the North Pennines Area of Outstanding Natural Beauty (AONB) Partnership's community archaeology project. *Altogether Archaeology* was run in collaboration with Durham County Council and largely funded by the Heritage Lottery Fund. Following an initial pilot phase - run in 2010 and 2011 - the main *Altogether Archaeology* project started in 2012 and was completed in November 2015. Its purpose was to enable volunteers to undertake practical archaeological projects within the AONB area, working with professional support, supervision and training, and it was delivered through a programme of nine modules (see Appendix 1). As well as raising the capacity of local groups to undertake fieldwork and research, the project was designed to make a genuine contribution to the understanding of the North Pennines historic environment, thus enabling more effective future landscape management.

Through the *Altogether Archaeology* modules, volunteers were given opportunities to take part in excavation, site survey, geophysical survey, documentary research and many other, largely site-based, archaeological activities. The core agenda behind the AVH project was to engage local communities and individuals with little or no archaeological background in ways of understanding the broader landscape of the North Pennines AONB using data derived from aerial laser scanners, commonly referred to as lidar (light detection and ranging). It was hoped that through this process new archaeological sites would be discovered in the Allen Valleys and Hexhamshire areas, which had been generally overlooked by previous archaeological research projects, and that the results of this project would add to the knowledge base and understanding of the historic landscape through inclusion in the publicly available Northumberland HER (Historic Environment Record). By virtue of its scale and canvass this was the only *Altogether Archaeology* module which offered engagement with the North Pennines AONB landscape over a wide area.

The *Altogether Archaeology* project was managed by Paul Frodsham, formerly the Historic Environment Officer at the North Pennines AONB Partnership, and the AVH project was designed, managed and validated by Stewart Ainsworth through his affiliation with the University of Chester, with the University providing material support as an 'in-kind' contribution. The lidar data was freely provided by the Environment Agency and was processed for the project by two PhD students, Mark Kincey from Durham University and Gary Duckers from the University of Chester. This report, written by Stewart Ainsworth, provides a statement of the project methodology and a summary of the results that were obtained. A digital database containing the project records has been submitted to the HER.

Throughout the AVH project a unit of a single square kilometre as defined by the Ordnance Survey (OS) National Grid and printed on its 1:50,000 scale maps was adopted as the basic unit of reference for documentation, administration and database records, e.g. NY8056. In this report the abbreviation 'km square' is used as shorthand. More detail on this is given in Section 3.

1. AIMS AND SCOPE OF THE PROJECT

From the outset the AVH project was designed in response to requests from local communities to investigate the landscape archaeology of a large part of the North Pennines uplands south of Hadrian's Wall which had seen little archaeological activity in the preceding 200 years. Apart from a project which was primarily aimed at recording industrial sites from the OS First and Second Edition 6-inch scale maps, 'The RCHME North Pennines Industrial Archaeology Project' (AMIE Event UID 922755), landscape-scale recording projects revealing new archaeological sites had been geographically peripheral to the upland zone and mainly focused on the Hadrian's Wall corridor (Gates 1999; 2004; Boutwood 2005; Small 2008; Oakey 2009). In more recent years a localised ground survey had been undertaken on Holwick Moor as part of the *Altogether Archaeology* programme (Schofield and Vannan 2011) and, importantly, the enormous potential of the northern fringes of the North Pennine uplands had been revealed in a ground-breaking survey and database research project around the Alston Moor area of the River South Tyne (Miner-Farmer landscapes of the North Pennines AONB, hereafter referred to in this report as the Miner-Farmer project) by the research department of English Heritage (now part of Historic England). This Miner-Farmer project deployed a mixture of techniques, including analytical archaeological field survey using lidar, buildings survey, examination of aerial photographs and mapping of the resulting data also using lidar, and environmental survey using a number of remote-sensing datasets, again including lidar (Ainsworth 2008; 2009; 2010; Ainsworth, Oswald and Went 2013; Jessop and Whitfield 2010; Jessop, Whitfield and Davison 2013; Kinsey *et al* 2014; Oakey, Radford and Knight 2012; Oswald and Oakey 2011; Went and Ainsworth 2009; 2013). The Miner-Farmer project included within it extensive tracts of the North Pennine landscape where hundreds of new archaeological sites were identified. As the proposed AVH project area encompassed areas that were similarly diverse, both geologically and topographically, the expectation was that they too would prove rich in hitherto unrecognised archaeological sites.

The challenge of the AVH project was, firstly, to define the area to be examined and, secondly, to develop and implement an appropriate methodology which would allow community volunteers with little or no archaeological landscape interpretation skills to systematically identify, assess and record newly discovered archaeological sites over large tracts of countryside. No less important was the need to devise a methodology that would produce results of sufficient consistency and quality so as to allow for their ultimate incorporation into the HER. It was recognised at the outset that these challenges could not be met solely by systematic fieldwork, mainly because of the large size of the proposed project area and the time needed to investigate it, particularly if undertaken as a volunteer project. However, it was felt that the requirements could be met by adapting the methods of landscape investigation developed within the Miner-Farmer project (Ainsworth 2008, 2010; Ainsworth, Oswald and Went 2013). This methodology, using lidar as the principal evidence source, is covered in more detail in Section 3.

As outlined above, the AVH project was defined in response to requests from volunteers. The area as finally chosen, focussed on the valleys of the Rivers West and East Allen, and parts of Hexhamshire Common and Blanchland Moor areas (see Figure 1), and its boundaries were determined by three major factors. Firstly, as the project was being run by the AONB Partnership, and formed part of its community archaeology programme, it had necessarily to be confined to an area within the AONB; secondly, to be within the county of Northumberland to ensure compatibility with a single HER; and thirdly, the availability of lidar coverage obtainable from the Environment Agency.

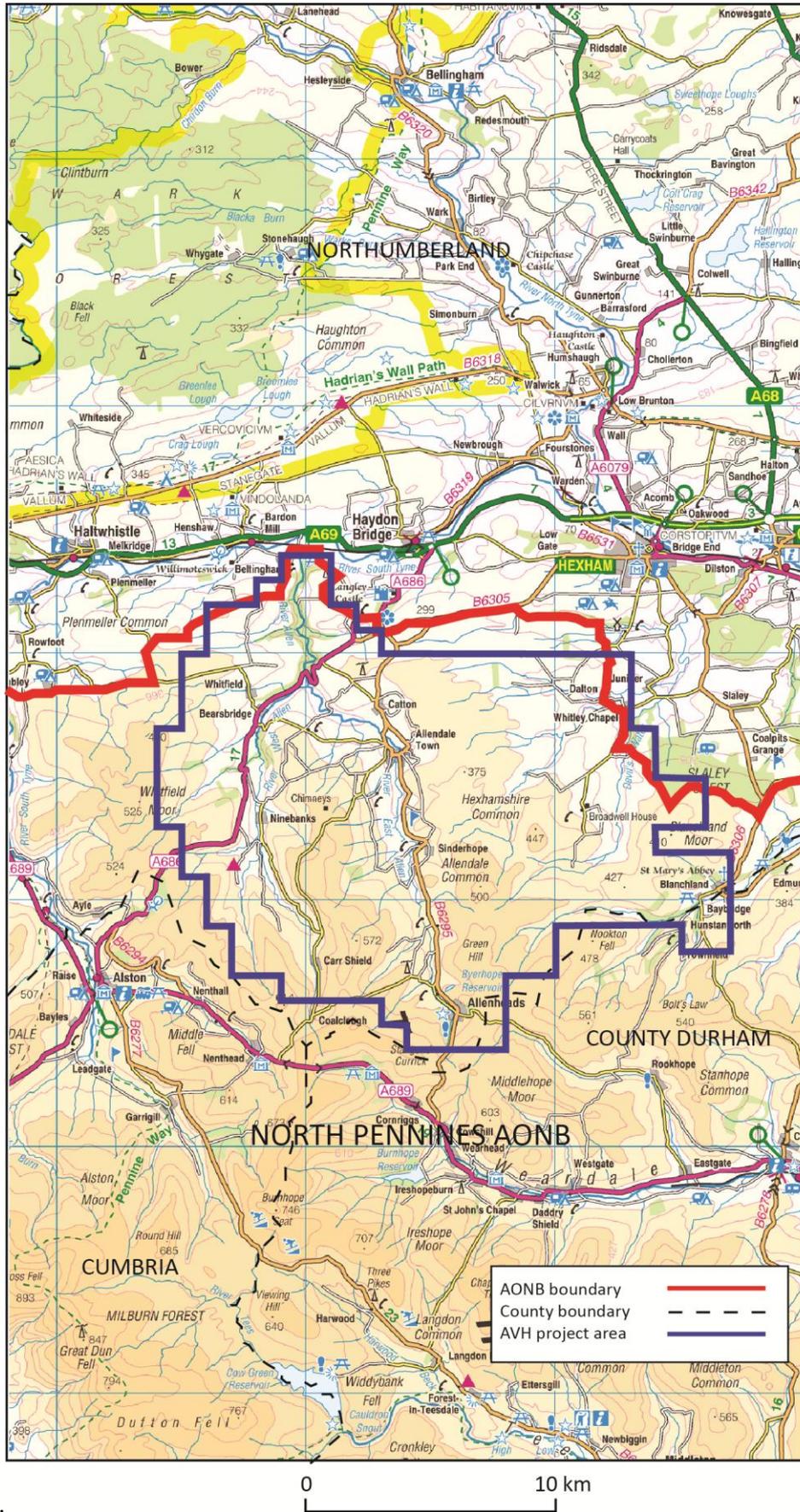


Figure 1: Allen Valleys and Hexhamshire (AVH) project area.

OS map: © Crown copyright. All rights reserved Durham County Council. LA100049055. 2016

Although lidar cover for the eastern parts of Hexhamshire Common was largely complete (apart from a small area of Blanchland Moor and Bulbeck Common) coverage of the Allen Valleys area was mainly confined to the valleys themselves and to the land immediately adjacent. Consequently, in these areas many km squares had only partial lidar coverage (see Figure 2). In the south-west part of the project area there was a slight overlap with the territory previously covered in the Miner-Farmer project, amounting in all to some 14 km squares.

In the end, the boundaries chosen for the AVH project area, in consultation with the *Altogether Archaeology* project manager, defined an area of 285 square kilometres. This was significantly larger than the original concept (for which the original estimate was 150 square kilometres) for reasons outlined more fully in Section 3 below. This larger area was chosen to enable volunteers to gain experience of a diverse range of landscape types and to give scope for as many as possible to take part. In peripheral areas, where lidar coverage for many km squares was only partial (see Table 1), it was thought desirable to include these for the sake of completeness. In some moorland areas, where the cover of blanket peat was particularly extensive, and scope for engagement was judged to be low, the involvement of volunteers was deliberately kept to a minimum. Nevertheless, as it was thought important that such areas should not be excluded, much of the assessment here was done by the validator. Nevertheless, certain limited areas of peat moorland were allocated to volunteers so that they could get some experience with this landscape type. Another attraction of the AVH project area as chosen was its well-known geological diversity and long history mineral exploitation. As noted above, the project was aimed at working within Northumberland, although at south, the border with County Durham ran through 10 km squares and so the areas within Durham were examined for the sake of completeness.

The aims of the AVH project went beyond the identification of new archaeological sites, and volunteers were encouraged to look at a landscape using a range of newly available resources such as lidar, and by doing this to learn how to recognise those earthwork patterns and features which make up the modern as well as the ancient landscape. The skills needed to recognise, interpret and record such patterns, are well described in a number of publications (e.g. Aston 1985; Bowden 1999), but the use of lidar as a resource as part of this process, whether in the context of a desk-based study or as an aid to field survey, is a relatively new concept in historic landscape studies (Crutchley and Crow 2009; Oakey, Radford and Knight 2012; Ainsworth, Oswald and Went 2013; Ainsworth, Gates and Oswald 2015; see also papers in Opitz and Cowley 2013). Experience gained from other research projects, particularly the Miner-Farmer project, had already shown that significant 'new archaeology', in the form of upstanding earthworks, could be successfully identified in the uplands of the North Pennines with the aid of lidar data (Ainsworth 2009; Oakey, Radford and Knight 2012; Ainsworth, Oswald and Went 2013), up to the start of that project in 2008 an untapped digital resource for this relatively remote area. The Miner-Farmer project had also suggested to the author that large-landscape type of analysis and recording using lidar could be adapted from the organisational/professional model and transferred into the volunteer sector. In essence, therefore, the AVH project was not just about discovering new archaeological sites, it was about equipping volunteers with the skills necessary to explore the landscape in a new way and the ability to use these skills long beyond the lifespan of the project. Also, it was about seeing whether volunteers and community archaeology groups could engage with lidar as a concept and use it as a tool for delivering usable results. If successful, it was hoped that the AVH project could form the basis of a model from which to develop other similar community landscape projects elsewhere in the future.

The project area was sub-divided into two approximately equal parts which were studied successively (Phase 1 - Allen Valleys, 167 km squares, and Phase 2 - Hexhamshire, 118 km squares; see Figure 2). This was done to achieve two aims. Firstly, to help create a sense of 'geographical ownership' for the volunteers, loosely corresponding to two already established community identities within the project area. Secondly, this division would provide a convenient mid-project breakpoint to assess the validation, training and feedback processes. Originally, it was intended that there would be an additional follow-up stage involving field assessment of some of the sites identified from the lidar. However, due to re-alignment of the budgets during the course of the broader *Altogether Archaeology* project, this intention was not carried out.

The recording system was structured so that once the work of the volunteers had been validated, the results would be sent for incorporation into the HER. The project was intended to be as paperless as possible and all file exchanges were to be via email. The aims which underpinned the design of the project methodology were:

1. Engage volunteers in the methods and processes of non-invasive landscape archaeology.

How? This was to be achieved by a systematic process in which discoveries made by the volunteers were the subject of feedback and validation throughout the life of the project. Also, through a series of training workshops and events, the results of the investigations were to be shared and the value of the volunteer contributions for the management of heritage management and future research demonstrated.

2. Engage volunteers in contributing to the identification and recording of heritage assets

How? By the provision of user-friendly recording documents and the supply of data in easy to use formats with clear statements showing how the records created by the volunteers should conform to nationally recognised standards, and how these records would be validated. Also, through the supply of documentation showing how records were to be created, and guidance on the use of freely-accessible heritage-related web sites and software programmes commonly used on home computers.

3. Develop a skill-set for the volunteers which will have a life beyond the end of the project.

How? As with Aim 2, through the use of training manuals, workshops, a newsletter, and the act of 'doing it yourself'. In addition, by giving specific guidance on the data sources (particularly lidar) in order to build up confidence in the identification of archaeological sites with written feedback as part of the validation process. Also, introduction of more sophisticated lidar techniques (such as processing and 3D manipulation of data) for those who wished to continue personal or community projects beyond the AVH project.

4. Produce a database of newly identified sites to agreed data standards for inclusion in the Northumberland HER.

How? By the setting of standards for documentation and validation as agreed with HER staff.

5. Make the project methodology as inclusive as possible for mixed ages, mobility and disabilities.

How? This was primarily a desk-based process so that volunteers could participate within their own home environment at a pace and level of mobility that suited their own lifestyle and abilities. Following validation, a database of sites which would benefit from field inspection would be made available to those who wished to go out into the landscape to explore their discoveries.

It was not the intention to design and implement a fully analytical mapping survey to the same exacting professional standards as those reached by the Miner-Farmer project on Alston Moor. That would have been an unrealistic expectation with a volunteer project on this scale. The AVH project was the equivalent of a Level 1, desk-based identification of new archaeological sites as defined in English Heritage landscape survey guidelines (Ainsworth *et al* 2007). It aimed to be as closely complementary and compatible as possible - within the limitations imposed by the project aims - with the categories of data collected and standards applied by the English Heritage (now Historic England) National Mapping Programme (NMP) element of the Miner-Farmer project. One major difference, however, was that no use was made of graphical mapping techniques within the AVH project (as is done in NMP projects). The AVH project was primarily aimed at encouraging and mentoring volunteer engagement with the historic landscape through the medium of lidar and creating database records only. All the sites identified were given a 1m OS National Grid Reference (NGR) and recorded as point files within the database for submission and inclusion on the HER Geographical Information System (GIS). More details of the data structure and recording categories are given below in Section 3.

To summarise, the principal object of the project was to guide contributors through the process of interpretation and recording, using digital lidar images on their home computers with commonly available programs such as *Open Office, Microsoft Paint, Word, Excel* etc., whilst at the same time, through the validation process, producing usable records which would be made publicly available through the HER. The ultimate hope was that at the end of the project contributors would have acquired the skills and enthusiasm necessary to explore and use lidar as an aid to landscape analysis, interpretation and recording and be able to continue using it beyond the life of the project.

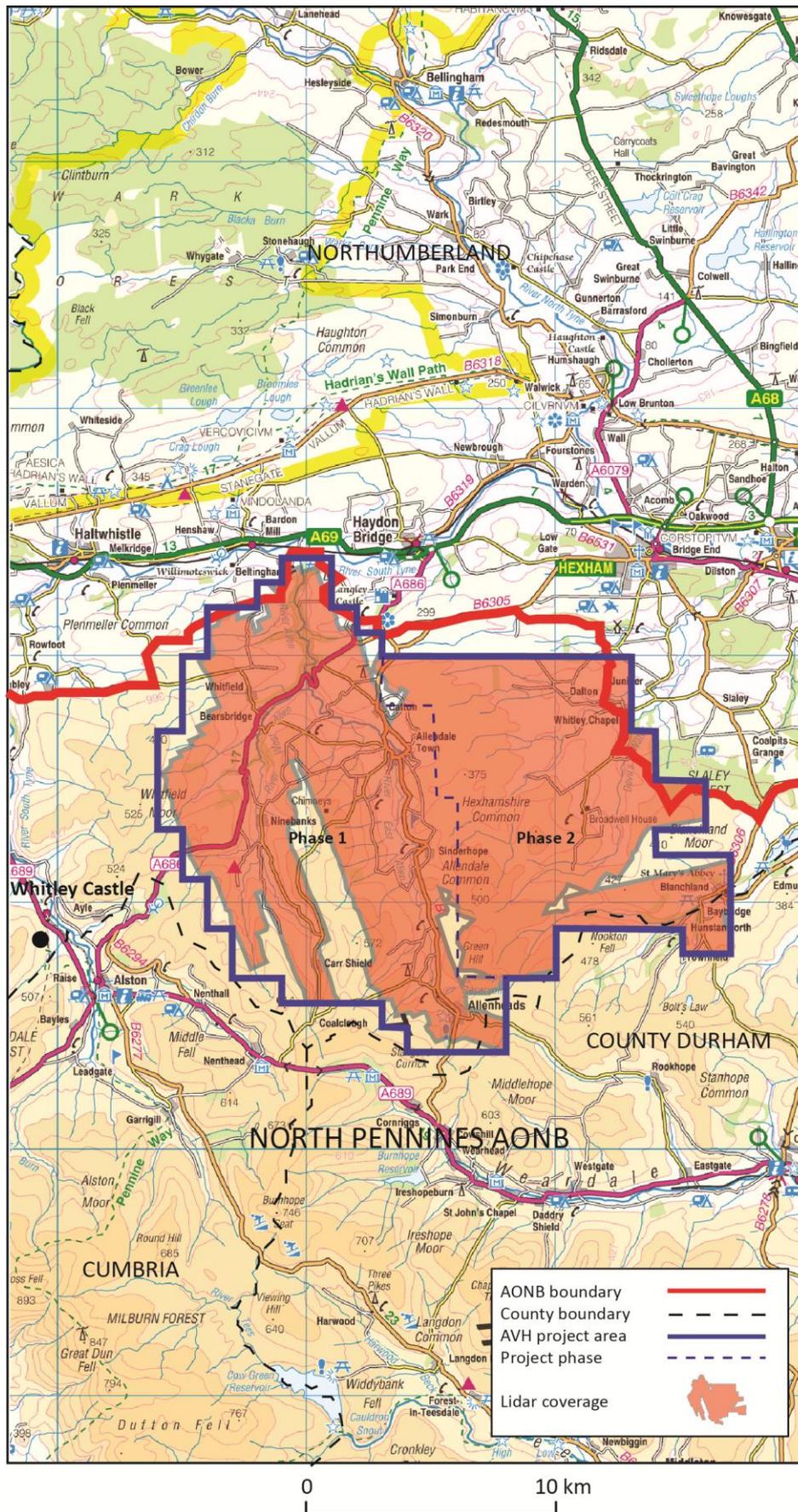


Figure 2: Lidar coverage

OS map: © Crown copyright. All rights reserved Durham County Council. LA100049055. 2016

2. LANDSCAPE OF THE PROJECT AREA

In broad terms the geology of the chosen project area comprises a layered sequence of Carboniferous rocks, comprising limestone, shale, sandstone and thin coal seams in regularly repeating sequences. It is this geology which has created a rich resource of lead and other minerals, and has left a landscape legacy of mining remains, many of which are still visible in the landscape (Natural England 2013). The topography of the project area within this upland landscape is generally characterised by large areas of peat and open moorland cut by a series of rivers and watercourses which mostly flow from the high tops towards the north and east. The moors are mainly managed for sheep grazing, summer grazing for cattle and grouse shooting. The agriculture of the lower ground along the valleys is primarily dominated by sheep and cattle rearing on enclosed in-by-land allotments along the valley sides, and associated dispersed farms.

The steep valleys of the Rivers East Allen and West Allen dominate the landscape of the western half of the project area, whilst the eastern half contains large areas of peat moorland, particularly on Hexhamshire Common, from where three lesser valleys, the Rowley Burn, the Devil's Water and the upper reaches of the River Derwent, all emanate. As a result, the landscape has a complex catchment and watershed dynamic. Much of the higher ground within the project area is unenclosed moorland, fringed in some areas by regular fields typical of parliamentary-type enclosure, dating from the 18th and 19th centuries. In broad terms, these unenclosed moorlands range from c.300m - c.570m above OD. Within the dales occupied by the main rivers and their tributaries, the modern landscape is dominated by walled fields dating to the period of parliamentary enclosure, most of which are used for pasture or as hay meadows. This landscape character is particularly striking along the valleys of the Rivers West and East Allen, although it changes to a more varied agricultural landscape north of their confluence, as the slopes descend towards the valley of the River Tyne. In the north-east and eastern parts of the project area, as the slopes descend from the higher moorlands of Hexhamshire Common, the density of small hamlets, farms and enclosed fields increases, with this more intensively farmed landscape becoming the norm toward the valley of the River Tyne to the north.

Overall, there is little natural woodland within the area, being mostly confined to river banks and steeper slopes of the valleys, with the largest zone of this along the valley of the River Allen, north of the confluence of the Rivers East and West Allen. There are a number of conifer plantations within the project area, but overall the combined area of these is relatively small. There is only one small market town in the area, Allendale Town, along East Allendale and generally, the bulk of small hamlets that exist tend to cluster along the dales.

3. RECORDING METHODOLOGY

In defining a recording strategy for the project it was acknowledged at the outset that the volunteers were likely to have a range of skills potentially applicable to landscape archaeology. Thus, while some volunteers might have no such skills at all, others might have more, whether acquired in their personal or professional lives. All the documentation associated with the project therefore had to be appropriate for a variety of skill levels, being intelligible to all whilst at the same time containing all the necessary terms and information required to understand and complete the recording process without creating 'overload' for those who were new to archaeological recording and analysis. Also, regardless of the differing levels of experience of the volunteers, a usable HER record had to be created at the end of the process, both in terms of quality and format. Even the most basic skills required for landscape interpretation, such as previous use of OS maps and an understanding of grid references, could not be taken for granted. Therefore, the project documents supplied to volunteers had not only to be functional, they also had to contain sufficient guidance to enable them to be used successfully by the less experienced volunteers. The aim was to encourage the new volunteers to 'learn' the language of landscape interpretation terms commonly used in record systems such as the HER. As lidar was a completely new concept for many volunteers, the project had to include a strong element of teaching in order to inform volunteers about both the technical aspects of this resource, and how to use this new investigation tool in the right way. In terms of equipment, the only requirement was that volunteers should have access to a computer, though once again it was recognised that levels of computer literacy were likely to be variable. It was this variability in levels of experience that was fundamental to the design of the methodology.

In order to help ease volunteers into the process of looking at landscapes with lidar, it was decided to use individual OS km squares as the basic unit of investigation and organise all recording documents on this basis. The 1km square unit had the additional benefit that it is the grid interval on all OS 1:50,000, 1:25,000 and 1:10,000 published maps as well as the unit used by the Environment Agency for the identification and supply of its lidar data. Although a 5km by 5km square, as defined by the appropriate OS 1:10,000 scale map number, is the basic unit adopted for use by the NMP when recording from aerial photographs, also by the Miner-Farmer project when using lidar (Oakey, Knight and Radford 2012, 14), an area this size was considered too large for volunteer beginners to tackle. The adoption of the 1km square as the base recording unit made administration, processing, distribution, validation and database recording of data simple to manage, and offered a number of benefits, particularly to those volunteers who were unfamiliar with maps and recording processes:

- Simple way of identifying areas on published maps.
- Help new volunteers with the concept of grid references, and correlation of maps with project documents (lidar workmaps, record sheets etc).
- Km square boundary created a sense of 'ownership' of a defined part of the landscape.
- Small enough area so not to swamp those new to the process.
- Provided a key into the Environment Agency web-based index of available lidar.
- Ensured that volunteers could sample a variety of landscape types.
- Potentially, more volunteers could take part.

In designing the project methodology, a principal consideration was to give the volunteers an enjoyable experience as they discovered about lidar, in the process

coming to see the landscape in a new and exciting way and learning how to use it as a means of identifying new archaeological sites. For many, everything would be new - for others a chance to extend themselves. Experience gained by the author of working with many volunteer groups has shown that the more technically complex a project is, the greater is the potential to confuse and disenfranchise the uninitiated, ultimately leading to a loss of interest; conversely, some volunteers want to embrace new technology and methods and want, even demand, to explore things further. Therefore a deliberate decision was made to define a suitable level of technical infrastructure which would allow both categories of volunteers to learn and participate – without disenfranchising either group. This was achieved by adopting a ‘lowest common denominator’ approach to software, with opportunities to introduce more advanced strands as and when appropriate, or as requested by the volunteers themselves (see below). Some projects elsewhere have approached lidar recording projects in different ways and a strong trend has been to promote the use of GIS or web-based software as a recording tool by volunteers (e.g. Stiperstones and Cordon Hill Country Landscape Partnership Scheme Community Archaeology Programme 2, 2016). GIS recording has its advantages, particularly with regard to the standardisation of mapping and database inputs by volunteers at source, so reducing the need for later editing etc. However, this usually requires downloading or accessing GIS software, and more importantly, volunteers then have to learn how to use it and this can often demand quite complex techniques depending on the software package. Industry-standard GIS software such as ESRI’s ArcGIS is complex and costly to acquire, and although increasingly, open-source packages such as QGIS are becoming more readily available, they still demand an understanding of GIS before they can be used efficiently, especially by volunteers, as do custom-made, web-based GIS portals. It is also a misconception to believe that because data is input in a prescribed GIS format at source it will thus have been collected more efficiently and have a higher qualitative value at the end. In reality, the quality is better controlled by paying close attention to the validation process and the consistency of the record before it is input to GIS, whether this be done as part of the project or at the HER. After consideration of these issues, it was decided that by imposing GIS software there was a risk of detracting from the experience of volunteers in learning about landscape and lidar and for this reason it was not considered an appropriate strategy for the volunteer groups participating in the *Altogether Archaeology* project overall. Also, in the majority of the area covered by the project, basic broadband coverage is poor, further weakening any arguments for direct inputs to a purpose-built, web-based recording GIS system, which was likely to be technically complex, costly to set-up and manage, and likely to be inaccessible to many.

3.1 Digital records and documentation

The project area consisted of 285 km squares. As noted above, within that area there was variable lidar coverage for particular km squares, particularly along the upland fringes of the West and East Allen valleys, the eastern edge of Hexhamshire Common, and northern fringe of the valley of the River Derwent (see Table 1 and Figure 2); and for four km squares within the project boundaries no lidar data at all was available. For the areas where lidar coverage was complete or near complete (coverage between 75% and 100% of the km square area) there were extensive areas of upland peat and open moorland, particularly on Hexhamshire Common. A preliminary assessment of these areas indicated that much of the peat-covered upland was likely to be both unrewarding and difficult for volunteer engagement and so in these areas only selected km squares were issued to volunteers. Similarly, some km squares on the fringes of the project area, where lidar cover was notably incomplete, were likewise not sent out. The strategy that was adopted ensured that volunteers would be exposed to the maximum

variety of landscape types with potential for the discovery of new archaeological sites. To ensure that the whole project area was examined, the km squares that were not sent out to volunteers were scrutinised during the validation process, along with any km squares that had been sent out to volunteers but which had not been returned. It was felt that by reversing the role of the validator to that of ‘contributor’ for those km squares, a better insight would be gained into the landscape of the project area, while at the same time enhancing both the validation process and the final analysis. In this way, the methodology would also be tested, and opportunities would arise to make refinements should similar projects be contemplated in the future. This process of selection resulted in 160 km squares being sent out to volunteers, thus exceeding the original target which was to assess an area of some 150 km.

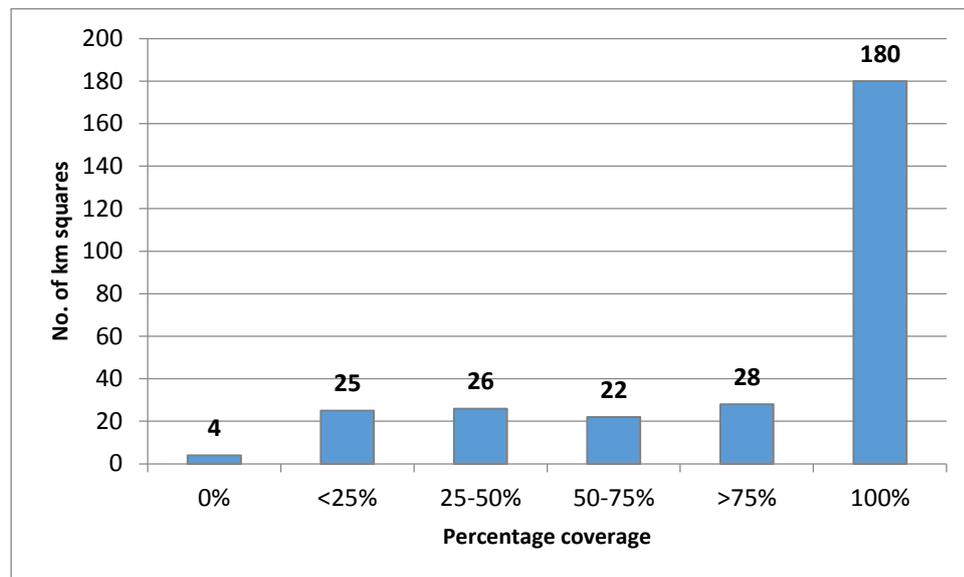


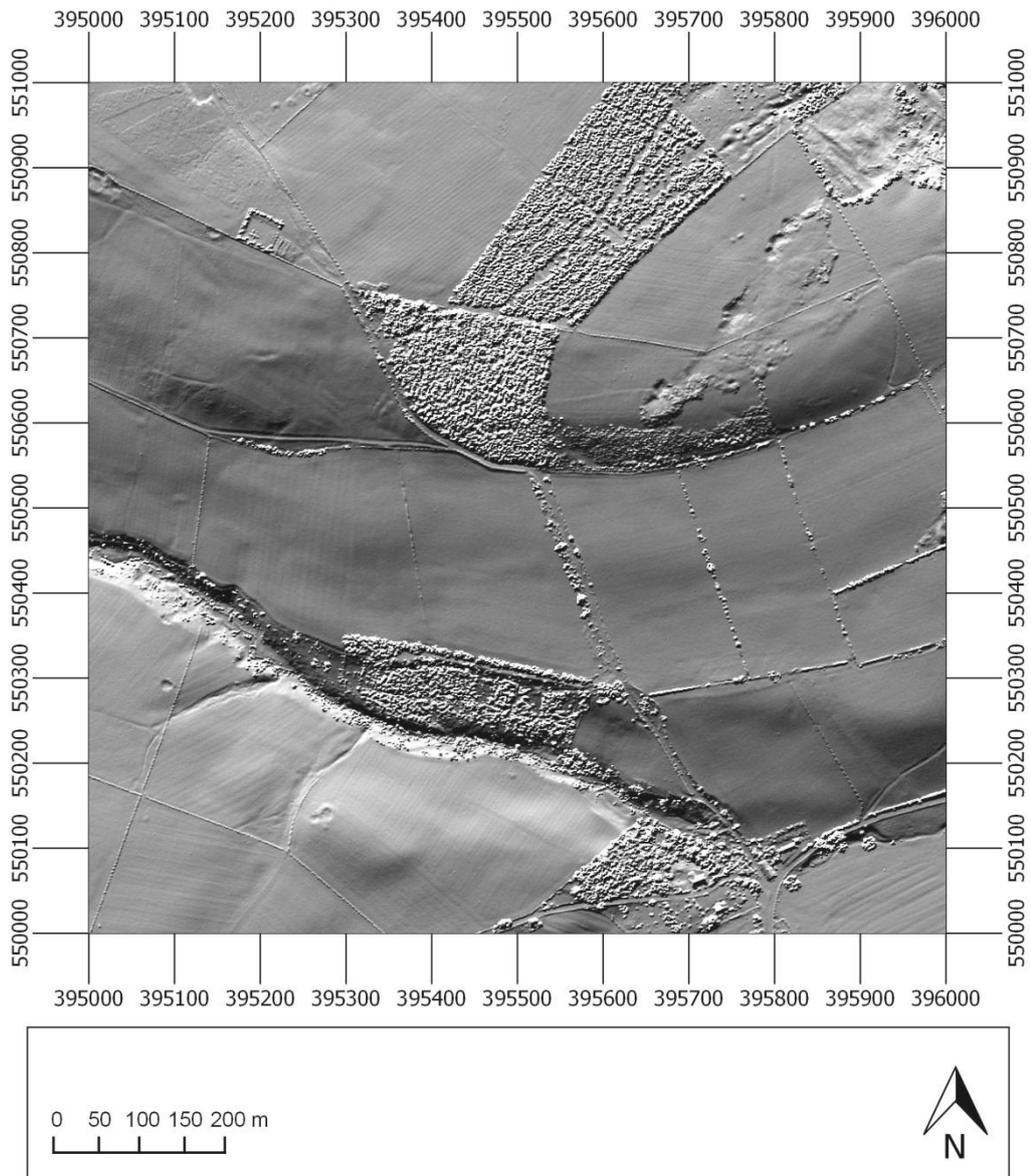
Table 1: Percentage coverage of lidar per km square

As stated in Section 1 above, although the training of volunteers to use lidar as a research tool was at the core of this project, it was also important that volunteers were made aware of, and learned to apply standards used in regional and national archaeological records. These aims were achieved by training through workshops, and by providing volunteers with a basic digital recording ‘package’ for each km square sent directly to their home computers via email, as well as guidance as to other useful resources on available on the internet. This ‘package’, more fully described below, comprised lidar, aerial photograph and OS map images, recording-form template and a recording manual.

Lidar, aerial photograph and OS map images

Lidar data (available up to 2011) for the project was supplied by the Environment Agency as km squares in ASCII format. The data was at 1m resolution and rectified to the OS National Grid in OSGB36 coordinates and was supplied as two separate surfaces, DSM (Digital Surface Model - showing all surfaces, including trees, buildings, walls etc.)

Hexhamshire - NY9550 LiDAR DSM - Hillshade PCA

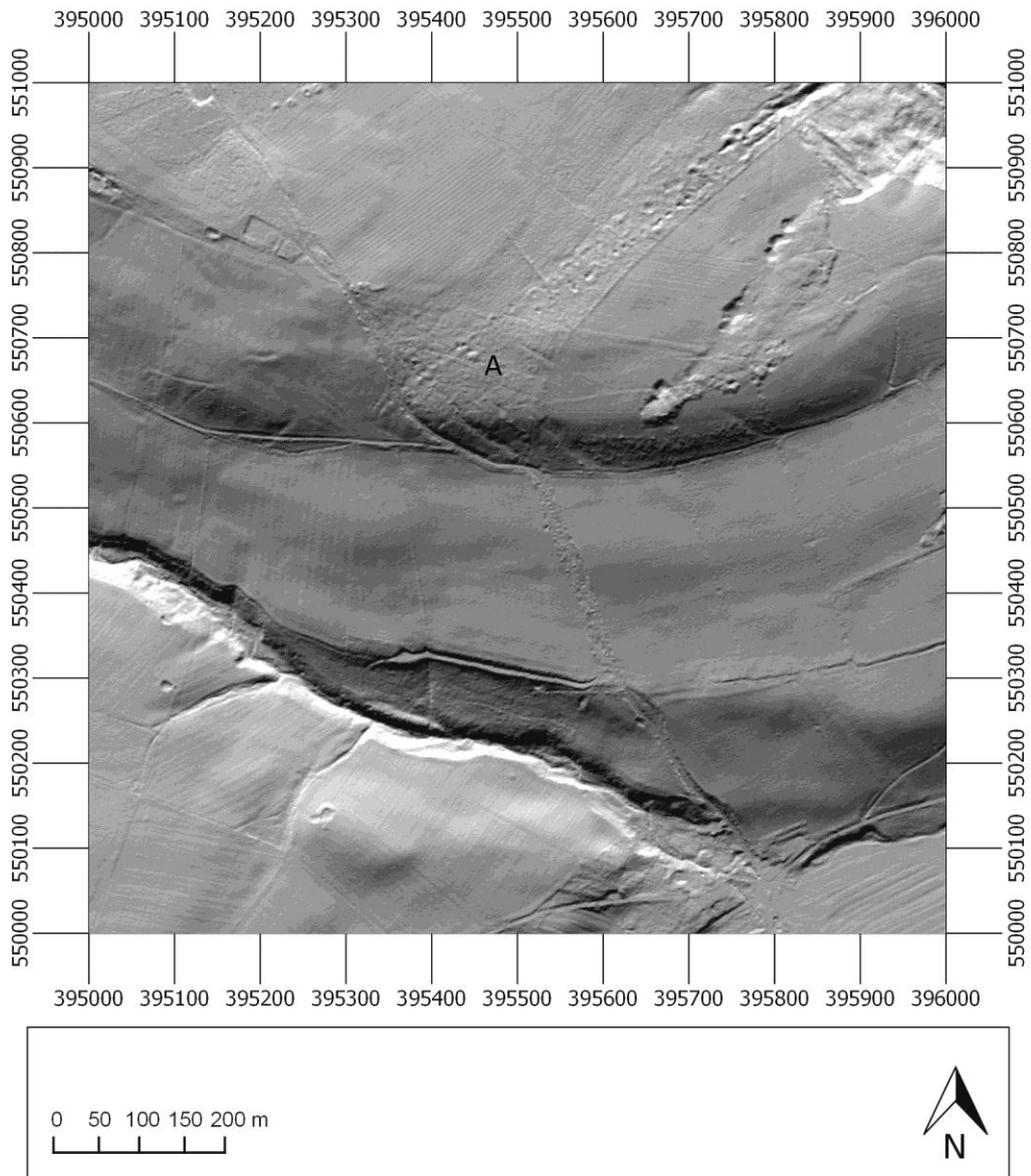


OS Maps: © Crown Copyright. All rights reserved Durham County Council LA100049055. 2014.
LiDAR & AP maps: © Environment Agency copyright and database right 2014. All rights reserved.

Figure 3: Example of a DSM lidar workmap (km square NY9550). Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Hexhamshire - NY9550 LiDAR DTM - Hillshade PCA



OS Maps: © Crown Copyright. All rights reserved Durham County Council LA100049055. 2014.
LiDAR & AP maps: © Environment Agency copyright and database right 2014. All rights reserved.

Figure 4: Example of a DTM lidar workmap (km square NY9550). With surface features removed, note how features such as the mining remains in the woodland (A) can be identified on the DTM which were not visible on the DSM image (Figure 3). Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

and DTM (Digital Terrain Model - in which above ground features such as trees, buildings, walls etc. were removed, sometimes referred to as a bare-earth model). The ASCII data was then processed with raster processing tools in GIS software during the preliminary set-up part of the project using Principal Components Analysis (PCA) tools to combine data from 8 directions into a single greyscale image for the DSM and DTM surfaces for each of the km squares (see Figures 3 and 4). Although a number of GIS tools in various software products can be used for the processing, analysis and visualisation of lidar (see various papers in Opitz and Cowley 2013), the PCA method of processing was chosen because experience gained with lidar in a similar upland environment during the Miner-Farmer project had already shown that both hillshaded and PCA images were the most intuitive and easiest to use (Ainsworth, Oswald and Went 2013). This aspect was considered particularly important for beginners. However, loss of visual information due to shadow on single images hillshaded from only one direction, particularly in hilly terrain (as was the case in the Miner-Farmer project area), had the potential to cause a loss of information and create problems during interpretation. This could be largely negated by processing the ASCII data using PCA tools and the results were more informative than single direction hillshades for visual analysis of landscape and monument morphology. Two copies of the DSM and DTM images were sent out to volunteers, one set of which was to be used for digital annotation (lidar workmaps) and one set which could be kept clean to use as a reference (lidar reference maps).

The results of a recent NMP upland project using lidar (Oakey *et al* 2015) advocates the use of 16-directional hillshades rather than PCA images. In this AVH report, 8 direction hillshade PCA, and 16 direction hillshade images are used to illustrate both, and a comparison of methods on the same data is shown on Figures 16-18. This is discussed more in Section 6.2).

In addition to the lidar provided by the Environment Agency, colour vertical photographs in digital georectified form and digital mapping at 1:10,000 scale under licence from OS were supplied for the whole of the project area by the North Pennines AONB Partnership. Image overlays derived from these datasets for each of the km squares at a common scale were supplied in JPEG format to volunteers. This particular format was adopted because it is easily read into viewing and editing software commonly available on home computers. A common scale for the image sets was adopted so as to allow direct comparison of these three sources regardless of whether volunteers preferred screen-based viewing or hard-copy printouts for the analysis. The images were placed within a border showing OS National Grid easting and northing coordinate values, scale, north arrow etc.

As noted above, 3D modelling was built into the project as a secondary activity so as to allow volunteers to determine their own level of interest in the use of lidar as a landscape analysis tool and to develop this interest at their own pace if they wished to. For each km square, 3D models were created as DTM and DSM surfaces using Applied Imagery's *Quick Terrain Modeler* [sic] v7.1.6 software. These models, and a training guide, were loaded into a communal *Dropbox* account to which all volunteers had access. As part of the training process, volunteers had been shown how to use these models within a free *Quick Terrain Reader* lidar viewer that could be downloaded from the internet. Volunteers were encouraged to explore the 3D element of lidar data to complement their analysis of the lidar workmaps

Recording Form

A digital recording form was designed so that the volunteers could easily input observations about what they could see on lidar in the form of text, but also use terminology and database categories compatible both with the HER, and with the NMR Thesaurus (see below). The form was supplied in .doc format for use in *Microsoft Word* and .xls for *Microsoft Excel* as these file formats could be read by most commonly used proprietary software packages as well as open-source software (see Appendix 2).

Recording Manual

A recording manual (Ainsworth 2013), providing instructions on how to record features on the lidar workmaps and the recording form was supplied to volunteers in .doc and .pdf formats.

Other on-line imagery and mapping resources

Volunteers were encouraged to explore the following on-line aerial imagery and mapping resources as part of their analysis:

Google Earth and Bing Maps – colour aerial imagery.

Keys to the Past - portal into the Northumberland HER database records which also allows the user to access historic and current OS maps of Northumberland.

National Library of Scotland – high-resolution images of OS First Edition (and subsequent Editions) of 1:10,560 (6-inch) scale OS maps of the project area.

Pastscape – Historic England’s portal into a database of archaeological sites and historic buildings.

National Monuments Record (NMR) Thesaurus – list of standard terms to be used for recording of archaeological sites and monuments.

In summary, the digital files initially supplied to volunteers for each km were as follows:

- | | | |
|----|-------------------------|-------------------------------------|
| 1. | DSM lidar workmap | e.g. NY8352_DSMworkmap.jpeg |
| 2. | DTM lidar reference map | e.g. NY8352_DSMreferencemap.jpeg |
| 3. | DTM lidar workmap | e.g. NY8352_DTMworkmap.jpeg |
| 4. | DTM lidar reference map | e.g. NY8352_DTMreferencemap.jpeg |
| 5. | OS Map | e.g. NY8352_OS.jpeg |
| 6. | Air photograph | e.g. NY8352_AP.jpeg |
| 7. | Recording Form | Recording Form.doc (also as .xls) |
| 8. | Recording Manual | Recording Manual.doc (also as .pdf) |

Database structure

As noted above, the project database was designed to be compatible with the HER. It was compiled in *Microsoft Excel* in such a way that information for each km square was digitally exchangeable with GIS software (see Appendix 3). In line with guidance given by the HER staff at the set-up stage, tracts of ridge and furrow were not recorded as separate sites. (On the HER ridge and furrow is kept as a polygon-based mapping layer rather than as individual monument records). As the AVH project did not include any element of map-based recording or digitisation (see below), this effectively meant that cultivation remains would not be recorded by the volunteers. On the other hand, as the identification of cultivation remains was considered to be an important part of the analysis and interpretation of landscape features visible on the lidar imagery, volunteers

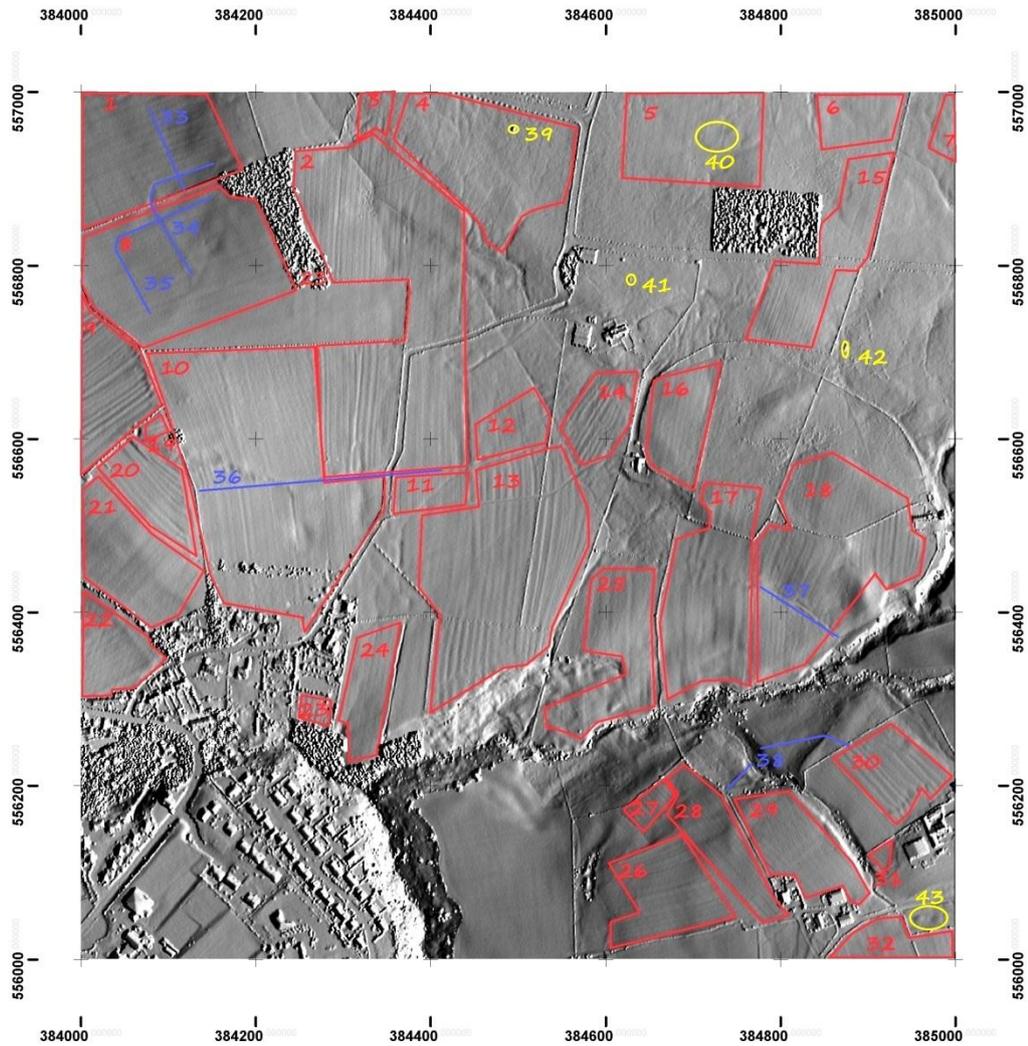
were asked to record it, but those entries were kept separate on the project database and the majority were eventually removed from the version sent to the HER (see below). The result of this approach was that 384 instances of ridged cultivation of various types were identified and treated as a discrete category of monument (see Table 5). Several different types of ridged cultivation were identified by the volunteers and divided into three broad categories for the purposes of the project database - ridge and furrow cultivation that was likely to be medieval; ridged cultivation at least potentially attributable to a later, possibly post-16th century, agricultural expansion, but created before the main phase of parliamentary enclosure in the late 18th early 19th centuries; and ridged cultivation associated with fields created by parliamentary enclosure. Where appropriate, specific significant examples of field systems of the first two categories were recorded separately for the HER (see Section 5).

Information from the recording forms and lidar workmaps produced by the volunteers was assessed and collated during the validation process and entered onto the project database by the validator (see Section 4). As the project was primarily aimed at developing the skills of the volunteers in landscape analysis and their ability to recognise archaeological sites, no programme of graphical digitisation or mapping was included. All sites accepted for submission to the HER were feature-centred and given 1m accuracy grid references (validated from the lidar). For features that were linear in nature (e.g. park pales, head dykes etc.), or large in extent (e.g. field systems), grid references were given for an identifiable element of the site on the lidar, especially if they were fragmented, or extended over a wide area; some of these features may have more than one record. In all, 21 categories of database information were created for each km square, although some of these were used purely for project-related analysis and were removed before submission to the HER (see Appendix 3). A summary list of sites submitted for inclusion on the HER is given in Appendix 4.

3.2 Training

The training programme for the volunteers comprised two main strands, group sessions (workshops) and feedback from the validation process. In all, four group sessions were held at local venues during the life of the project. The initial session was an introduction to the project aimed primarily at new volunteers, and outlined what the aims of the project were, how the documentation and feedback processes would work, and how lidar worked. Group sessions were set up with examples of lidar workmaps so that volunteers could discuss what they were able to see on the 2D lidar images and become familiar with the material in a mutually supportive atmosphere. Before km squares were allocated, volunteers were invited to express an interest in particular areas, either where they lived or parts of landscape that interested them. Subsequent group sessions were aimed at developing the skills-base of the volunteers in easy stages, primarily by providing verbal feedback from the validation process as it progressed, and inviting discussion with examples and questions from the volunteers. Also, they provided a good opportunity to discuss things as a group, particularly the recording process, which was very much a home-based activity for individuals working on their own. The workshops also provided an opportunity to explain the validation process and present an overview of how the work of individuals was contributing to the project overall. In each group session the emerging map of new discoveries was presented, and the importance of the work to a wide constituency of future users emphasised. Feedback resulting from the validation process was an integral part of the training for volunteers, particularly those who went on to complete multiple squares. More detail on this process is given in Section 4.

Allen Valleys - NY8456 LiDAR DSM - Hillshade PCA



OS maps: (c) Crown copyright. All rights reserved Durham County Council. LA100049055. 2013.
LiDAR & AP maps: (c) Environment Agency copyright and database right 2013. All rights reserved.

Figure 5: Example of an annotated DSM lidar workmap returned by a volunteer (km square NY8456).
Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

It was considered important to allow volunteers to work at their own pace, and to recognise that some would progress faster and further than others. This indeed proved to be the case. To cater for those who wanted to explore the lidar asset more, one of the group sessions was specifically structured to introduce working in 3D. Following this, 3D models were created for all the km squares (initially in the Phase 1 area, then subsequently for the Phase 2 area) and a training guide for working in 3D circulated.

At the end of the umbrella *Altogether Archaeology* project in 2015, a public celebration event was held in the Chapter House at Durham Cathedral and a presentation was given summarising the results of the lidar recording. This was followed by a final public presentation of the results of the AVH project in Allendale Town in 2016 to coincide with the completion of this report.

4. STAGES OF RECORDING

The recording strategy comprised two main stages:

- Volunteer recording
- Validation and feedback

4.1 Volunteer recording

48 volunteers signed up for the project and of these, 34 remained active contributors for the duration of the project and returned the km squares allocated to them (see Table 2). Many of them recorded multiple km squares at their own request over the course of the project while others were content to do only one. Volunteers were asked to record only those sites that were not already on the HER. The reasons for this were two-fold. Firstly, it was to encourage them to access the existing on-line HER (*Keys to the Past*) and become familiar with what sites had already been recorded in the km square, the terminology used etc., while at the same time becoming familiar with the concept of consulting different map editions that were available, and how landscape changes could be identified. Secondly, to reinforce the concept that there were new discoveries to be made using the lidar resource. For each potential archaeological feature identified, the volunteers were asked to annotate the appropriate DSM or DTM lidar workmap by digitally drawing a colour-coded point, line or polygon (depending on the type of feature) and allocating a sequential monument number to each (see Figure 5). For each feature recorded a recording form was filled in by the volunteer. Apart from asking the volunteers to use standard NMR Thesaurus terms for monument type, period and form, and fill in basic information such as name, date, grid reference etc., they were encouraged to use the description field to articulate what they saw and how they interpreted it, and not to be constrained by feeling that a 'language template' had to be followed.

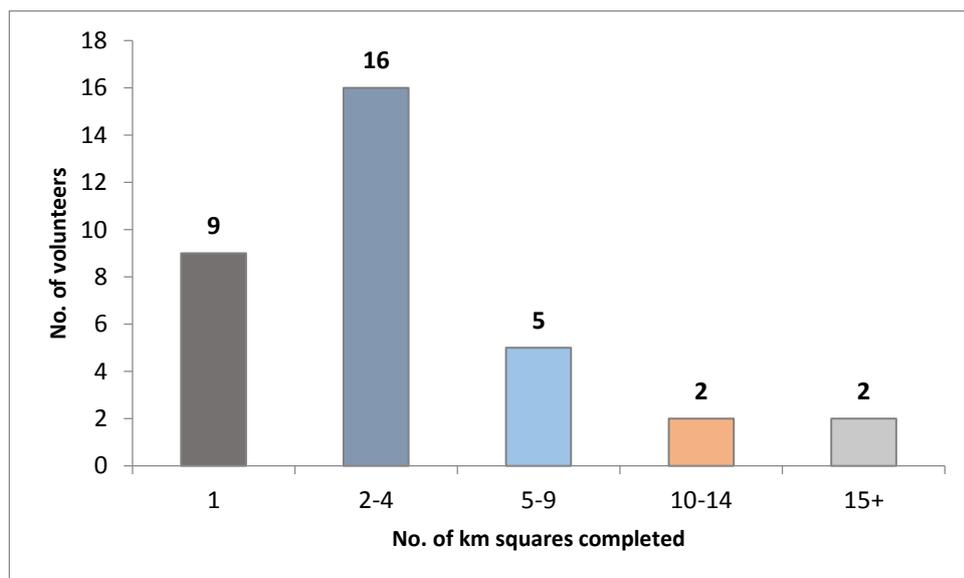


Table 2: Volunteers/km squares examined

A total of 160 km squares were sent out to volunteers of which only 14 were not returned for validation, a return rate of 92% (see Table 3). The outstanding 14 km squares were completed by the validator. All the km squares returned were validated and feedback sent to volunteers. The number of new archaeological sites recorded which fell within the HER sphere of interest totalled **1,027** (see Table 4: Category 5), this final figure representing those recorded by volunteers plus those added at the validation stage. It can be seen from Table 4 that of the 1,819 sites provisionally identified by volunteers (Category 1) approximately 25% of the sites (463) were sites for which an HER entry would be appropriate (Category 2). In validating the km squares submitted by volunteers another 226 sites (Category 3) were added by the validator, giving a total of 689 sites identified within the 146 km squares returned by the volunteers (Categories 2 and 3). The remaining 338 sites (Category 4) were identified during the process of examining the km squares which had either not been returned or not sent out to volunteers for the reasons outlined above.

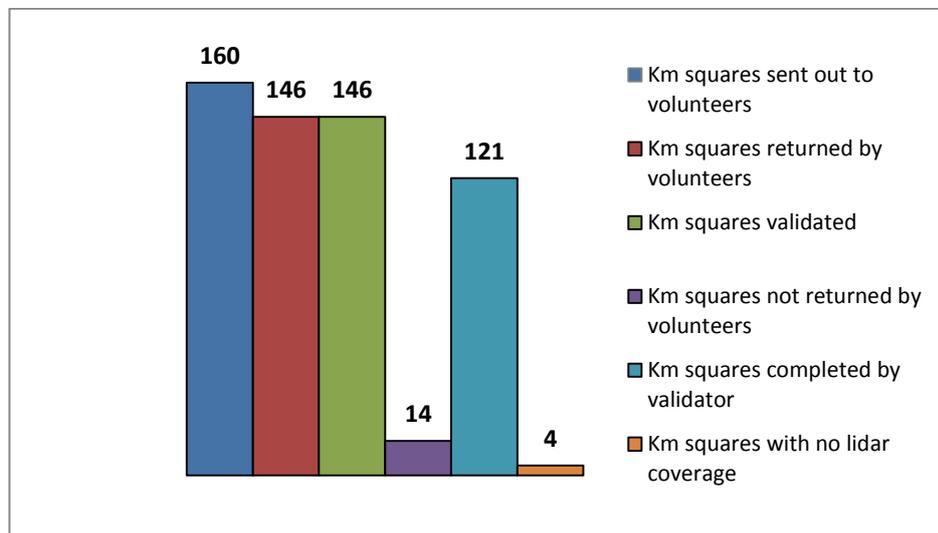


Table 3: Km squares in the project area

4.2 Validation and feedback

Once completed by volunteers, the annotated lidar workmaps and recording forms (plus any additional information such as scanned sketches etc.,) were returned via email for validation. The validation process was structured so that it not only acted as quality control, but also formed an essential part of the training and feedback process. For many volunteers this was to be the first time they had ever undertaken any kind of landscape analysis and for them it was a learning opportunity as much as it was a programme of archaeological discovery. Validation aimed to achieve the following:

- Identify features likely to be genuine archaeological sites suitable for inclusion on the HER and create an electronic database of these.
- Sift-out features identified by volunteers which were not genuine archaeological sites and provide feedback as to why.
- Integrate the validation process with the training and feedback programme.

During the validation process the record forms and lidar workmaps were assessed on an individual km square basis, but wherever possible this procedure was left until a sufficient number of km squares within an area of landscape had been received. This helped provide a better landscape context for the km square in question and ensured that interpretation and analysis could be applied consistently to the individual sites and features that had been recorded by the volunteers. Each of the km squares was assessed in 3D model mode using Applied Imagery's *Quick Terrain Modeler* [sic] v7.1.6 to enhance the lidar by controlling the sun/shadow effect, and exaggerate height differences etc. in real-time. As well as allowing manipulation of the lidar data in 3D, grid references could be checked and large areas could more easily be assembled and modelled as part of the analysis.

The validation process sifted out those which were not genuine archaeological sites within the sphere of interest of the HER. As can be seen from Tables 4 and 5, 1,356 out of the total number of records created by the volunteers (1,819) were sifted out at the validation stage, while the remaining 463 (25%) were accepted. Of the sifted-out sites (755; or 57%) failed to meet the necessary archaeological criteria. In the main the most common misinterpretations related to misidentifications of modern agricultural landscape features, ditches, banks, drains etc., and combinations of topographic and geological features which appeared to create 'sites'. Of the remaining records, the majority (384; or 28%) were identified as non-site specific ridged cultivation, followed by records where the features (166; or 12%) were judged to be components of larger sites. For example, in the case of complex monument types and landscapes, such as mining landscapes and field systems, many individual records were amalgamated into a single record. Inevitably, given that many volunteers were new to the subject and the available sources, some 51 sites (3%) that had already been recorded on the HER were duplicated. It can be seen from these figures that a creditable acceptance rate of roughly one in four sites was achieved by the volunteers (total of 463 sites).

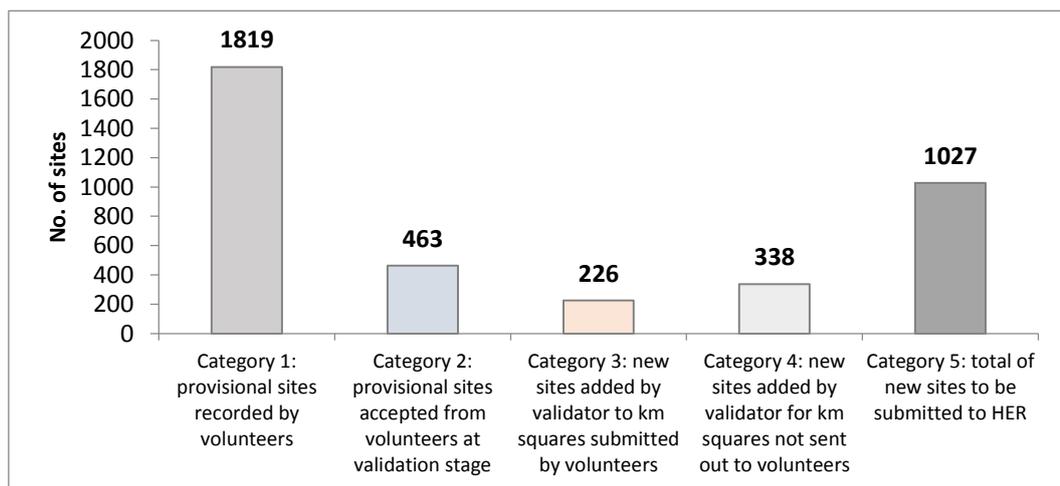


Table 4: Archaeological sites recorded

As noted in Section 1, this project was the equivalent of a Level 1 survey as defined by English Heritage (Ainsworth *et al* 2007) and using only those sources outlined above. To ensure some consistency of recording with other Level 1 projects which had fed into the HER, specifically the 'The RCHME North Pennines Industrial Archaeology Project' (AMIE Event UID 922755), which was undertaken using OS First Edition 6-inch scale maps as

the primary source, this same edition (via the *Keys to the Past* website) was used as the basic historic map source consulted for the validation process. Where appropriate, later editions from the same source were consulted but no further documentary research was undertaken. In the AVH project area the survey and publication dates of individual map sheets vary, and the editions of maps are bracketed by ‘epochs’ on the *Keys to the Past* website. The epoch of the First Edition is listed at c.1856-1865, and the Second Edition c.1919-1926. Six other epochs of mapping are specified up to 1994. All references to map dates in the project database, or in this report, use these Edition epochs as their source.

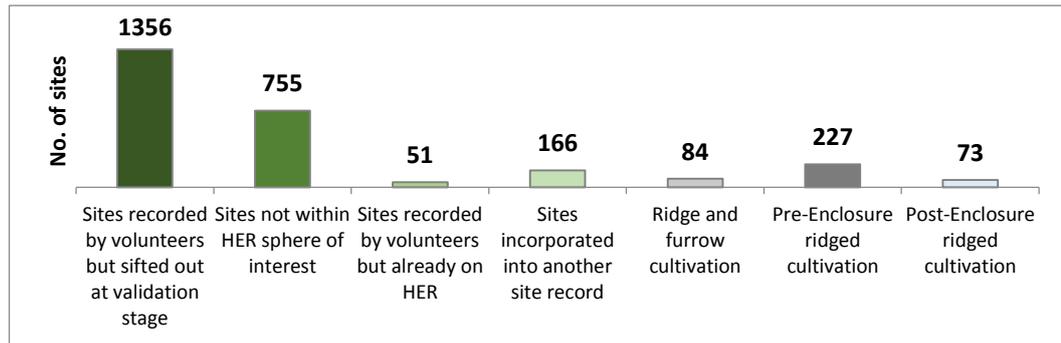


Table 5: Breakdown of sites sifted-out at validation stage

Following validation, the database was completed for each km square and an extract (with any additional comments if needed) returned to the volunteer by email. It was inevitable that during the validation process, new sites would be identified by the validator which had not been recorded by the volunteer. It was never anticipated that all the new sites which might be evident on the lidar would be recognised by the volunteers, especially those with no experience of landscape archaeology. However, as the project progressed the level of acuity increased and many of the volunteers who completed multiple km squares developed a high level of observation and analysis. Many developed a ‘thirst’ for this type of recording and asked to be allocated more squares as the project progressed.

Feedback to volunteers resulting from the validation process was provided at two levels. Firstly, a summary explanation of why some features had been sifted-out as not being genuine archaeological sites. Secondly, for those sites which were genuine, a copy of the completed project database entry for the km square was provided. This also included interpretation of the sifted-out features as well as the completed entry for the sites that would be sent to the HER at the conclusion of the project (see below). The project flowline was specifically designed to ensure that feedback was given by email as soon as possible after validation as part of the process of continuous training throughout the project. To allow volunteers to work at their own pace, little control was exercised over which km squares would be returned or when. This being so, in order to maintain a consistency of interpretation, returns from multiple users were collated into blocks of landscape before they were assessed as part of the validation process. For many sites, the interpretation was very straightforward (e.g. quarries), for others less so. Where it was felt that the interpretation could be refined or clarified by a field visit a caveat to this effect was included in the site description and database. As systematic, follow-on fieldwork did not form part of AVH project this caveat was intended to be used as a measure of the confidence in some aspects of the interpretation, but it is also hoped that these sites will form the basis of a future field project for volunteers (see

Section 5 and Appendix 5). Other levels of feedback were given to the volunteers at group sessions and through a newsletter.

At the end of the volunteer recording stage a final round of data editing and cleaning was undertaken to ensure as much consistency as possible in the record across the whole area. This final stage was undertaken by the validator along with the additional task of completing the km squares which had not been sent out to volunteers, for the reasons outlined earlier in this report.

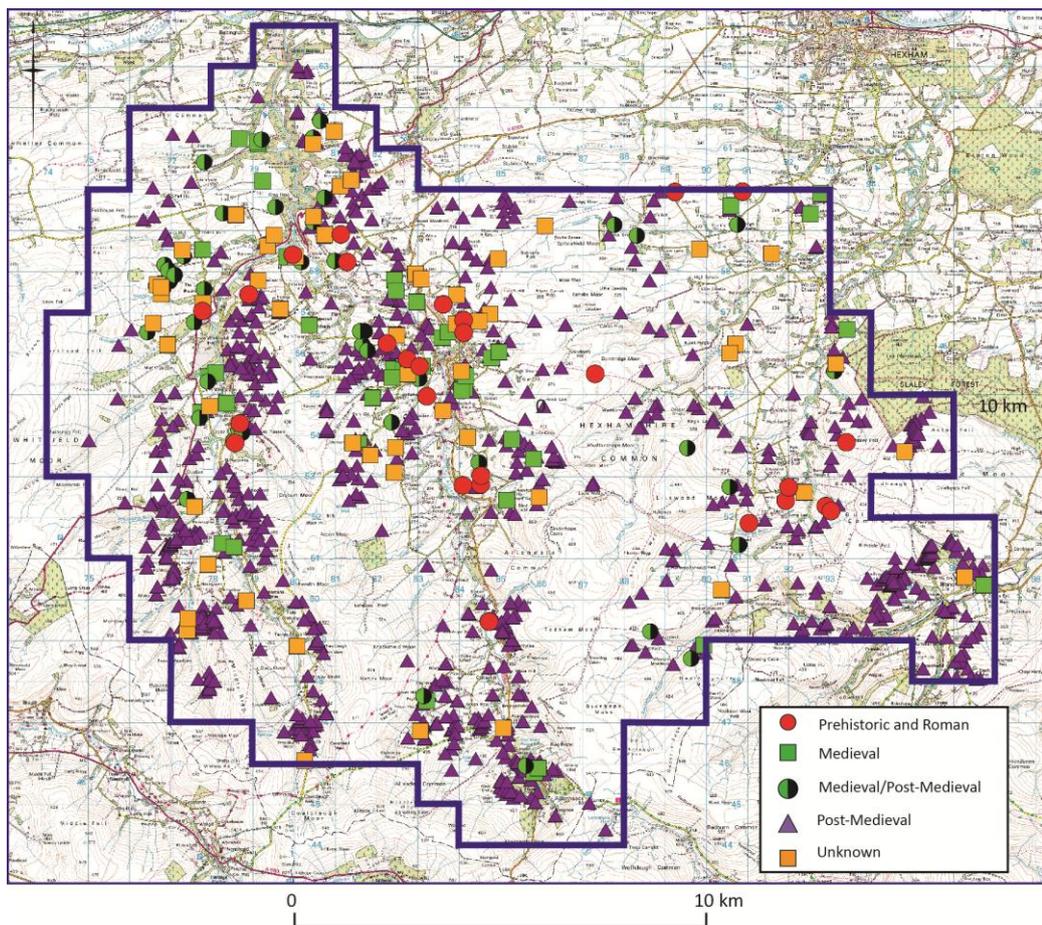


Figure 6: Location of sites by period

OS map: © Crown copyright. All rights reserved Durham County Council. LA100049055. 2016

5. ARCHAEOLOGICAL RESULTS OF THE PROJECT

The AVH project covered an extensive geographical area, and those who contributed to it had varying levels of experience and aptitude. Although the validation process was designed to introduce a degree of professional expertise to both the interpretation and the final record, it was never intended that this project would result in a fully analytical assessment of the archaeological results, placing the discoveries in a wider, regional context, against established patterns of landscape evolution and site distribution, and a framework of recent scholarship. The following is therefore intended as a summary statement of the new discoveries, and is similar to the approach previously adopted by English Heritage for the NMP programme. Where relevant, examples are used to illustrate the morphology of newly-identified sites as they appear on the lidar. At the time of compiling this report, HER numbers have not been allocated to the sites, and the numbers (in brackets) used in this report are project identification numbers as recorded in the database. Each number consists of the km square number within which the site lies, but without the prefix letters NY, followed by a unique sequential number within that km which corresponds to the number allocated during the recording and validation stages. Thus, for example, site 2 in NY9151 is numbered 91512.

A principal aim of the project was to identify and record new archaeological sites defined as earthworks visible on lidar images. (Standing buildings lay outside the scope of the project). As stated above, 1,027 new archaeological sites (990 in Northumberland and 37 in Durham) falling within the HER sphere of reference have been identified and recorded (see Figure 6). These sites can be divided into two main groups, depending on the level of confidence accorded to their interpretation. The first group comprises the majority of the sites, 836 (81%), in whose interpretation and period dating a reasonable degree of confidence can be placed, without the need for further clarification by means of fieldwork. By contrast, where the remainder are concerned, only field investigation could provide a more reliable interpretation, due either to the complexity of remains or the limitations of the available lidar (even where enhanced by 3D or other enhancement techniques). A total of 191 sites (19%) fell into this latter group (see Appendix 5). For these sites it was felt that interpretation would be either significantly enhanced or clarified by field inspection, and a note to this effect was included both in the site record, and as a separate category in the database. In cases such as these, fieldwork could have a variety of outcomes, ranging from simple clarification of specific attributes of the site to its complete removal from the record, dependant on the type and complexity of remains.

In the AVH project database, sites displaying evidence of multi-period activity have been attributed to the earliest period thought likely to be represented, the descriptive field being used to indicate the possible time depth. Inevitably, where lidar is being used as the sole evidence on which to base an interpretation, some sites will prove very difficult to interpret and cannot confidently be attributed to a specific period; these sites have been recorded as of 'Unknown' period in the database. Similarly, where alternative interpretations as to monument type are possible, the one most in accord with the evidence was recorded in the monument type field (with up to two 'alias' fields in the database to record alternatives), with further clarification in the description field as appropriate. Where there was confidence in a broader time frame, but not a specific period within it, a combination of two categories was used (e.g. Prehistoric/Roman; Medieval/Post-Medieval).

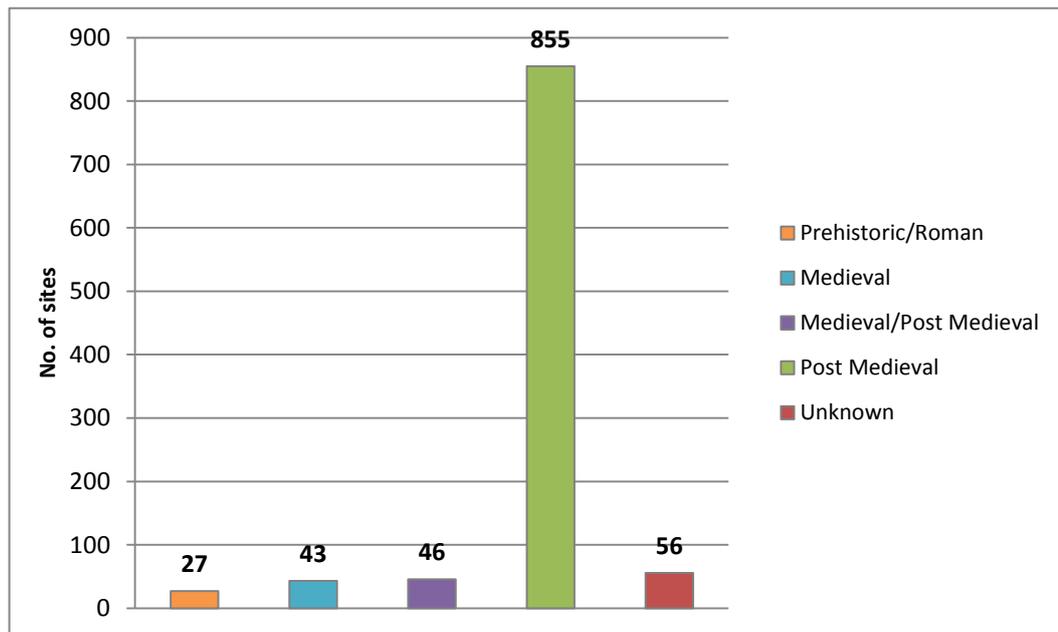


Table 6: Archaeological sites by period

As can be seen from Table 6, the majority of newly-discovered sites, 855 (82%), fall within the Post-Medieval period, a not unexpected result in areas where mineral mining and the extractive industries of the 18th and 19th centuries have played a major role in the continuous re-shaping of the landscape. However, our knowledge of the early landscape within the project area has been significantly enhanced in many ways, and not least by the recognition of a strikingly large number of hitherto unrecognised sites of the prehistoric and Roman periods.

5.1 Prehistoric and Roman

A total of 27 sites were recorded which, in broad terms, may date to either the prehistoric or Roman Iron Age periods (the latter sometimes referred to as the Romano-British period, indicating the influence of Romanisation on native cultures). The majority of these sites, 20 in number, were either settlements, homesteads, or enclosures; five were field systems, and two were mounds or cairns (see Table 7). No Roman military sites were identified.

5.1.1 Settlements and enclosures

What may be the earliest site recorded during the project, is an enigmatic earthwork in km square NY8355, near Low Broadwood Hall, on the west side of the River East Allen and immediately west of Allendale Town (83554). It is located on gentle east-facing slopes leading down to the river, immediately north of the Wager House Burn at 253m OD (see Figure 8). The earthwork appears as a roughly semi-circular arc of bank and ditch which may be the surviving western part of a larger, circular, or near-circular enclosure, with an estimated diameter of c.75m, had the perimeter in fact made a complete circuit. Its true shape, and status as a genuine enclosure, are both difficult to determine in its present state of preservation. The extant, western portion of the earthwork takes the form of a low terrace-like ditch and external bank and is well defined. There is no obvious evidence of an internal bank in this section. A gap is evident in the bank and ditch along this side, but whether this is an entrance or results from later disturbance is unclear. While there is the slight suggestion of an eastern arc,

it is only indistinctly evident as a c.25m stretch of possible bank and ditch whose curvature appears to have been truncated by a combination of later field boundaries, lynchets and associated ridged cultivation which override and cut it. On this eastern side, the postulated line of the earthwork is overlain by what seem to be agricultural terraces created by ploughing, possibly in the medieval period. If this interpretation is correct then the earthwork must be medieval or earlier in date. To the south the earthwork cannot be traced further than a drystone wall, but here obvious signs of later land use would account for the absence of surface traces, as is the case at the east. At the southern 'terminal' there is a suggestion of a lynchet-like feature which runs from this point to the south west although the relationship between the two features is unclear. There is a hollow within the area of the 'enclosure' but this is not necessarily associated with it.

If there was indeed an enclosure here, as the evidence does seem to suggest, its shape and size would not be unusual for a prehistoric settlement, such as a small Iron Age hillfort. On the other hand, the presence of an external bank without any indication of an internal bank to the accompanying ditch (where this is evident), is more suggestive of a hengiform monument, and thus possibly of a date in the late Neolithic. Its location, too, is typical of henges i.e. close to major rivers. Its form, size and location is broadly similar to the double-ditched enclosure at Rotherhope (alternatively referred to as the Dry Burn enclosure), c.15km to the west, in the South Tyne valley near Alston (Cumbria HER 6236; Oakey, Radford and Knight 2012, 19; Payne 2011; Historic England Miner-Farmer database) which through ground survey and excavation is better understood. This enclosure is defined by very low earthworks, with no indications of ever being any more substantial, and shows evidence of banks either side of the ditches. Both the

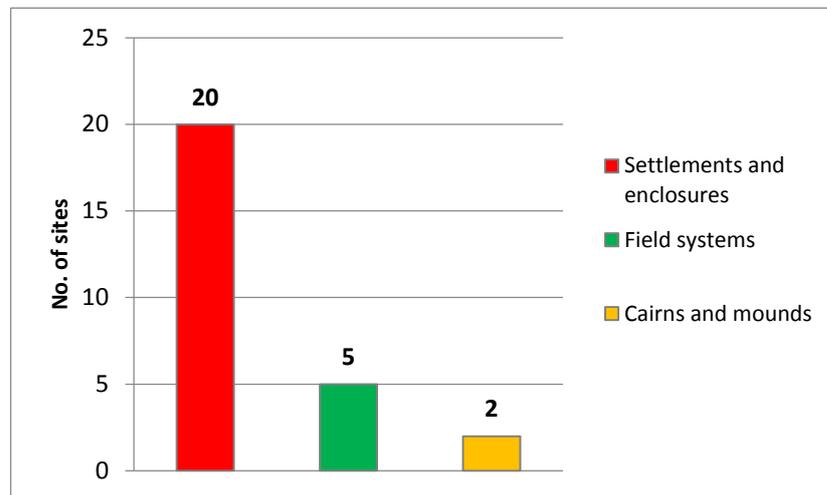


Table 7: Prehistoric and Roman sites

earthwork and geophysical surveys had suggested several gaps in the banks and causeways across the ditches and which led to this being interpreted as a hengiform enclosure (Historic England Miner-Farmer database; Payne 2011; Cumbria HER 6236). Here, recent excavation as part of the *Altogether Archaeology* programme (Claydon 2014; 2016) of the primary fill of the outer ditch and an early deposit from its associated outer bank returned radiocarbon date ranges of 2200-2030 cal BC respectively

indicating an Early Bronze Age date for the construction. The inner ditch and bank produced a radiocarbon date range of 800-560 cal BC indicating construction in the Iron Age. The excavation, based on two narrow trenches and one test pit, seems to support the interpretation from ground surveys that a small settlement occupied the inner area of an earlier enclosure.

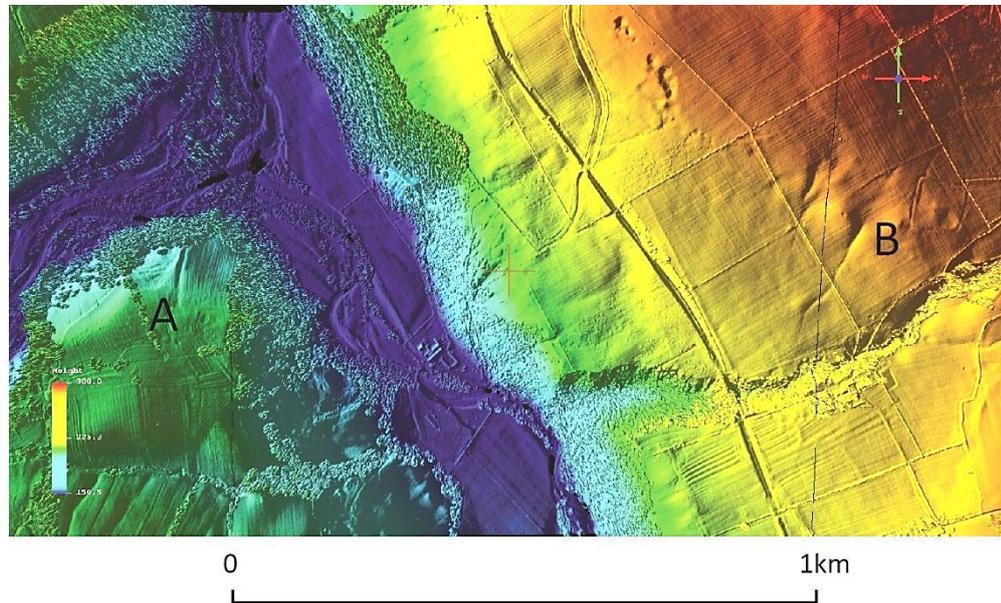


Figure 7: The use of colour banding with lidar can help emphasise relative heights and relief. This example shows the topographic setting of two prehistoric/Roman period enclosures at the confluence of East and West Allendale. The enclosure (A) is a new discovery (see Figure 9); B was already recorded in the HER. Lidar image: single direction hillshade colour-banded by height to illustrate relief.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Whilst this enclosure appears to be of two distinct phases, its function particularly in the earlier phase, remains enigmatic and the limited scale of the excavations precluded assessment of the interrupted bank and ditch hypothesis. However, lack of any structural or artefact evidence of settlement from the trench that crossed approximately half of the enclosure may indicate that the earlier enclosure had other functions. The only other local monument with which the earthwork at Low Broadwood Hall may be compared is the curvilinear, partial enclosure at Harbut Lodge (NY7121 4746) in the South Tyne valley near Alston, and newly identified during the Miner-Farmer project (Oswald 2009; Oakey, Radford and Knight 2012, 23; Swann and Hale 2012). The large curving ditch (with traces of an inner bank) at Harbut Lodge has been interpreted as a stock corral appended to a Roman Iron Age enclosed settlement. Like the Low Broadwood Hall site, this is a unique feature within that project area, but is larger and with differing morphological characteristics. For the time being the true identity of the earthwork at Low Broadwood Hall remains enigmatic, due to a combination of its relatively poor state of preservation due to later land use, and the insecure interpretation of its components based purely on 1m resolution lidar (i.e. no inner bank?). Whilst its interpretation as a possible prehistoric hengiform monument or enclosure similar to the early phase of the site at Rotherhope must remain speculative at this stage, the earthwork is certainly unique within the AVH project area.

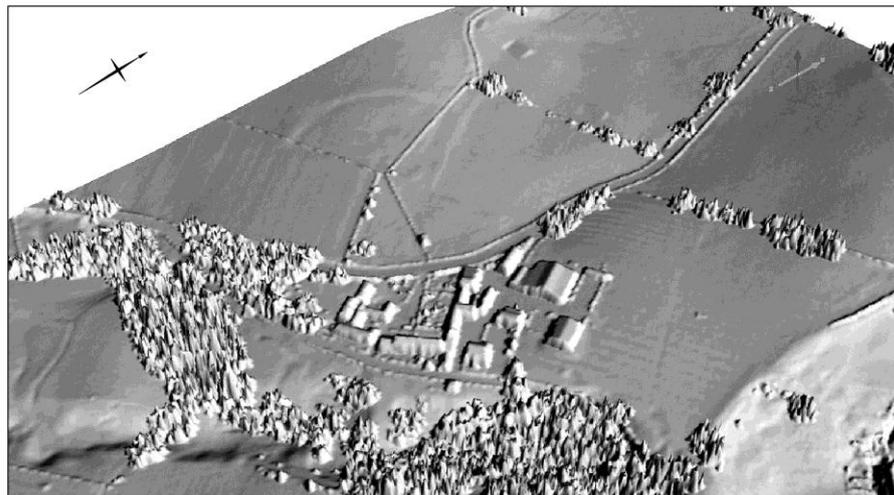
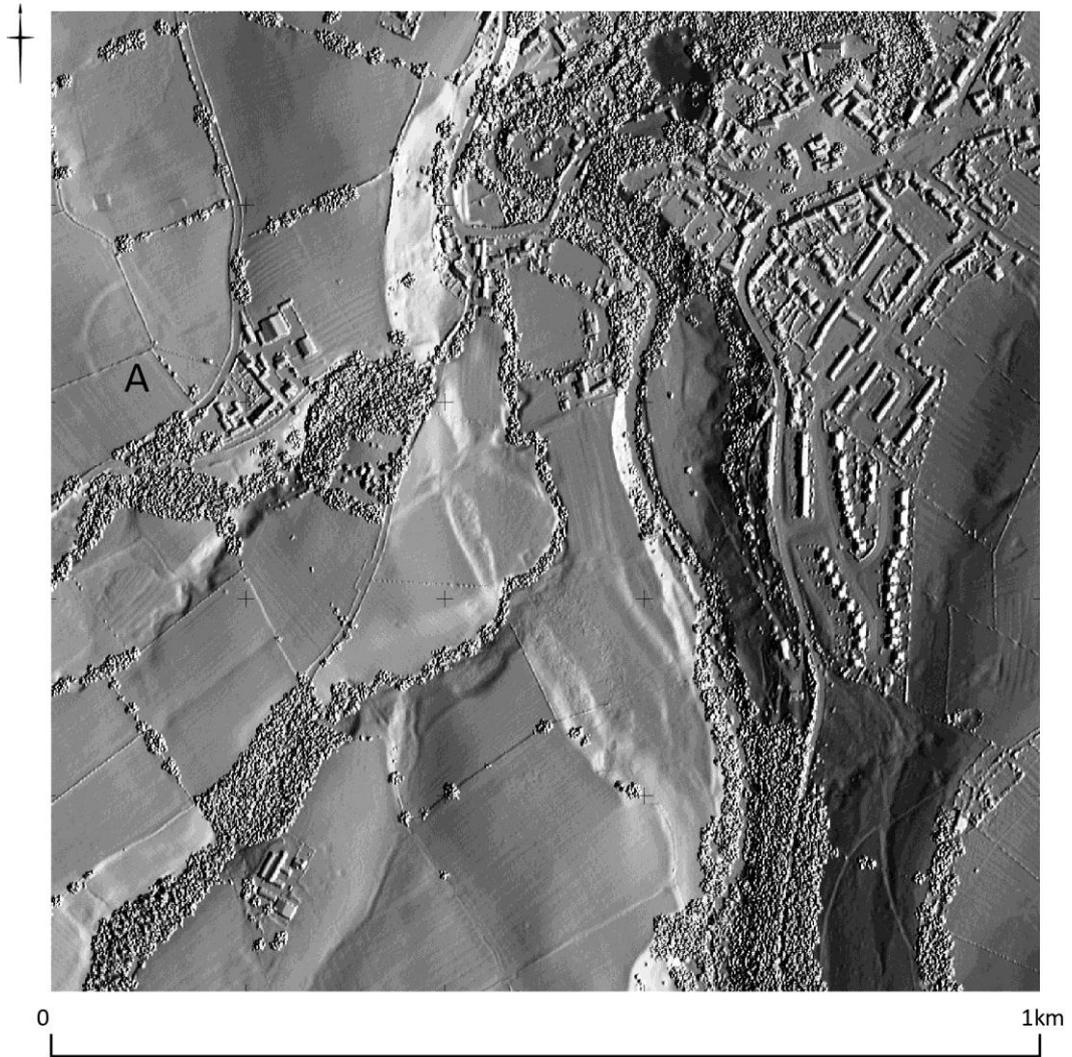


Figure 8: Possible prehistoric ditched enclosure at Low Broadwood Hall (km square NY8355). The curving earthworks (A) may be the partial remains of a much larger, circular or elliptical enclosure. The centre of Allendale Town can be seen at the north east corner of the km square. Top lidar image: 8 direction hillshade PCA. Bottom lidar image: view from the south east derived from 3D model.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

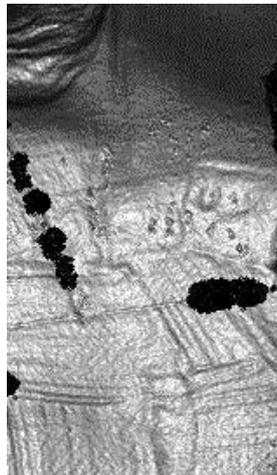
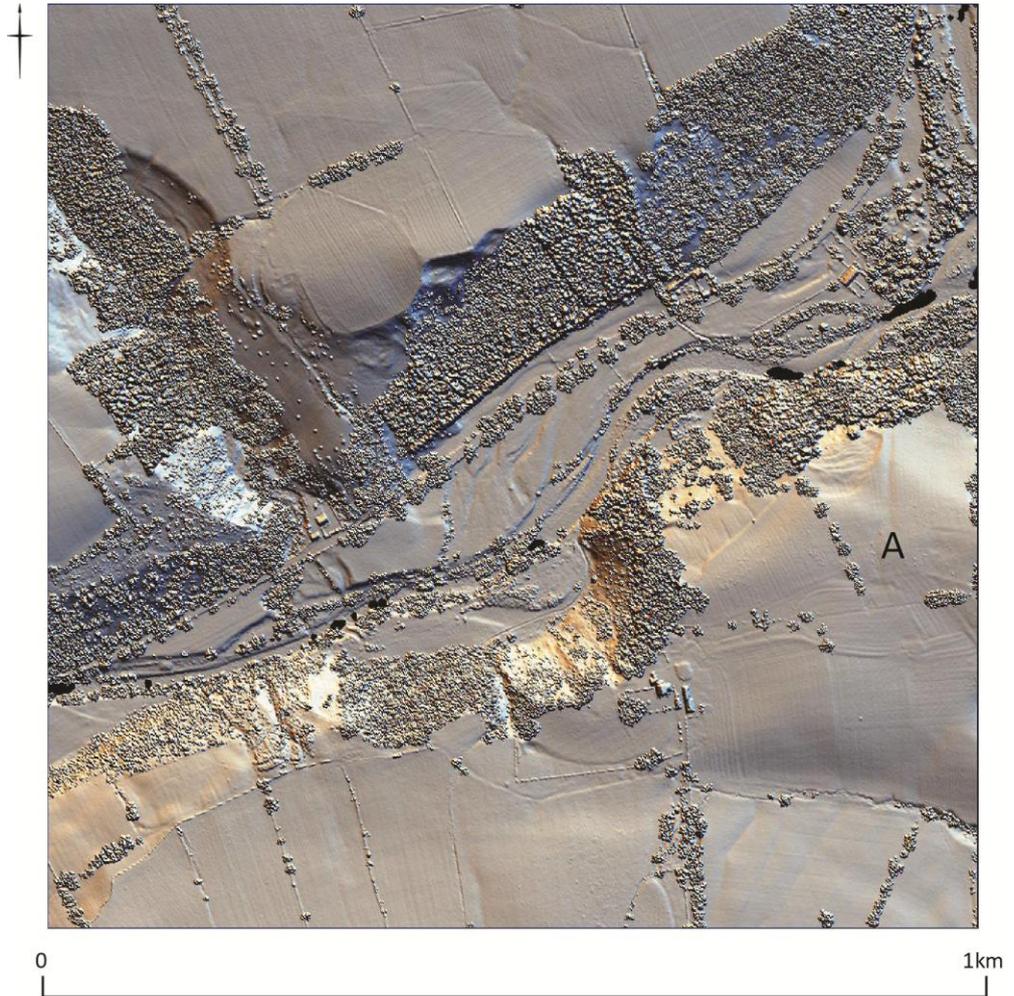


Figure 9: Prehistoric/Roman period rectilinear enclosure at Hindley Wrae (km square NY7958). The enclosure (A) appears to have been partly lost to erosion or landslip at the east on the steep escarpment edge (see Figure 7). The earthworks are very slight. The lower image, derived from a slope model where grey tones reflect steepness of slope (light – flatter, dark – steeper), shows the enclosure more clearly. Top image: 16 direction hillshade. Bottom lidar image: slope model.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved

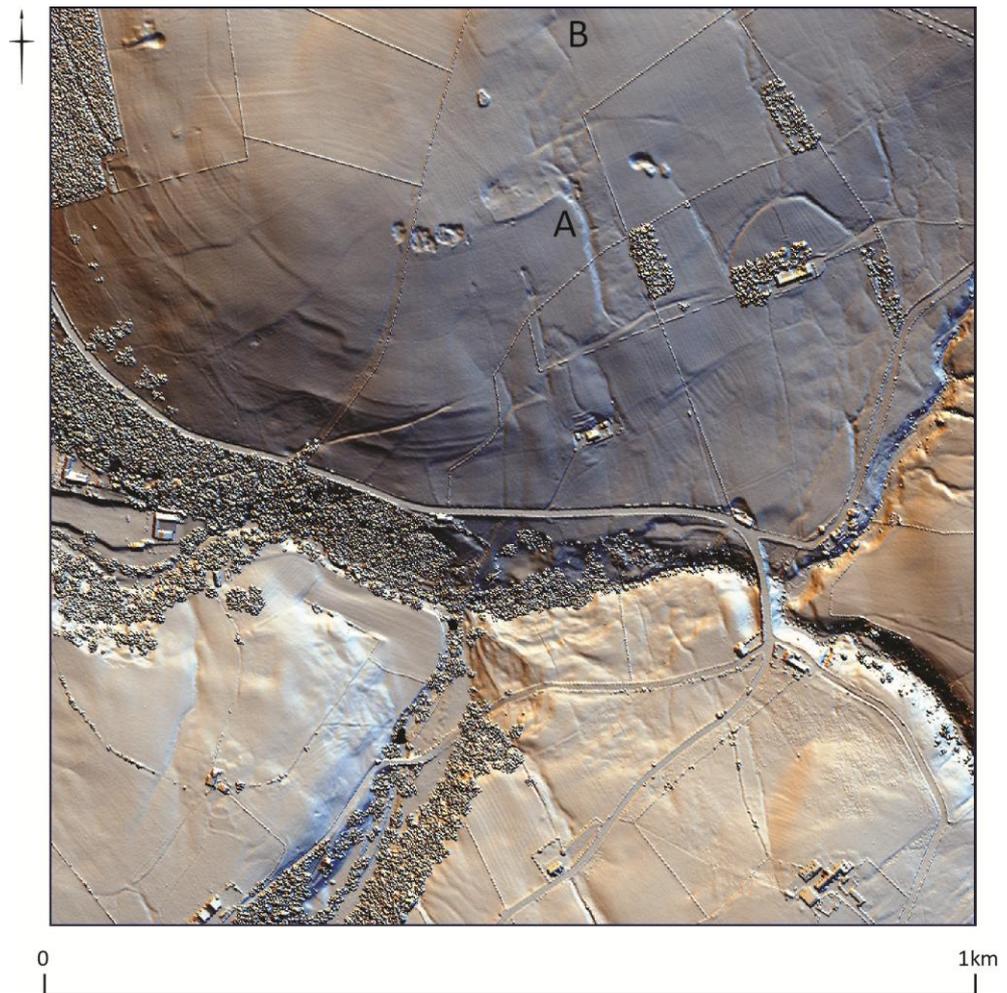


Figure 10: Prehistoric/Roman period settlement, enclosure and field system at Holms Hill/East Garret's Hill (km square NY8452). The settlement (A) appears to have been disturbed by small-scale quarrying. The upper enclosure (B), which falls mostly in km square NY8453, has no obvious internal evidence of settlement. Note the lynchets of a probably contemporary field system to the west. Top lidar image: 16 direction hillshade. Bottom lidar image: view from the south west derived from 3D model.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

In the main, all the other enclosures and settlements identified as being potentially of prehistoric or Roman Iron Age, fall into those two broad groups – enclosures and settlements. Possibly contemporary field systems have been identified with members of both groups. All of the enclosures and settlements identified lie along the fringes of valleys of the Rivers East and West Allen, and the Devil's Water.

In general, the enclosures identified tend to be larger in size than settlements. They are commonly rectilinear in shape and lacking obvious evidence of internal detail such as hut circles, yards, structures etc. Some enclosures may nevertheless be settlements in fact, and it is simply that the evidence to demonstrate this is not visible on the surface. Others may on the other hand be stock enclosures. All are rectilinear or sub-rectangular in shape and survive in varying states of preservation. At Hindley Wrae (795828), in km square NY7958, a sub-rectangular enclosure, measuring c.56m by 50m and defined by a low bank and ditch, is prominently located at the confluence of the Rivers East and West Allen (see Figures 7 and 9). The enclosure lies within a complex of medieval and post-medieval fields and the earlier earthworks have been partly degraded by ridged cultivation of uncertain date. On the opposite side of the East Allen valley, at Kilburn, a larger, similarly-shaped enclosure has been previously recorded and attributed to the Iron Age or Roman periods (HER N7291). This site sits within a complex field system in km square NY8158, newly identified during this AVH project (81581). Both enclosures have hollow areas within them, although there is no positive indication of structures.

Another example of a large sub-rectangular enclosure is located in km square NY8453, on Holms Hill on the east side of the East Allen valley (84535). It is defined by a low bank and ditch measuring c.85 by 52m and is lacking any obvious internal detail. Its shape appears to be somewhat deformed by the adoption of a natural ridge at the north west as part of its perimeter (see Figure 10). Approximately 180m to the south, there is another, smaller, sub-rectangular enclosure, in NY8452 at East Garret's Hill (84522), which is morphologically closer to the second group of smaller settlements (see below). This site is scooped into the hillslope and in part defined by a low bank. Internally there appear to be divisions, possibly yards which are also slightly scooped, although some pitting may be associated with nearby quarrying. Both the larger enclosure (84535) and this settlement sit on the edge of a large 'Celtic-like' field system to the west, and some of the field boundaries appear to align with both enclosures. At Holms Hill, therefore, we have examples of a settlement and an enclosure in close proximity both of which are apparently associated with the same field system. Though it cannot be proved that the two are contemporary, it could well be that this is the case.

Compared with enclosures, most settlements are smaller in size, more complex and generally display some indication of internal structures. At least two appear to be 'scooped' into hillsides and similar in form to those many comparable settlements in the Cheviots and the Border regions which are traditionally attributed to the Iron Age and Romano-British periods (Jobey 1960; 1964; 1966; RCAHMS 1967), as are a number of newly discovered settlements and enclosures identified during the Miner-Farmer project along the fringes of the South Tyne Valley, c.8km to the west (Ainsworth 2010; Oswald and Oakey 2011; Oakey, Radford and Knight 2012). Recent excavation at one such scooped, enclosed settlement at Gilderdale Burn near Alston, has yielded radiocarbon date ranges from 37 cal AD to 233 cal AD from two samples from the site of a roundhouse, indicating occupation and activity from the late Iron Age well into the Roman period (Ainsworth and Carlton in prep). Four probable settlement sites typical of the prehistoric/Roman Iron Age have previously been recorded at the very eastern end of the AVH project area (HER N8375, N8393, N8394 and N7428) of which the first three on Burntshieldhaugh Fell are in the upper reaches of the Devil's Water. One settlement

(HER N8375), comprising a trapezoidal embanked enclosure, measuring c.42m by 35m, contains three internal hut circles and is accompanied by an associated field system. As previous field inspection has confirmed the identity of this site as a genuine late pre-Roman or Roman Iron Age settlement, we can be confident that other, ostensibly similar, sites which have been identified on lidar but not yet visited on the ground will eventually turn out to belong within the same broad context. Prehistoric and/or Roman Iron Age activity along the east side of the Devil's Water is further indicated by the discovery of another small, sub-rectangular embanked enclosure, measuring c.50m by 37m, on Embley Fell, in km square NY9353, which is similar to the other identified examples (93531). In this case no hut circles are evident on the lidar, although there is a suggestion of a small rectangular structure in the north-east corner (see Figure 11).

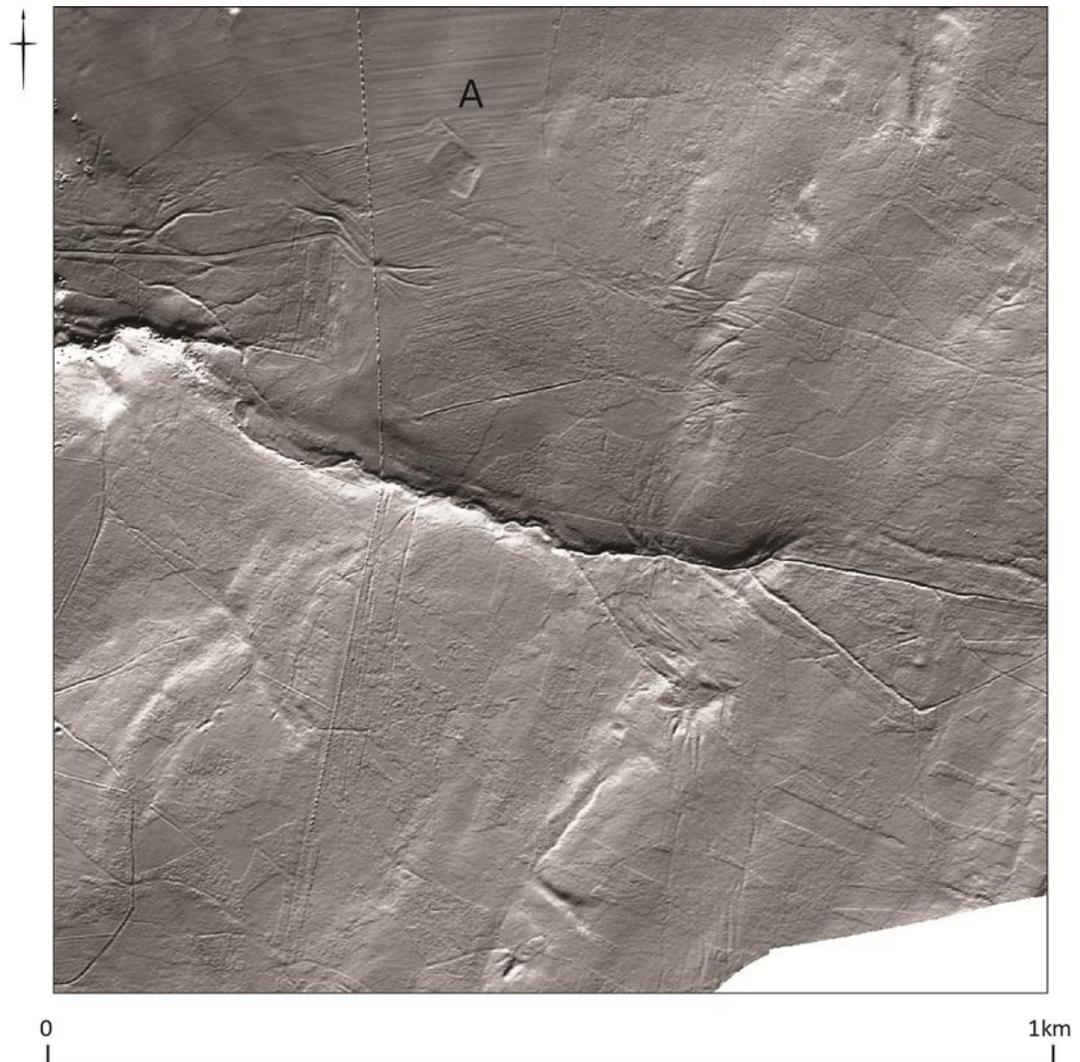


Figure 11: Sub-rectangular prehistoric/Roman period enclosure (A) on Embley Fell (km square NY9353). Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

On the opposite side of the valley of the Devil's Water the AVH project has identified two other settlements 400m apart (see Figure 12): one in km square NY9252 at

Hesleywell (92523), and the other at New House in NY9152 (91521). The site at Hesleywell (A on Figure 12) is a sub-rectangular embanked enclosure, measuring c.61m by 50m, and tapers slightly to the west. It shows evidence of scooping, possible yards and what might be a single circular house platform. To the west and south are banks which may form part of an associated field system, although some may belong to the later bastle and farm at Hesleywell. To the east there is a suggestion of a track which could also be contemporary with the settlement, although it may simply be a field boundary. The site at New House (B on Figure 12) comprises a series of earthworks which seem to define the remains of a small enclosure, or group of enclosures, extending over an area of c.50 by 45m. The earthworks are most clearly defined to the west and north, and are split lengthwise by a modern field boundary. Although difficult to interpret purely from lidar, they do seem to have elements in common with enclosed homesteads of the prehistoric/Roman period.

Almost all of the other newly recognised settlements are situated in the Allen valleys. One good example of a small, enclosed settlement or homestead, measuring c.68m by 50m, lies on the slopes above the east side of the West Allen valley, in km square NY7854, near Leadgate Farm north of Ninebanks (78543). Its perimeter seems to be defined by a bank without a ditch, and the interior appears to be slightly scooped, with one possible internal yard or roundhouse platform (see Figure 13). This site shows

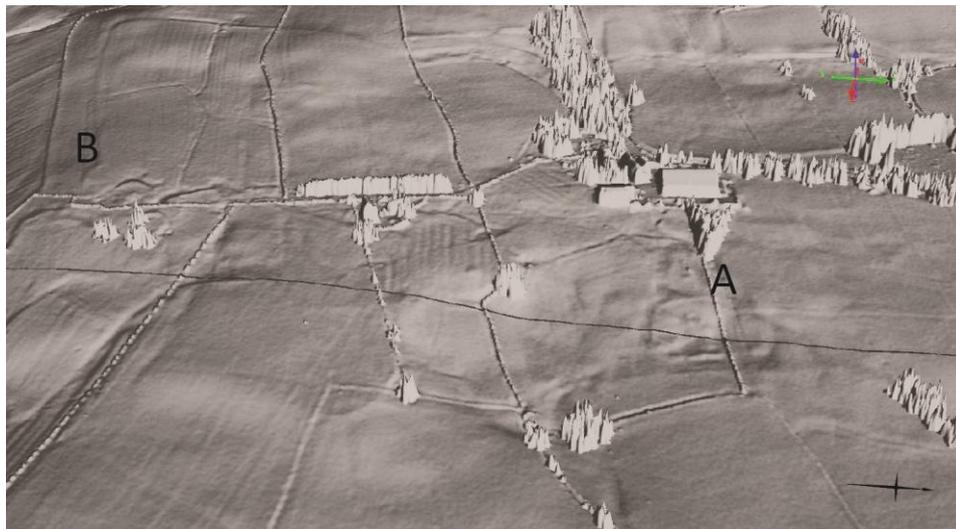


Figure 12: Two prehistoric/Roman period settlements or homesteads at Hesleywell and New House (km square NY9152). In (A) there appears to be a single roundhouse. Settlement (B) is less clear, and interpretation is confused by later land use. Lidar image: view from east derived from 3D model (x2 vertical exaggeration).

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

evidence of later occupation, in the form of a rectangular structure, possibly a steading, which appears to intrude into the south-east corner. This site, too, has indications of a contemporary field system. A smaller, more irregular and slightly scooped homestead enclosure lies some 500m to the south in km square NY7853 (785317). The potentially destructive effects of later agricultural land use on the survival of these smaller,

scooped settlements is apparent in km square NY7857 (785710). Here, the upstanding remains of what appears to be a small, scooped rectilinear enclosure, measuring at least c.36m by 30m, may have been truncated by a field boundary and then further eroded by later land use to the south. The bank defining the west side returns eastward at the north-west corner but cannot then be traced further up the slope beyond the probable half-way point. To the south a terrace runs parallel with the west and east sides of the enclosure and may represent a sub-division of it. Other minor earthworks are visible inside the enclosure and also to the north of it, although they are indistinct on the lidar. The whole site has been over-ploughed by ridged cultivation, further eroding the earthworks and complicating their interpretation. Other terraces to the west may or may not be associated with the settlement.

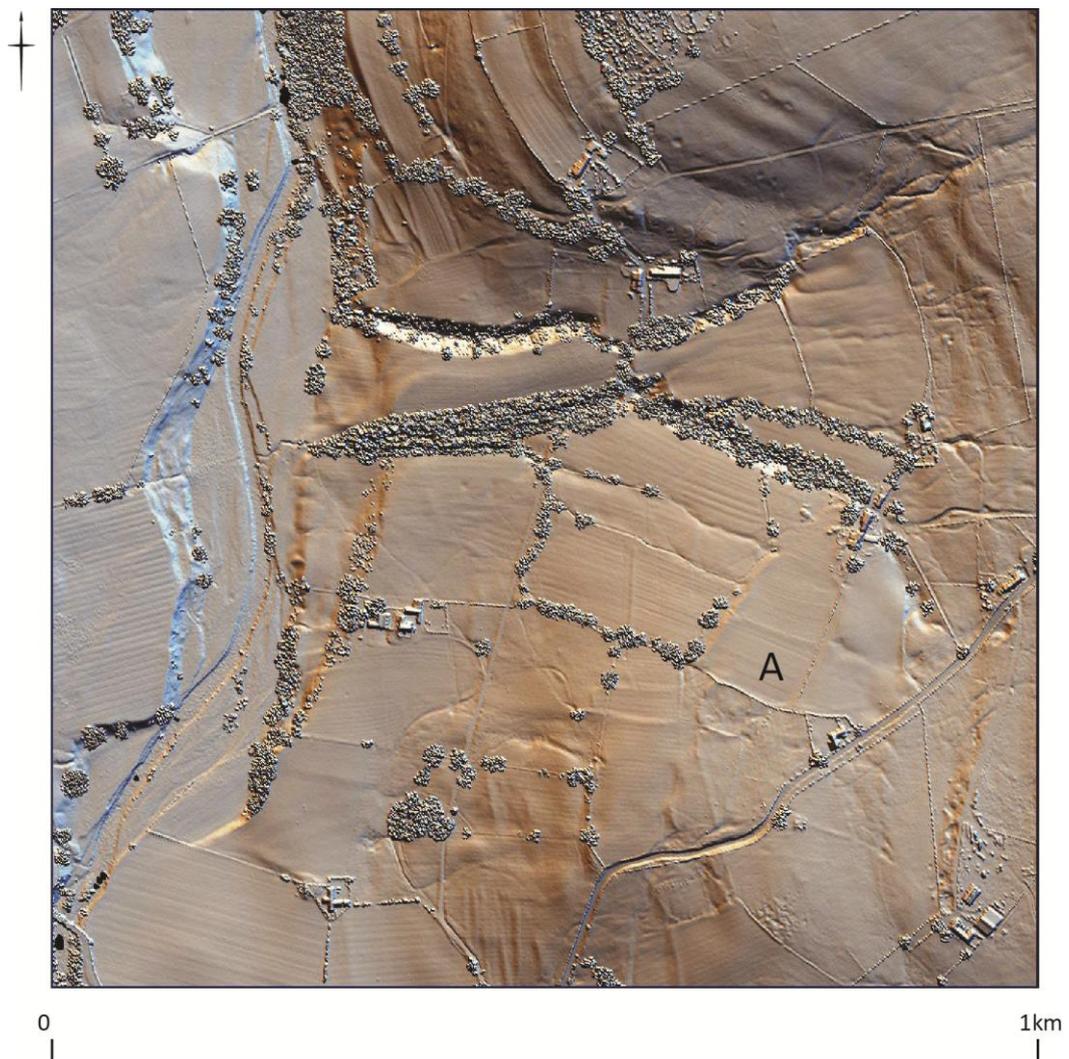


Figure 13: Enclosed settlement or homestead (A) at Leadgate (km square NY7854). Parts of the field system to the west and south may be contemporary. Lidar image: 16 direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

5.1.2 Field systems

As outlined above, the AVH project offered limited scope for the recording of field systems, particularly those which comprised medieval ridge and furrow, and later

ridged cultivation. For the prehistoric/Roman periods examples have been recorded where they occur in association with settlements and enclosures that are demonstrably earlier in date than the medieval period. They have only been given separate records if they are notably good examples or form a distinctive element of the landscape. Due to the destructive impact of ploughing and agricultural improvement, from the Middle Ages up to the present day, many of the boundaries of what appear to be early fields are fragmentary, and it is highly probable that such early field systems as can now be recognised were originally much more extensive than they appear to be now. Of the prehistoric/Roman period settlements identified, at least five examples can plausibly be associated with field boundaries which are either connected with the settlements or share a common alignment in the wider landscape setting. In general, these fields consist of a mixture of banks and lynchets, and usually forming a network of interlinked boundaries reminiscent of so-called 'Celtic fields', although some may appear as co-axial strips. Although many of field boundaries follow a sinuous course, the overall pattern is generally regular, and in some cases covering large areas. In one example, at Edge House (89591), in km square NY8959, a series of four roughly co-axial strip fields appear to be associated with a small, previously recorded rectilinear enclosed settlement (HER N7428). In this instance a series of ploughed-down linear boundaries is visible on the lidar to the north-east of the settlement, where it is aligned on the same south-west to north-east axis as the settlement (see Figure 14). One of the early boundaries (B on Figure 14) was later adopted as part of a later walled field established by the date of the OS First Edition 6-inch scale map, while others clearly underlie the same walled fields within which they remain intermittently visible despite the effects of ploughing. Two of these field boundaries extend out from the northern corners of the settlement to which they seem to be joined with and which are therefore probably contemporary. All the fields are roughly the same in width, at between 80-100m, and broaden out toward the north. Unfortunately, because they extend beyond the boundary of project area, their full extent has not been determined.

As noted above, the enclosed settlement at Holm's Hill and the enclosure at East Garret's Hill, in km squares NY8452 and NY8453, have lynchet-like field boundaries aligned on them, forming a radiating pattern down the slopes of the east side of East Allendale (84522 and 84535). The fields thus formed have the appearance of linear strips, averaging c.100m wide and up to c.300m long, although here there is also evidence of irregular cross-divisions (see Figure 10). A more regular 'Celtic-field' pattern of conjoined fields is in apparent association with the small enclosed settlement on Burnshieldhaugh Fell, noted above (HER N8375), where again boundaries are physically linked to the small settlement. Here a natural terrace has been divided into a series of generally rectilinear fields, some of which possess sinuous boundaries which conform to the local topography.

No instances of cord rig were identified in the AVH project area. However, the ephemeral nature of this type of cultivation makes it unlikely that it could be seen on 1m resolution lidar. This was the same conclusion reached following an analysis of lidar and aerial photography as part of a recent NMP assessment of 174 square km of upland landscape in south Cumbria and north Lancashire (Oakey *et al* 2015).

5.1.3 Cairns and mounds

It has to be acknowledged that smaller monuments such as small burial mounds and cairns, field clearance cairns, burnt mounds etc. may exist within the project area but cannot easily be identified using lidar alone for the same reason that cord rig may be undetectable as outlined above. This may be one reason why only two such possible monuments were recorded in this AVH project. The first, in km square NY8755, is an

irregular mound c.10m in diameter (87551), lying c.319m west of the previously recorded Burntridge Moor cairn (HER N7455). It is difficult confidently to class this as a burial cairn from lidar alone and it may indeed be a natural feature. The second is in km square NY9059 north of Myra's Wood. Here, a small horseshoe-shaped mound, c.8m diameter, situated in a valley bottom (90522), is suggestive of a burnt mound, although this interpretation can be no more than speculative without confirmation on the ground; alternatively it could be a small lime-kiln or a modern feature.

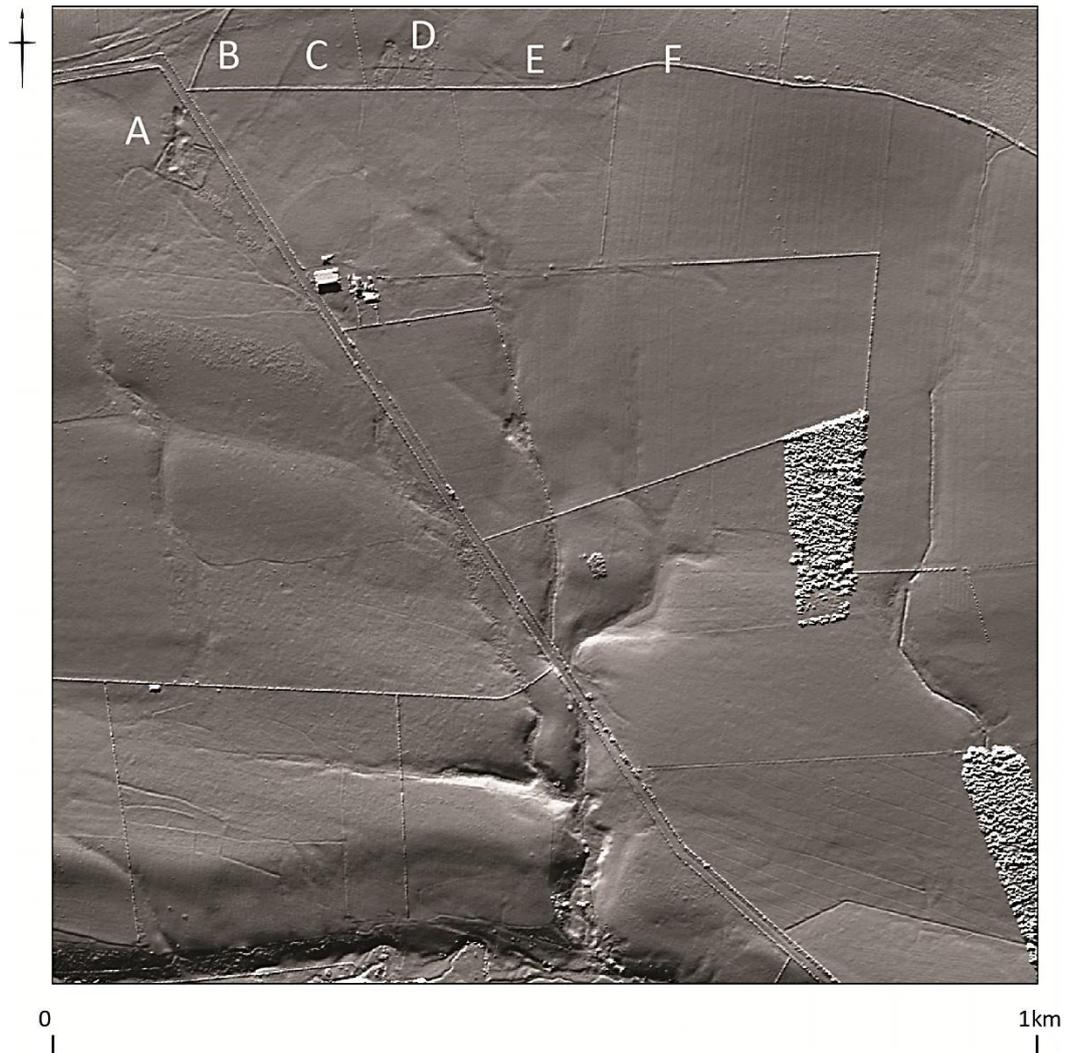


Figure 14: The prehistoric/Roman period enclosure (A) and field system at Edge House (km square NY8959) was already recorded in the HER (N7248). However, a series of contemporary strip fields marked by low banks (B, C, D, E, F) were newly identified on the lidar. Top lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

5.2 Medieval

A total of 43 sites are likely to be medieval in date (see Table 8). In the case of a further 46 sites, a generalised medieval/post-medieval context is possible but cannot be confirmed on the basis of the lidar evidence alone (see Section 5.3).

5.2.1 Settlement, farmsteads, steadings and related structures

Twelve sites were recorded where there was some evidence of medieval settlement, whether that be in the form of possible village desertion, an individual farmstead, stading, or related structures such as a buildings or yards. Four of these sites may represent the sites or component parts of the deserted medieval villages of Kingswood, Parmontley, Keenley and Whitfield. At Kingswood, in km square NY7961, there is an unusual linear arrangement of earthworks (79617) which comprises a line of eight, or possibly nine, small, apparently rectangular structures visible as earthworks and bounded by fields to the north and south (see Figure 15). The modern farm is at the western end of this group of earthworks, which are bounded by embanked field boundaries containing ridged cultivation. Two of the more readily identifiable rectangular structures, possibly buildings, both measuring c.10m x 5m, have been overploughed by narrow ridges probably associated with later improvement ploughing. Overall, the earthworks appear to represent a linear arrangement of possible tofts stretching over a distance of c.190m although there are no obvious plot divisions. While this may be the lost medieval village of Kingswood (HER N6852) it is equally possible that the 'structures' are the truncated remains of broad ridge and furrow ploughing (visible to the south) which have been left isolated by the cutting of a track across them more or less at right angles. Field investigation would clearly be of benefit here, as the evidence of lidar is ambiguous and the resulting interpretation no more than tentative. A second possible deserted medieval settlement (775513), in km square NY7755, is indicated by a complex series of earthworks north of Parmontley Hall in former parkland. In the areas either side of a drystone wall are two, perhaps three, rectangular earthwork features, which may be buildings and yards. They lie within an uncultivated area of a well-defined field tract of ridge and furrow cultivation, and possibly at the

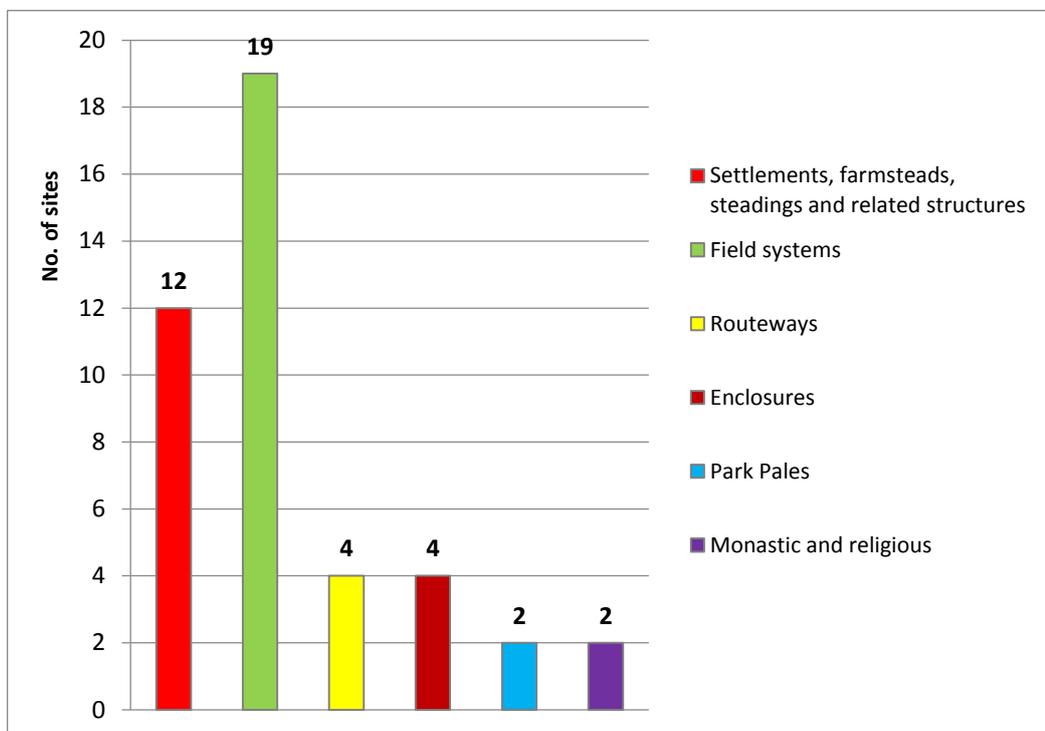


Table 8: Medieval sites

focus of trackways, of which there are a number. These earthworks may be related to the medieval settlement of Parmontley thought to lie some 300m further to the south (HER N6346). Alternatively, they may represent separate outlying farmsteads and their associated structures. One of these structures, measuring c.10 x 4m, is two-celled and appears to be set within a rectangular yard. 200m to the north-east, another sub-rectangular cluster of earthworks, covering an area of c.80m by 40m, seems to be the focus of two, or possibly three, trackways. Some of the features here are undoubtedly natural undulations and others are field banks. Additionally there are hints of some low earthworks which may be building platforms, although they do not form any recognisable pattern. Between this cluster of earthworks and Parmontley Hall is another series of earthworks which appear to consist of mixture of overlapping field banks and trackways and which may be part of a surviving medieval field system associated with Parmontley.

The remains of a third possible deserted medieval settlement are indicated by a series of earthworks in km square NY8056, between Hollybush and the Methodist chapel to the north (80561). If that is indeed what they are then they may represent the medieval settlement of Keenley, recorded as a hamlet in 1536 (HER N7295). To the east a number of small paddock-like enclosures and banks are scattered over an irregular-shaped area bounded by ridged cultivation, with a possible hollow way to the west. A fourth possible deserted medieval settlement may be evidenced by a series of rectangular-shaped earthworks in km square NY7758, lying immediately to the east of a minor road at Town Green, north of Whitfield (77587). Here at least three platforms are evident as well as possible yards. These earthworks may correspond to the site of the medieval village of Whitfield, first recorded in the 12th century (HER N6342 and N6351). Further earthworks can be identified on lidar in the fields to the south of Church Burn nearby.

In addition to these possible village sites, there are some other earthworks which might indicate the sites of individual farmsteads or steadings. For example, in km square NY8552, at Hay Rake, there is a complex of earthworks (85527) which suggest a multi-period farmstead site, possibly with its origins in the medieval period. In the fields to the north and south of Hay Rake farmhouse, there is a complicated, overlapping series of earthworks, some of which may be associated with the late 16th or early 17th century bastle there (HER N7527). A large, embanked sub-rectangular enclosure, measuring c.85 by 55m, which straddles two fields to the north and is cut across by a field wall, is probably an earlier field. On the north side it is bounded by a stream. Within this putative field, and possibly associated with it is a small, sub-rectangular earthwork structure, measuring c.8m by 3m, may be the remains of a single building. Between the southern boundary of this enclosure or field and Hay Rake are further small enclosures or paddocks, a lane and a possible building. Another possible paddock lies to the north-east. In the fields south of Hay Rake there are still more earthwork boundaries which are related to fields dating earlier than the period of parliamentary enclosure. The easternmost of these earthwork boundaries, which runs for over half a kilometre, from a stream gully in the south to another stream gully near Newfold House in the north, may be the head dyke of the field system around Hay Rake. It is possible that some elements of this earlier field system, and the buildings or structures tentatively identified with them, may predate the bastle at Hay Rake and be medieval in date, although some are clearly post-medieval and more likely to be associated with the bastle. While there is a suggestion of ridge and furrow ploughing in the southern part of this area, the ploughing is probably connected with agricultural improvement undertaken after parliamentary enclosure in the later 18th or early 19th centuries.

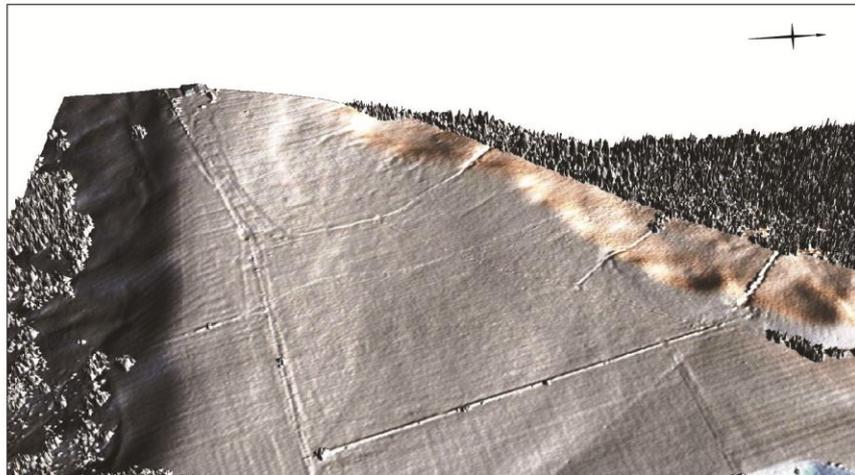
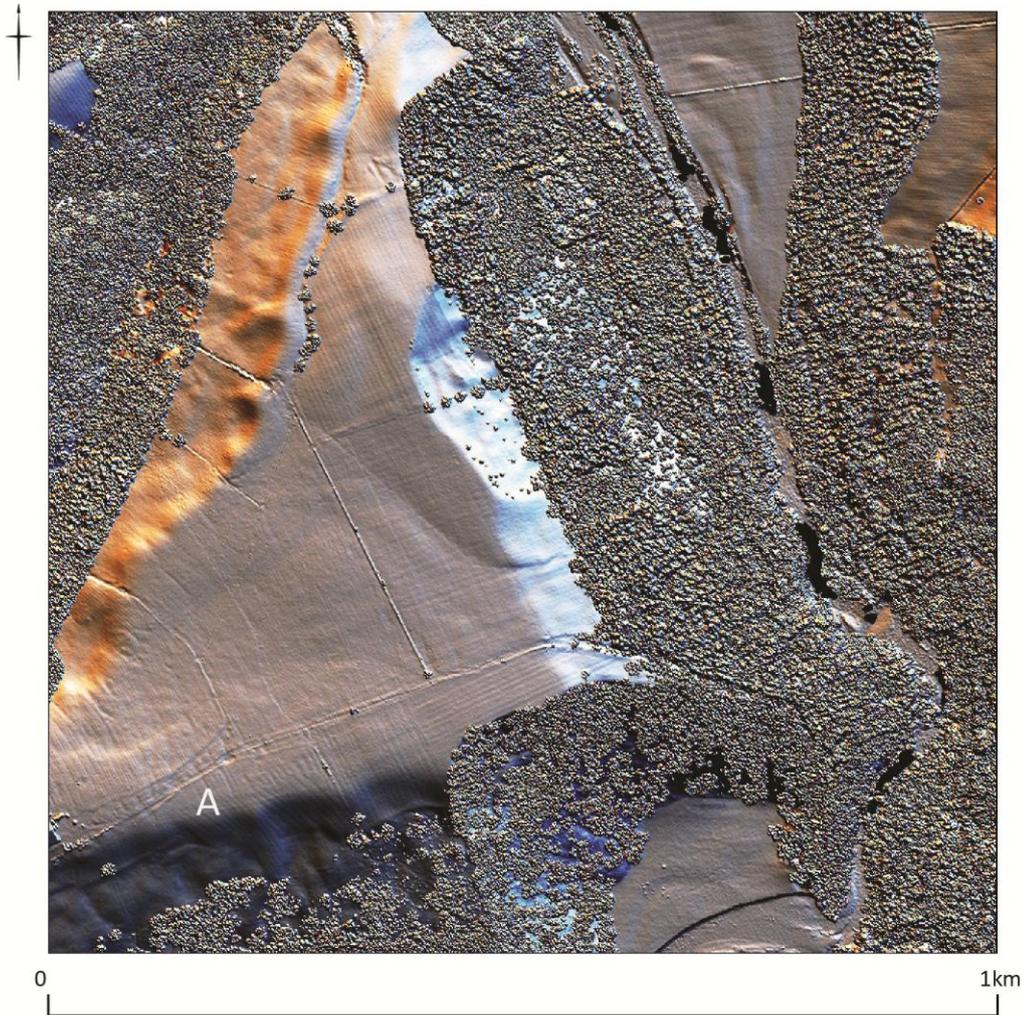


Figure 15: Possible site of the deserted medieval settlement at Kingswood (km square NY7961). The earthworks (A) may indicate the site of toft-like features but they might also be an amalgam of overlapping field boundaries and plough patterns and cannot be fully understood from analysis of lidar alone. Even using 3D and vertical exaggeration they are still difficult to interpret confidently. Top lidar image: 16 direction hillshade. Bottom lidar image: view from east derived from 3D model (x3 vertical exaggeration).

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

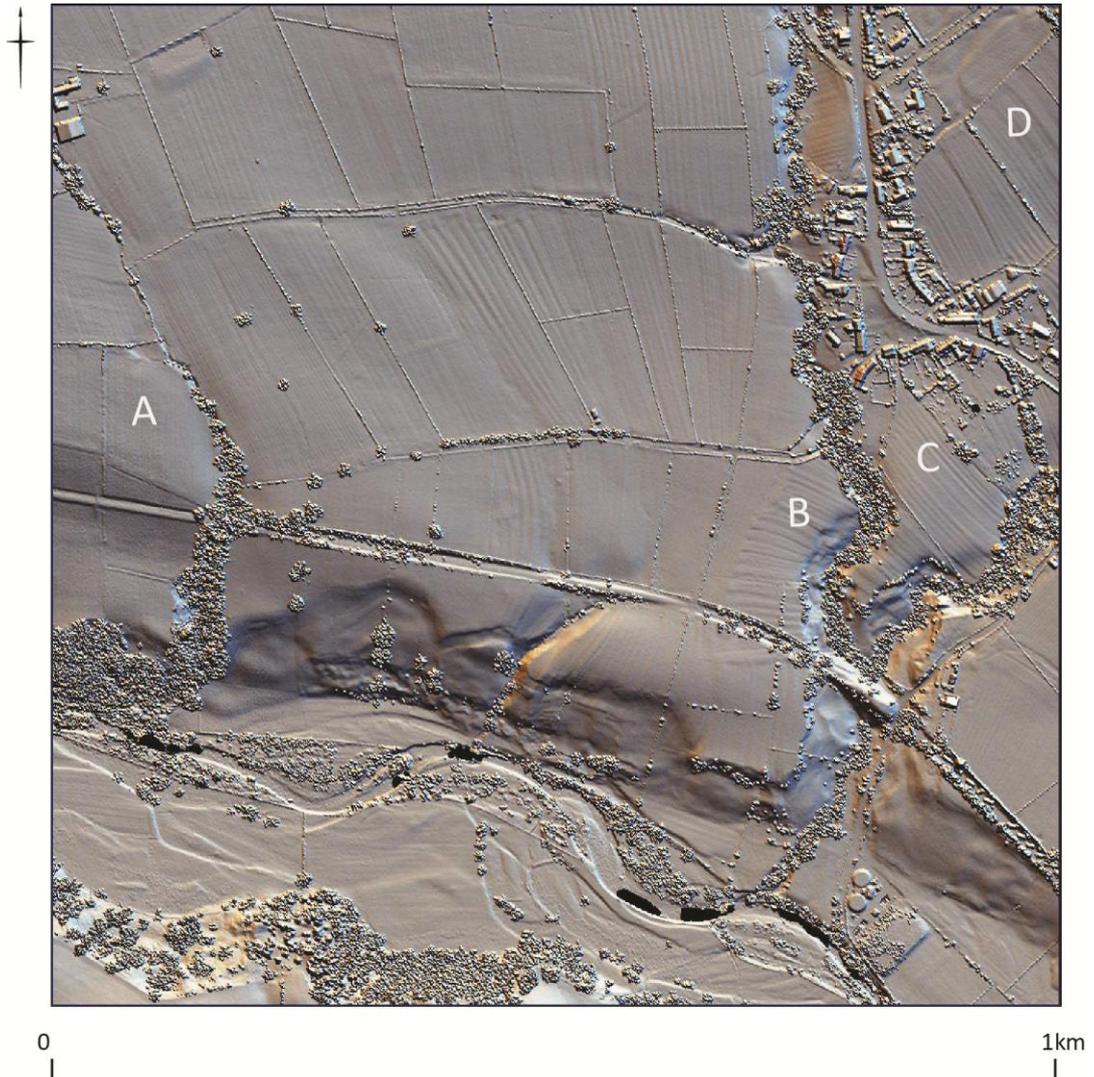


Figure 16: Medieval and later field systems near Catton (km square NY8257). The complex, multi-directional ridged cultivation illustrates how three different methods of lidar data processing can affect the visibility of features, and thus interpretation. Compare areas (A-D) on Figures 16-18 to see how features appear (or are not evident) depending on the processing method chosen. This demonstrates the value of using more than one method depending on the complexity of the landscape and/or the scope of a project. Lidar image: 16 direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

5.2.2 Field systems

As noted above, cultivation remains, particularly ridge and furrow and other types of post-medieval ridged cultivation, were not recorded as monuments. However, there were ten areas where it was considered that the HER would be enhanced by including specific examples of medieval field systems either because they were especially good examples or because they helped to contextualise other recorded sites. An example of a well-preserved landscape of ridge and furrow ploughing can be seen west of Catton, in East Allendale, in km square NY8257 (see Figures 16-18).

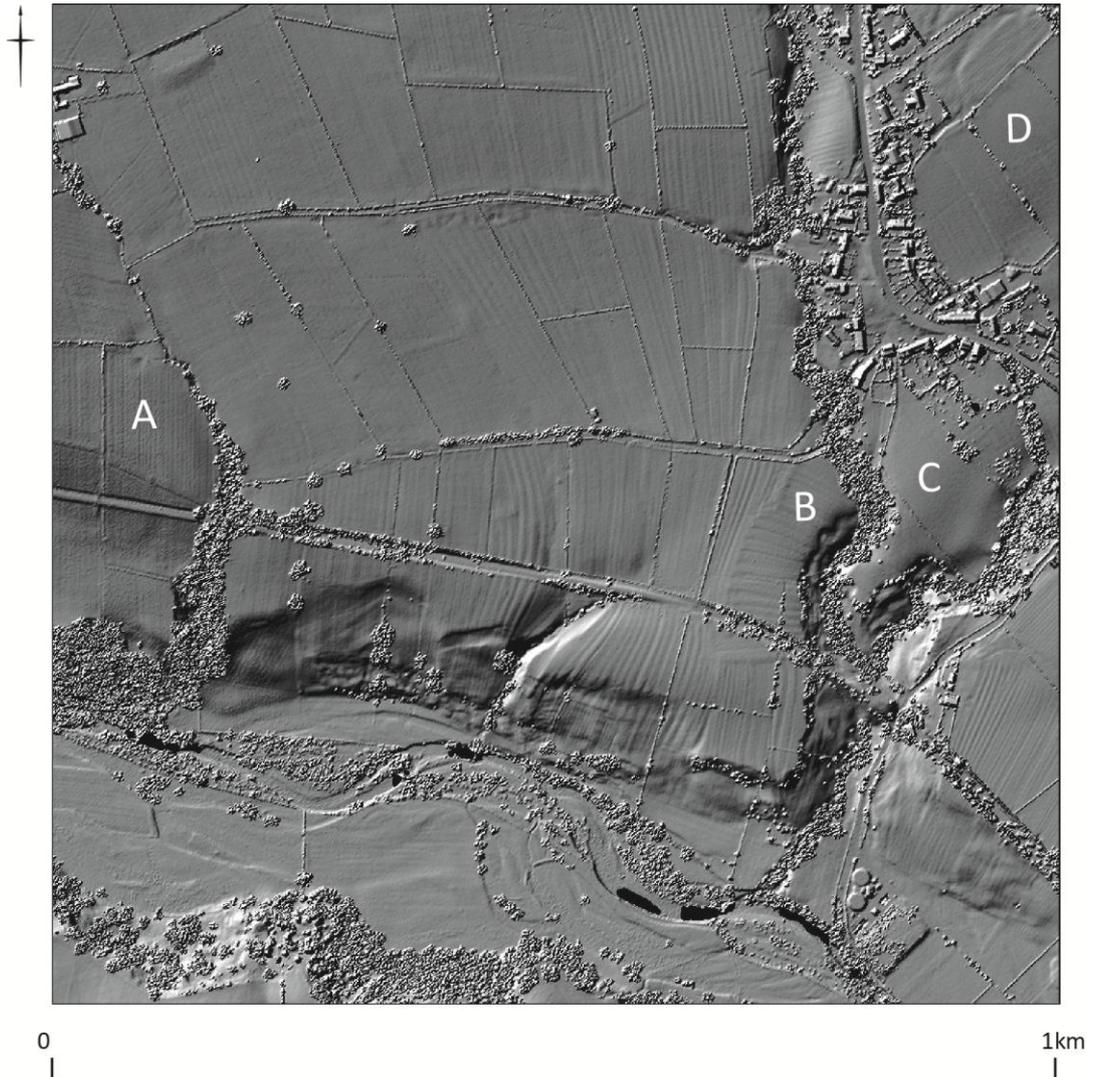


Figure 17: Medieval and later field systems near Catton (km square NY8257). Lidar image: single hillshade direction from the north west.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Here, broad, curving ridges, which clearly pre-date the regular fields of 18th/19th century parliamentary enclosure, seem likely to be medieval in origin (82576). Although most of the medieval field systems that have been recorded are in the form of curving broad ridge and furrow, there are also good examples of cultivation terraces, as for instance the contour terraces at Cupola Banks, in km square NY8059, at the confluence of the Rivers West and East Allen (805916), although it is unclear whether all these are medieval in origin (see below).

Nine linear earthworks formed by banks and ditches were noted during the project and interpreted as head dykes. In the AVH database all head dykes have been recorded as 'Boundary Bank' in line with NMR Thesaurus guidelines. These generally followed the contour lines, with the ditch on the upslope side. Head dykes are commonly occurring features in upland areas and define the boundary between in-bye land, used either for a hay crop, occasional arable cultivation or good quality grazing, and the open fells and moorland beyond which are used for common grazing in summer. They are an

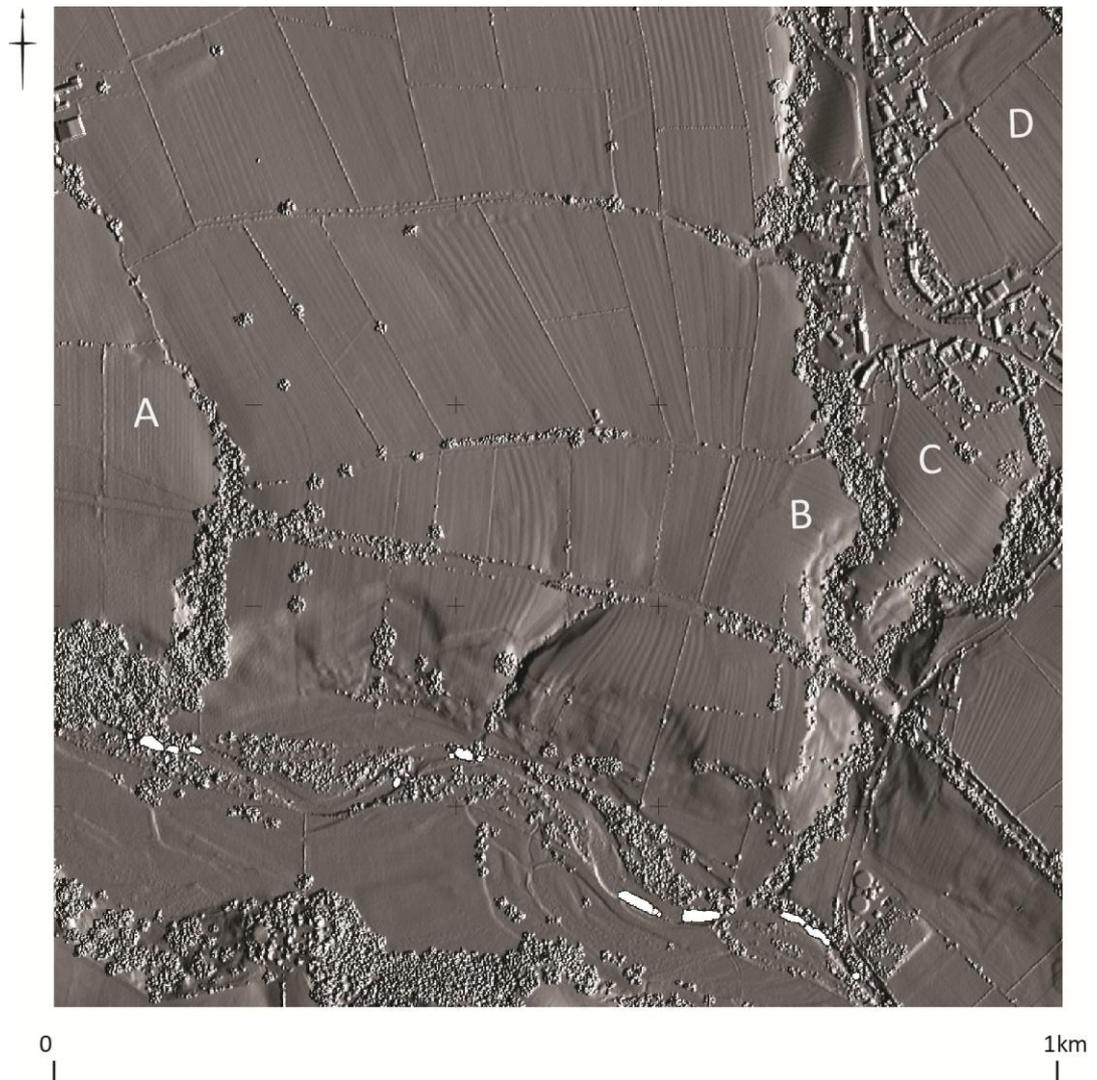


Figure 18: Medieval and later field systems near Catton (km square NY8257). Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

important element of upland agriculture and often have their origins in the medieval period (Winchester 2000, 52-53). In the post-medieval period they often continued to have legal status in civil law as is illustrated by the Paine Roll for Alston Moor in 1597 (*ibid* 160-162, 164). In the AVH project area head dykes seem to have been especially vulnerable to agricultural land improvement, particularly if they happen to be on land taken in and enclosed by parliamentary enclosure. Whole sections may have been levelled by ploughing leaving only disjointed sections, as was the case with most of the examples recorded. In these circumstances their date and original extent may be difficult to determine from the surviving fragments (*see* Figures 19, 23 and 24). Occasionally there are suggestions that head dykes have migrated up slopes onto higher ground, most probably reflecting the taking in of additional land at the fringes of the moorlands in the post-medieval period. In some cases, streams and valleys were recruited into a head dyke and tenement boundary system, so avoiding the necessity of constructing a bank and ditch, as they appear to do in km square NY8347 (83477). It has been suggested that some of the head dykes in the nearby South Tyne valley may have prehistoric origins (Historic England Miner-Farmer database; Oswald and Oakey 2011,

21), an assertion based on the observed stratigraphic relationship between a head dyke and a prehistoric site at Corby Gates, where the head dyke occupies the primary position (Oswald 2010; Historic England UID 153712). Unfortunately no such conjunction of earthworks was evident to suggest that a similar scenario was being re-enacted the AVH project area.

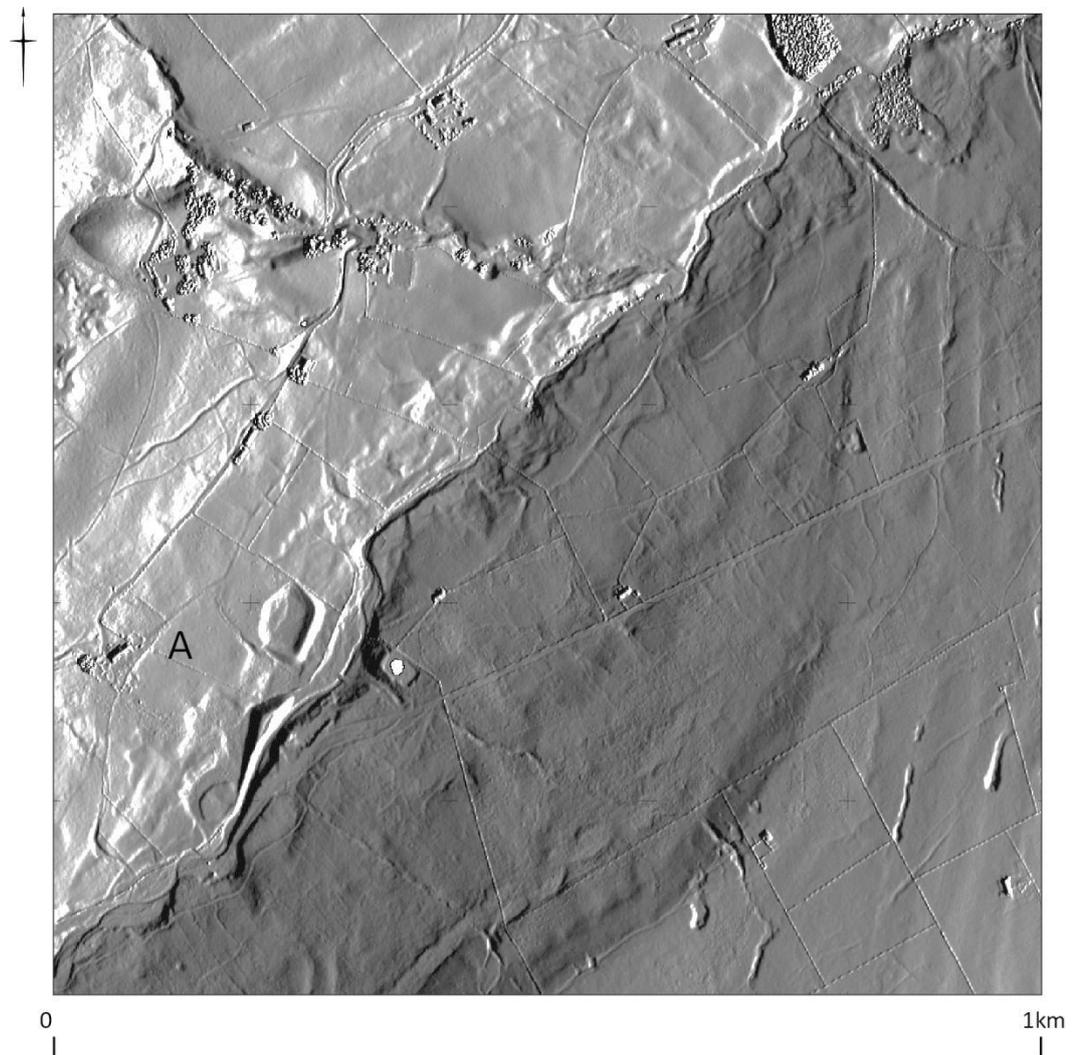


Figure 19: Head dyke (A) to the north of Swinhope Burn (km square NY8347). This can be traced intermittently through this km and beyond, and appears to have been subsumed into later fields. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

5.2.3 Routeways

Only those hollow ways were recorded which displayed significant braiding or other indication of long term use or which functioned as primary routes across the landscape. One such starts in km square NY8553 (855314), close to Sinderhope Gate in East Allendale, and runs north-east across Hexhamshire Common towards Burnt Ridge, above the Rowley Burn in km square NY8955, a distance of c.5km. Along the way, there is evidence of multiple braids suggesting longevity of use. One solitary stone, possibly a boundary marker, has been previously found along its length (HER N7533).

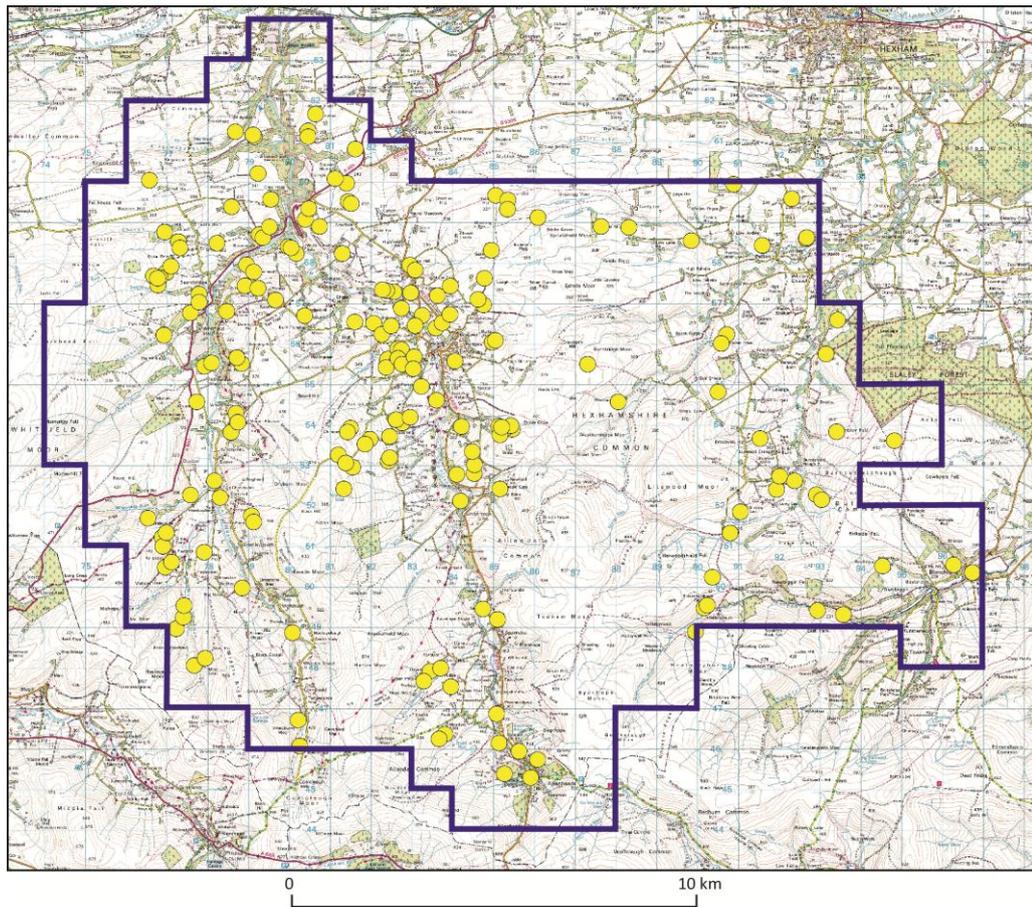


Figure 20: Sites where the interpretation would benefit from field inspection

OS map: © Crown copyright. All rights reserved Durham County Council. LA100049055. 2016

5.2.4 Enclosures

Other sites which may be elements of the medieval landscape are evidenced by a small number of enclosures whose form and function are difficult to determine. One enclosure in km square NY8456 may have had an industrial function, although this can be no more than a highly speculative suggestion (845643). It comprises two raised, rectilinear mounds within a rectangular enclosure, defined on three sides by low earthwork banks, and by a lane on the remaining side, and is partly overlain by a later wall. As this wall is shown on the OS First Edition 6-inch scale map, the enclosure must be earlier than 1856/65. The enclosure is also respected by ridge and furrow suggesting the possibility of a medieval date. The mounds are relatively flat-topped but do not appear to represent building platforms and the possibility that this complex may have some industrial or agricultural function cannot be discounted.

5.2.5 Park Pales

Long, curving boundaries which are often typical indicators of medieval park pales were identified at two locations, one near High Broadwood Hall, in km square NY8255, west of Allendale Town, and the other in NY9259, near Dotland. The first, immediately west of High Broadwood Hall, is a significant curving boundary feature (82558), marked for much of its course by a bank and ditch. Enclosed fields respect it to the north and south-

west, although some other boundaries, which overlie it, were clearly added between the dates of the OS First and Second Edition 6-inch scale mapping, i.e. between 1856/65 and 1919/26. Its south-western terminal seems to be the Wager House Burn, though its northern end is less clear and was not traced north of the road leading westwards from Thornley Gate. As part of this boundary is depicted on the OS First Edition 6-inch scale map, the bank and ditch was most probably surmounted by a wall, fence or hedge at that date. Taken all in all, the boundary demarcates a large block of land, with the River East Allen on the east side, and its size suggests something like a medieval park. More research would have to be undertaken to check historical sources but this feature has the hallmarks of a major land unit or ownership boundary. The placename 'Parkside', located to the south of the Wager House Burn, may also be a significant clue.

The second possible park pale, at Dotland (92592), surrounds the present Dotland Park farmhouse, which contains medieval architectural features. It is understood to have been a hunting lodge of the Priors of Hexham and a park may have been created when licence was given in 1355 to enclose a wood with a high wall (HER N8743). A strong curving boundary, defining an area measuring approximately 1km north to south by 1km east to west, can be detected on OS historical and modern maps, extending to the north, west and possibly to the east of Dotland Park. Unfortunately most of this boundary lies outside the AVH project area, but it may well be the line of a park pale marking the boundary of the Prior's park. To the south-west, and still within the project area, an earthwork bank, visible on lidar, continues the line and is traceable for a distance of c.160m before it turns eastward and merges with the curving line of the modern road as far as the north-west corner of km square NY9259. 'Park Wood' was shown close to the north side of the putative park on the OS First Edition map but not on later editions. Although the short section of the probable pale discovered during this project is only a small part of a much longer boundary which encircles the hunting lodge, it seems highly likely that it marks the boundary of a medieval deer park.

5.2.6 Monastic and religious sites

Features possibly associated with two medieval religious sites were identified. The first comprises a series of earthworks indicating what appears to be an arrangement of structures marking part of the south (c.82m long) and east (c.85m long) sides of a large, quadrangular area in the field to the east of the recorded site of Blanchland Abbey, a Premonstratensian abbey founded in 1165 (HER N8430). The eastern group of earthworks appear more building like, whilst the southern arm may define the limits of an enclosure (see Figure 21). Some of these earthworks have been overploughed by ridged cultivation which is probably of post-medieval date. Other slight earthworks on the same axial arrangement underlying ridged cultivation can be seen in the field to the east. Their overall arrangement and the regularity of their layout suggest that they are associated with Blanchland Abbey, the surviving ruins of which lie immediately to the west. The newly identified earthworks are outside the Scheduled Monument area. A second possible religious site is at Lowmill Haughs, in km square NY8356 where there is a roughly rectangular area of disturbance close to two, or possibly three, linear features, which may be slight ditches (835616). The evidence as it exists does not inspire great confidence as a coherent structure but it may be significant that the earthworks lie in an area named on maps as 'Chapel Plains', which is the traditional site of a burial ground and an entry in the 1680 parish register refers to burials at the 'old church' (HER N7289).

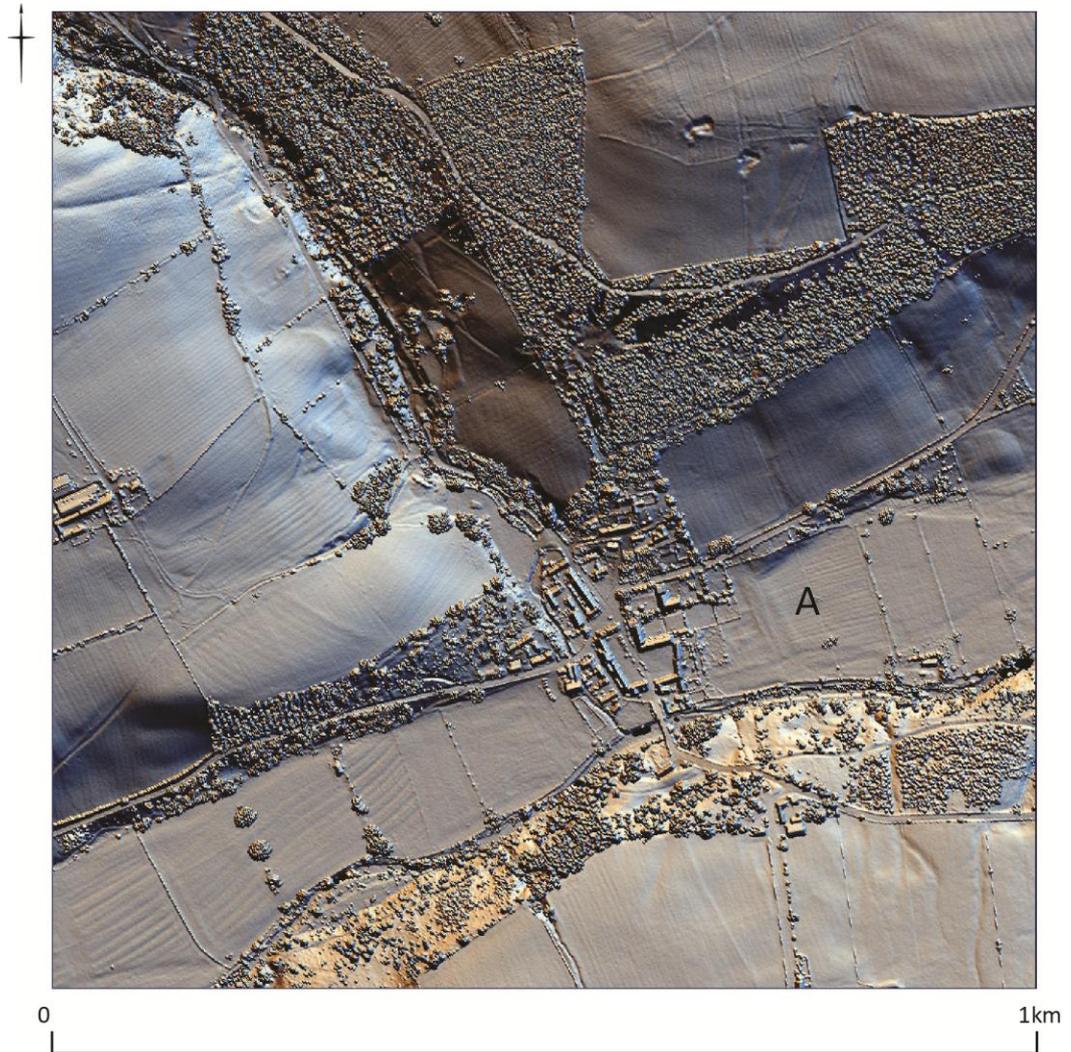


Figure 21: Blanchland Abbey (km square NY8356). Earthworks (A) to the east of the core of the abbey are likely to be associated structures within the precinct. Lidar image: 16 direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

5.3 Medieval/Post-Medieval

A total of 46 sites were assigned to a generalised medieval or post-medieval context where a more specific dating could not confidently be suggested and it is by no means impossible that some sites in this category may have a chronological span which extends across both periods.

5.3.1 Settlements, farmsteads, steadings and related structures

In all, fifteen sites fall within this category. Of these, seven sites seem likely to be farmsteads, defined by a variety of closely-grouped, mostly rectilinear, structures, yards, or compounds all closely associated with each other. For example, in km square NY9051, there is a complex of earthworks (90511), covering an area of c.115m by c.100m, indicative of a group of enclosures, field banks, paddocks and structures, collectively suggestive of a farmstead (see Figure 22). Both the earthworks and nearby ridged cultivation exhibit a degree of complexity suggestive of chronological depth, and may accordingly indicate more than a single period of activity. To the north and east,

numerous embanked fields clearly pre-date the period of parliamentary enclosure and seem likely to be associated with this complex.

Some sites were more easily interpreted on the lidar than others. In most instances individual elements could be distinguished, such as a likely domestic range, though in cases of greater complexity the component parts were less easy to disentangle. For example, in km square NY7959, there are earthworks of what appears to be a small farmstead (79598) on the edge of the steep escarpment. No distinct structures are evident but there is one possible platform on an east to west alignment. A curving bank to the north, which seems to be associated with the farmstead, overlies curving ridge and furrow cultivation which respects the northern limit of the site. In places the relationship between the bank and the ridge and furrow, as seen on the lidar, is ambiguous. The bank can be traced round in almost three quarters of a circle rising up onto a shelf, on which other related earthworks are evident. A number of field boundaries also focus on this complex, while several possible rectangular yards or structures are located on the escarpment edge nearby. At another site, located on a wooded terrace on the north side of Blaeberry Burn, in km square NY7756, there are indications of a rectangular structure (77565), possibly a steading, within an oval-shaped enclosure, the east side of which is formed by a stream gully. The structure measures c.15m by 5m, with indications of possible yards and ridged cultivation on the north side of the burn. This particular site is under trees and only evident on DSM lidar.

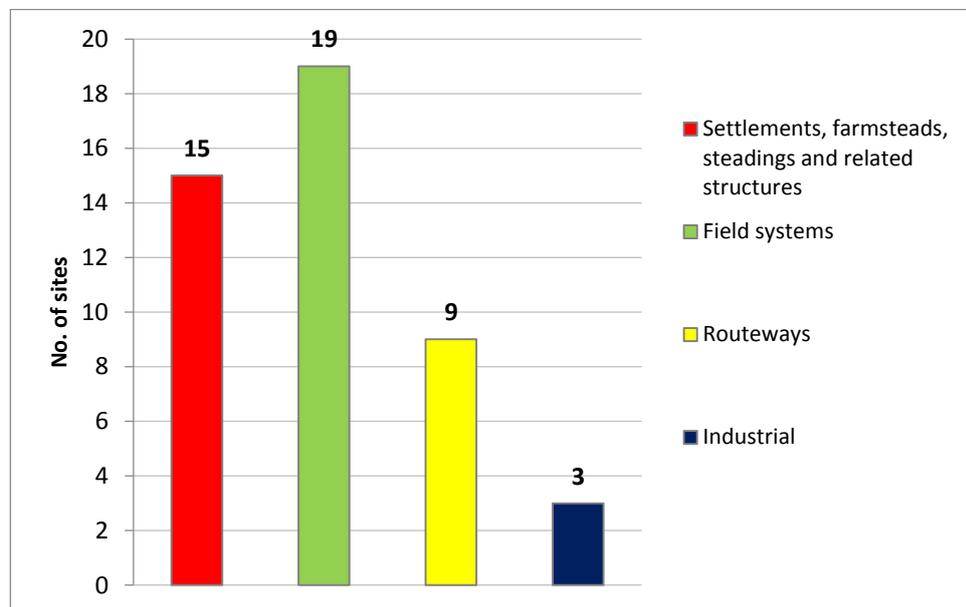


Table 9: Medieval/Post-Medieval sites

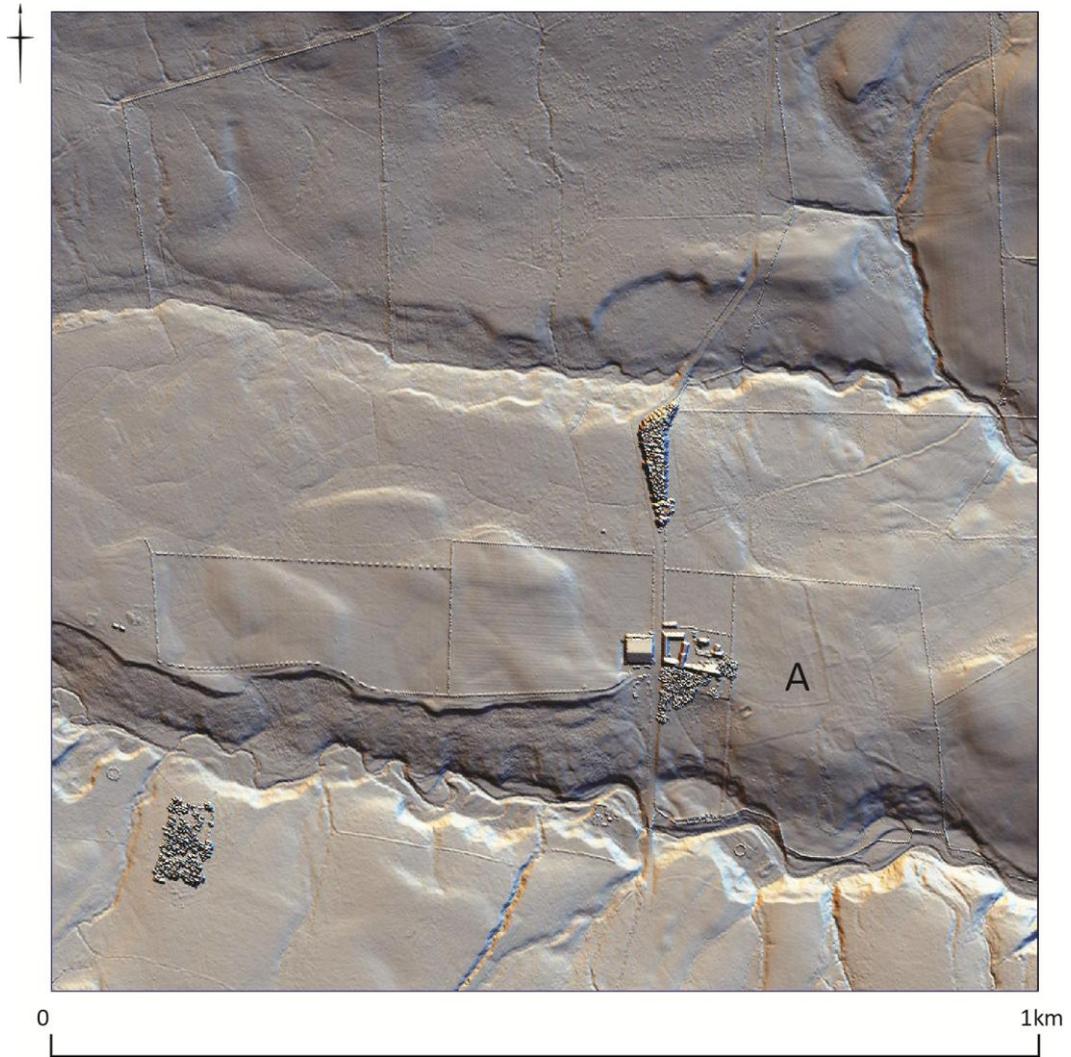


Figure 22: Earthworks (A) of more than one period of farmstead at Harwood Shield (km square NY9051). Lidar image: 16 direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

At some sites, only an isolated structure without associated yards, or other possibly contemporary features, could be identified. Other sites may be indicated by gaps or focal points within field systems where settlement sites or farmsteads might logically be thought to have been located, even though no obvious earthworks now exist to indicate the former existence of any structures. Thus, close to the modern Spital Shield farm, in km square NY8858, a piece of disturbed land (88584) lies on the line of an old trackway which runs east to west through the area, part of a pre-parliamentary enclosure field system indicated by ridged cultivation in the surrounding area. As the land in question has been affected by modern farming practices this may account for the lack of identifiable structures. On the other hand, in an enclosed field to the north and west a small, paddock-like feature is evident. There is a farm site at Hall Shield c.600m to the north and the name 'Spital Shield' suggests that it may have medieval origins (HER N22083) opening up the possibility that there may be other associated features in this area.

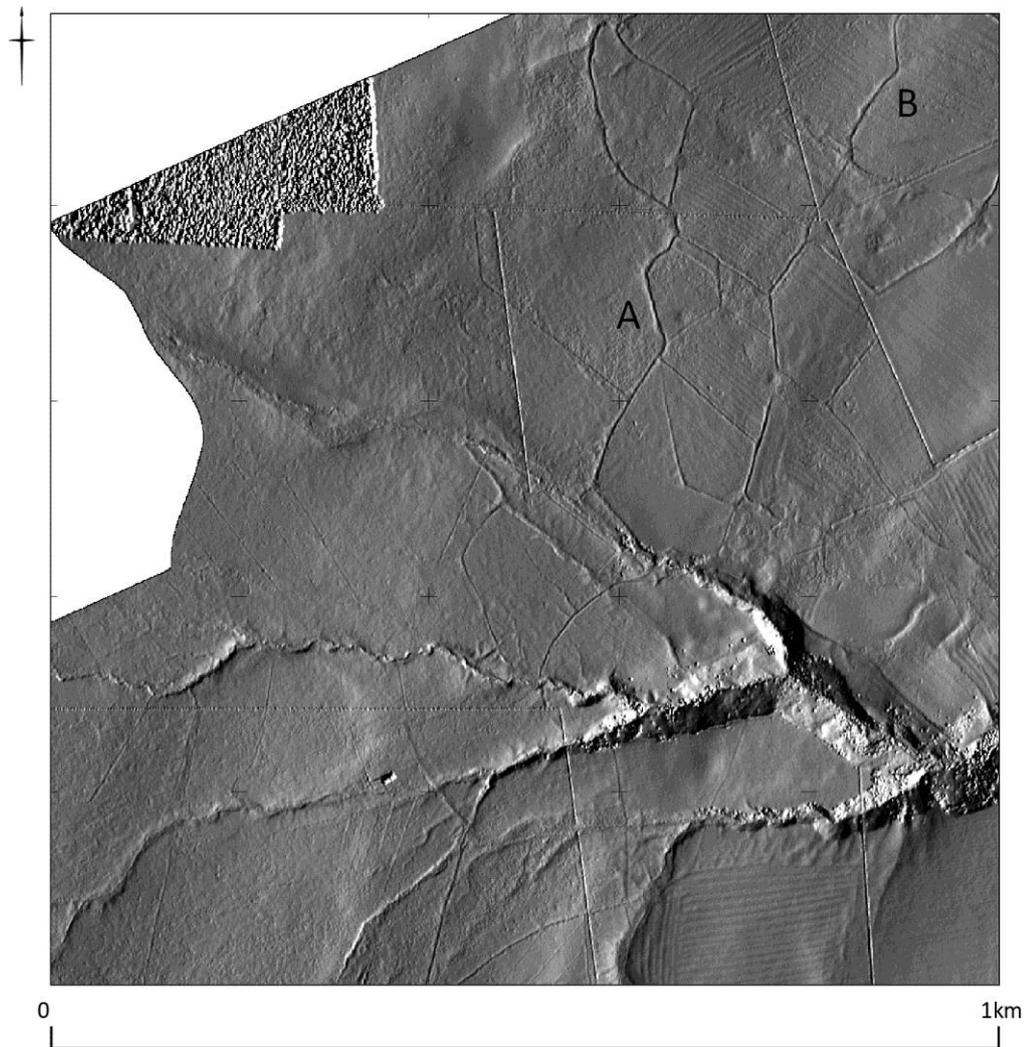


Figure 23: Field systems at Dewsgreen Burn (km square NY7657). Head dyke (A) separates moorland at the west from in-bye land to the east. Within this in-bye area can be seen a field system of conjoined embanked plots, many containing ridged cultivation. Another possible head dyke (B) cuts through what appears to be broad, curving medieval ridge and furrow. The field system and head dykes clearly pre-date the walled fields related to parliamentary enclosure and is likely to have evolved over a long period of time. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

5.3.2 Field systems

In twelve cases, field systems were included in the record because they were considered to be particularly good examples even though it was unclear whether they were likely to be medieval or post-medieval in date. One such example is in an area of extensive later improvement, west of Parmontley Hall, in km square NY7755, and close to the possible site of the medieval village of Parmontley (see above). The field system here comprises a series of irregular fields, possibly medieval ridge and furrow and later ridged cultivation (77557). There is also a series of interlinking hollow ways, one of which leads northwards across the valley of Carr's Burn to further fields on the north side of the valley. The area now containing earthworks extends over an area of c.400m square though other parts have clearly been lost to later improvement. There are also good examples of contour-following cultivation terraces on the east side of the River East Allen (805916), to the west of High Staward in km square NY8059, and there are others near Bearsbridge (77578) in km square NY7757.

Seven possible head dykes were recorded, of which three had evidence of a change in alignment, perhaps indicating some change of use over time or the expansion or even contraction of in-by-land and realignment of tenement boundaries. For example, in km square NY7657 (76571), a substantial bank, with a ditch on the west side, follows a sinuous course from north to south as far as the Dewsgreen Burn (see Figure 23). At some later date it appears to have been prolonged in a westerly direction toward Green Sike. On the east side of this boundary is a complex of irregular fields though there are none to the west. The bank and ditch referred to may be an extension to the west of another head dyke (76572) c.120m to the east.

5.3.3 Routeways

Nine routeways were recorded which might have origins in either the medieval or post-medieval periods. One example, in km square NY8953, appears as a hollow way running approximately south-west to north-east (89531). In this particular section it is heavily braided with a number of branches suggesting that it was formed over a lengthy period of time, although its origins are unclear. On OS maps it is named 'Broad Way' and it can be traced for a considerable distance across Hexhamshire Common, ultimately connecting East Allendale in the west with the valley of the Devil's Water in the east.

5.3.4 Industrial

In three places mining by means of shafts or pits was identified which could not confidently be placed in a post-medieval context, and which may possibly be earlier in date. Thus, to the west of Wide Eals, in km square NY8058, is a series of earthworks which appear to represent a string of closely-spaced, shallow shafts, perhaps for the extraction of lead ore (80583). It must be stressed however, that this interpretation is necessarily tentative as the lidar signature is not especially clear. Other shafts and related features are also evident to the east of this string. The group as a whole seems localised and the workings may never have been very extensive. A second group of similar features exists at Swin Hope, in km square NY8347, where numerous shallow shafts, some of which are possibly associated short leats, may again be for extraction of lead ore (834711). A third example, near Mount Pleasant, in km square NY7854, again consists of a group of small pits although in this instance it is unclear what material may have been sought for (78547). Another particularly interesting site occurs on Blanchland Moor (94532), in km square NY9453, and may indicate the site mineral extraction although its date is difficult to establish (see Section 5.5 and Figure 33).

5.4 Post-Medieval

As noted above, the North Pennines contains a wealth of mineral resources and is well known for its extractive industries. Therefore, it is not surprising that the largest number of sites recorded during the AVH project, 855 out of a total of 1,027 were attributed to the post-medieval period when these industries were operating at peak levels of production. Nor is it surprising that within this period the majority of those 855 sites (649) were of an industrial nature (see Table 10). The newly identified sites of this period have been broken down into four principal classes corresponding to those used for the earlier periods, viz. settlements, field systems, routeways, and industrial sites. However, because industrial sites are so numerous and are mostly related to the extractive industries, they have been sub-categorised in the following section according to the main minerals likely to have been worked.

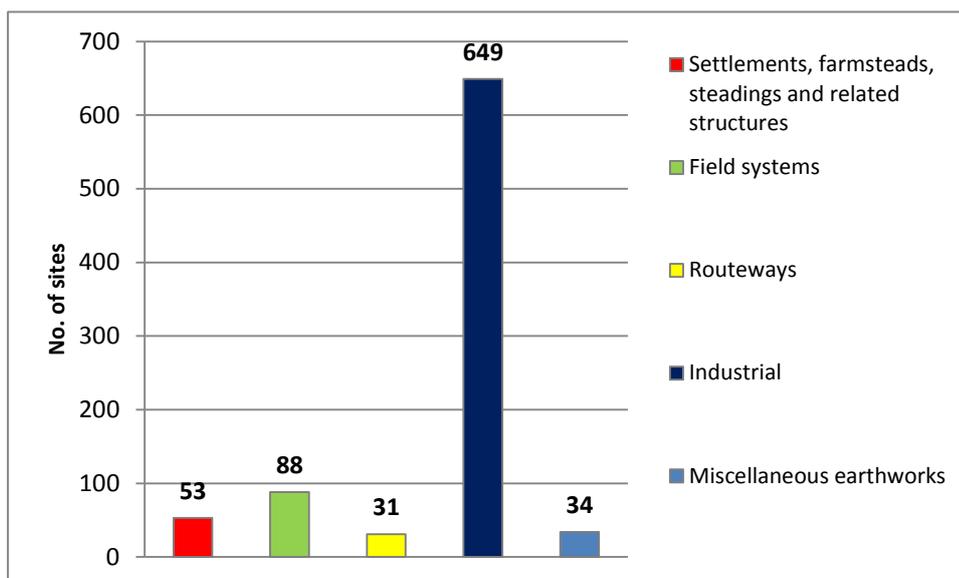


Table 10: Post-Medieval sites

5.4.1 Settlements, farmsteads, steadings and related structures

Some 53 sites have been identified which can be interpreted as elements of a dispersed pattern of settlement within the landscape, of which most are farmsteads or steadings. For many of these sites, the distinction between a farmstead and a steading is largely subjective, based on lidar evidence alone, but an attempt has been made on the basis of the extent and complexity of the earthworks. Three sites may be shielings, and used only in the summer. In a small number of other cases the evidence is somewhat ambiguous, and these hypothetical 'sites' may simply turn out to be fortuitous patterns visible on the lidar, such as one in km square NY8457 (84574) where it is unclear whether a small shieling or a vegetation pattern is evident. These sites are clearly ones where clarification by field inspection would be beneficial.

Fourteen earthwork sites possess features that were shown as extant structures on OS First Edition 6-inch scale maps, such as those in km square NY7962, close to the modern Briarwood Farm (796212). This was the site of 'Briarwood', a farmstead named on the First Edition map but apparently abandoned by the date of the Second Edition, when it was still shown but not named. The earthworks are those of a linear, sub-divided range of buildings attended by several enclosures or yards to which they are attached. This type of layout is a common feature on post-medieval sites identified in this AVH project, and to these may be added others which, though similar in form, are not shown on any OS maps and are therefore likely to have been abandoned by the mid-19th century, before the date of the First Edition 6-inch scale map. By contrast, eight sites in this category include the probable remains of rectangular buildings, some at least of which seem likely to have been occupied when the OS First Edition 6-inch scale maps were surveyed, as what are probably standing buildings are shown on the published maps. Five of these sites, all of which are likely to be either farmsteads or steadings, are given names on these early OS maps, including, for example, 'Hillside' in km square NY8548, to the north of Ellershope Bridge, in East Allendale, where what are now earthworks and ruined walls are depicted on the First Edition map as a cottage and garth (85482). The other three are all rectangular structures, but the function of the buildings is unclear though they may have been ruinous steadings or cottages when the OS First Edition 6-inch scale map was surveyed. Many steadings seem to be closely associated

with intakes of land and agglomerate field systems situated above or close to pre-existing head dykes. At Haggerstone Moss, in km square NY8553, what appears to be a two-celled rectangular building, measuring c.15m by 5m (85538), stood at the northern edge of one such field system; and on Harwoodshield Fell, in NY9050, a c.14m by 4m rectangular structure lies on the southern margin of a small embanked field system, defined by a series of irregular, curving boundaries, which is itself located within a larger field system made up of successive intakes (905012). A rectangular building foundation, measuring c.22m by 6m, north of Newfield, in NY8159, also appears to be a steading and, if so, is of unusual length compared with most examples seen elsewhere in the project area (81599). In plan it appears to have a bowed west end while the east end appears open although this may be the result of erosion by water from a neighbouring gully (see Figure 24). Intakes of land seen nearby very probably belong with the presumed steading. In numerous other cases, dispersed farmsteads and steadings of this kind, whether permanent or semi-permanent, can be associated with similar types of field systems which are not infrequently found in close proximity to them (see below).

5.4.2 Field systems

It was clear from the examination of existing entries in the HER, that upland agricultural activity in the post-medieval period is inadequately recorded compared with what can be seen on the lidar where many examples of field systems marked by banks and ditches can be made out, the great majority of which are demonstrably earlier than the period of parliamentary enclosure, and often quite extensive in area. Such field systems are most probably associated with the numerous farmsteads and steadings which were also newly identified in the AVH project. In some cases unenclosed areas of ridged cultivation were visible on the fringes of some of the embanked fields, while a 'core' intake, sometimes associated with a visible steading, appeared to represent the original focus of activity from which subsequent expansion had taken place (see below). As with the earlier field systems, it was decided only to create new records for good examples, in order to help contextualise their associated settlements.

Some 88 field systems and their related boundaries, including head dykes, have been newly identified in the AVH project area, all of which are likely to date somewhere between the end of the medieval period and the period of parliamentary enclosure in the late 18th and early 19th centuries. However, similarities with upland field systems recorded in Menstrie Glen in Scotland (RCAHMS 2001), might suggest that a 17th or early 18th century date is most likely (see below - Section 6.1). Many of these field systems cover extensive areas, and can be seen on in-bye land in current use and around the moorland fringes above head dykes. In the main they represent a series of intakes, marking the progressive spread of enclosure and improvement onto land that was formerly unenclosed and uncultivated. Many of these field systems seem originally to have been tightly grouped around a steading or farmstead, but, as enclosure continued, their original pattern has become progressively more obscure, leading to a complex palimpsest of overlapping or conjoined fields which has been further complicated by later phases of parliamentary enclosure and the amalgamation of fields into larger units by the selective removal of some of the earlier boundaries. The field systems referred to above are generally characterised by a mixture of irregular and gently curving boundaries, usually formed by banks and sometimes with attendant ditches, generally forming a pattern of enclosed, frequently conjoined and overlapping fields and plots, although rectilinear fields may also be evident (see below). In many cases, natural features such as stream valleys and run-off channels have been used to define intake boundaries.

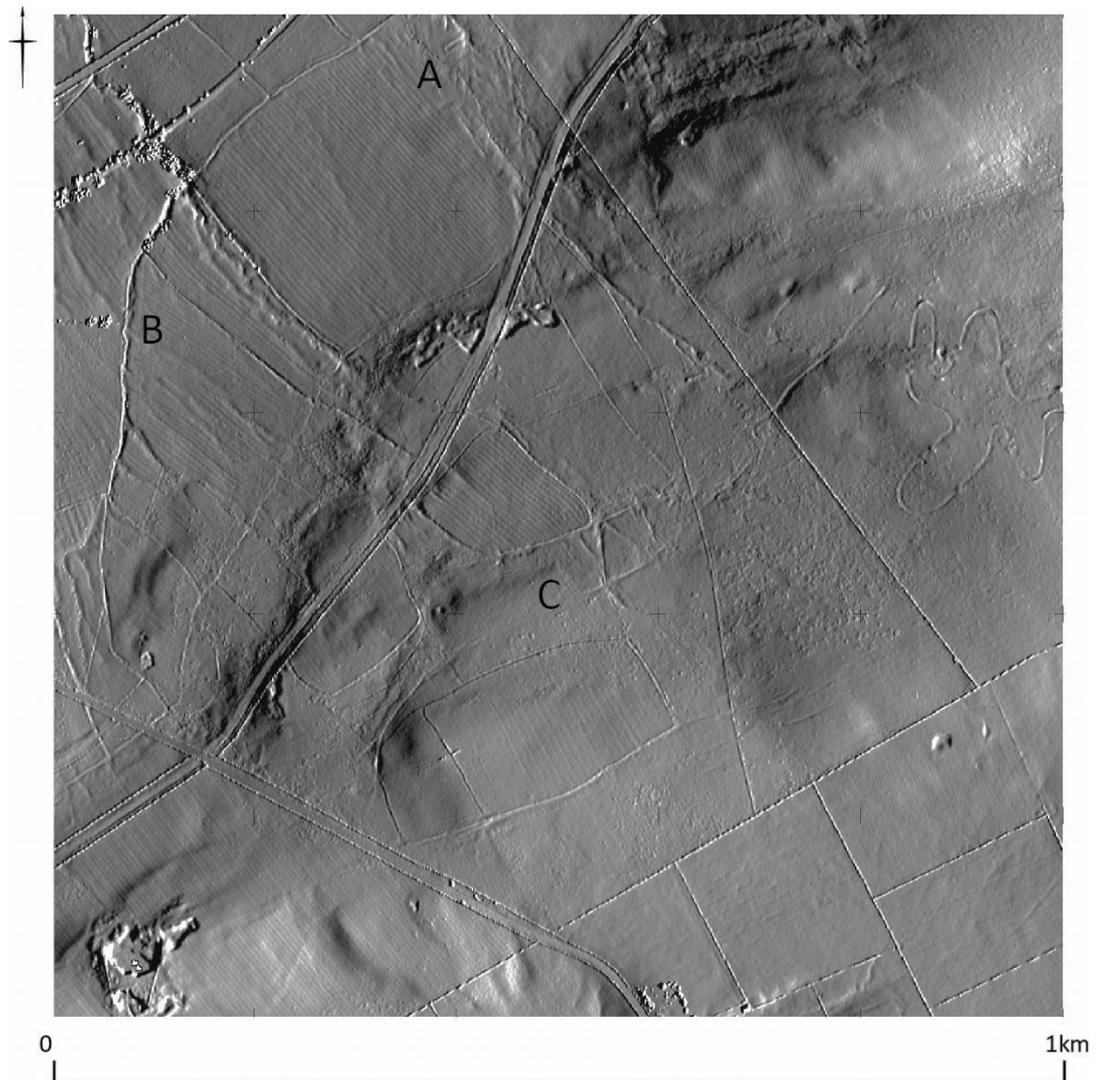


Figure 24: Post-medieval field system (C) at Newfield (km square NY8159). A rectangular structure (A) may be associated with elements of this field system. To the south west can be seen a former head dyke (B) and a series of intakes and detached plots which may indicate expansion above the head dyke in the post-medieval period into former moorland. The field system pre-dates the roads and walled fields related to parliamentary enclosure. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Cultivation ridges of varying width and degrees of straightness or curvature are often visible in the fields, which are frequently agglomerated into larger units, suggesting that the area under cultivation expanded over time. Field boundaries and cultivation ridges frequently overlap, suggesting either a change of use or functional reorganisation. Fields that are isolated or detached from the main farmholding may in some cases be paddocks or reserved for some different use. Many of the farmsteads and steading sites noted above are located within or in close proximity to these field systems, suggesting that they are indeed broadly contemporary. Where there is one larger field or enclosure with a steading within or close to it, it is tempting to suggest that this is the original or 'core' intake. Examples of such 'core' enclosures range in size from around 0.8ha to 12ha and display differing levels of evolution. One example which does not appear to have expanded to any great degree can be seen in km square NY8954 where Cocker Shield, a small steading shown on the OS First Edition 6-inch scale map and still in

occupation today (89542), lies within a small area of curvilinear, irregular plots, with a few outlying plots to the west (see Figure 25).

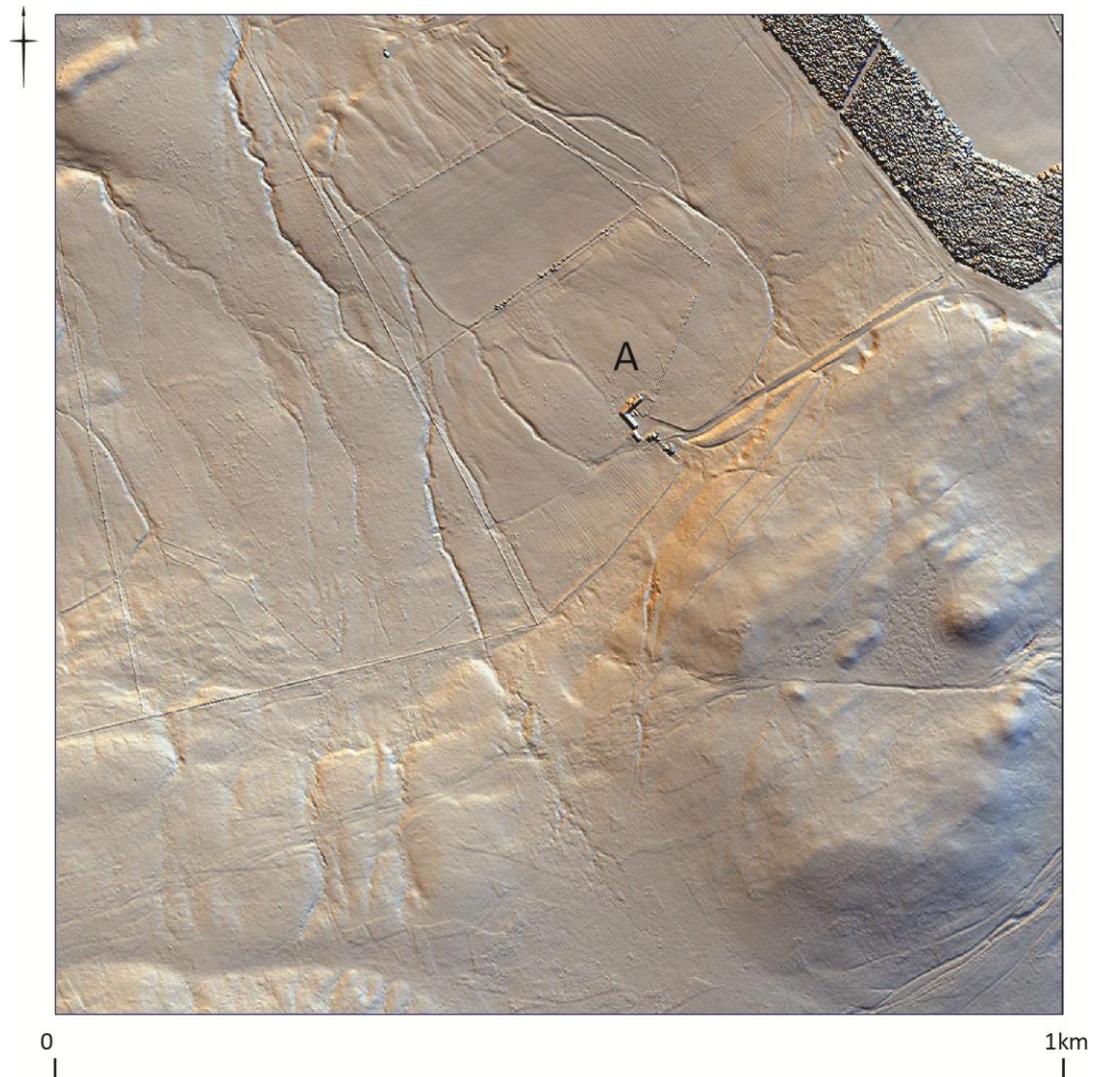


Figure 25: Intake at Cocker Shield (km square NY8954). Lack of a complex field system of irregular, conjoined plots as seen elsewhere (see Figures 23 and 24) suggests that this is a 'core' intake which has not evolved to any great degree. The boundary of one of five outlying plots can be seen at the west edge of this km square. The use of natural run-off channels as boundaries (as seen in this example) is a common feature of many intakes noted during this project. Lidar image: 16 direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

All the intakes pre-date the walled fields created by parliamentary enclosure, and some contain cultivation ridges, although these survive in different states of preservation due to later land use. The ridged cultivation itself is complex. In many cases the patterns of differently formed ridged cultivation overlap and post-date embanked plot boundaries and in other cases they are clearly contemporary with them. So, just as the plots have evolved and changed, so have the cultivation types. The ridges themselves display a variety of form. At least three types of ridge morphology can be identified on the lidar (in addition to the broad sinuous ridge and furrow typical of medieval landscapes) although the resolution of the lidar at 1m prohibits definition of fine detail and precise measurement which might help refine that classification. In general terms, these are

similar to the types of rig recorded by RCAHM in Menstrie Glen (RCAHM 2001, 52-54); wide low ridges defined by widely-spaced, sinuous grooves set between 5m and 8m apart; narrow low ridges defined by closely-spaced, sinuous grooves set about 3m apart; and straight narrow ridges defined by closely-spaced straight grooves set about 4m apart. Although the examples seen on lidar in the AVH area suggest that they are broadly similar to the Scottish categorisation, the scope of the AVH project precluded detailed assessment of these agricultural remains. Therefore, whether this comparison remains valid, or can be further refined, can only be really tested by field survey on selected examples.

A typical example of a field system with a mixture of conjoined and detached fields can be seen on high ground north-west of Catton Beacon, in km square NY8159. Here, is a well-preserved landscape of field boundaries (815910), some of which clearly pre-date later walled fields resulting from parliamentary enclosure (see Figure 24). These earlier fields are mostly defined by upstanding banks, and sometimes accompanied by slight ditches. Streams and run-off channels are also utilised as boundaries. The fields are very variable in size and shape and both curvilinear and rectilinear examples are present. In many cases fields can be seen to overlap with one another and complicated stratigraphic relationships with head dykes are also apparent. Most contain ridged cultivation exhibiting a variety of forms, even in adjacent fields. Unenclosed furlongs - bundles of ridges running roughly parallel with one another - are visible on the fringes of this system. Within the field system are two small rectangular structures which may be contemporary (81599, 815911). A smaller, but similarly-formed, system of conjoined fields and plots lying immediately above a head dyke occurs in km square NY8553, at Haggerstone Moss (85536). This intake seems to comprise one irregular 'core' field, measuring c.159m by 130m, with a small number of appended plots, although even within this small group some overlapping of plots is evident. A single, two-celled, rectangular structure is visible immediately to the north of the dominant plot. In some cases, parts of the boundaries of pre-existing field boundaries have been incorporated into later enclosures, although this generally occurs only on the fringes of in-by-land in the dales, or in close proximity to old established farms and former tenements. North of Hesleywell and east of Lilswood Moor, in NY9153, a curving boundary around Lilswood Farm encloses a roughly sub-circular area, measuring c.500m by 420m. Originally it may have defined one of the larger intakes, but has subsequently been absorbed into a mesh of later field boundaries (91532). Other examples where early intakes and their irregular boundaries can be seen to have been amalgamated into later field systems also occur in this area. At Huds Riding, north of Catton, in East Allendale, for example, several irregularly-shaped intakes have clearly been absorbed into what now looks like a regular pattern of fields resulting from parliamentary enclosure, in km square NY8258 (82585).

Occasionally, where rectangular or sub-rectangular enclosures or fields are detached from the main group, they may have had a different function or be different in date from the more irregular and organically formed clusters described above. While some examples of such fields contain plough ridges, such as one on Eshels Moor (km square NY8757) measuring c.275m by 70m, others do not, implying functional differences between them. In km square NY7856, near Bearsbridge (785616), an unusually long and narrow rectilinear embanked enclosure is worthy of note. Measuring c.620m by 190m, it clearly underlies and therefore pre-dates fields created by parliamentary enclosure, and partially overlies earlier plots and areas of ridged cultivation (see Figure 26). At the eastern end of Greenrigg Moor, in km square NY8859 (88591), is a series of rectilinear plots, all containing ridged cultivation, which form a ladder-like pattern extending over a distance of c.600m. Other detached fields may occur singly as rectilinear enclosures,

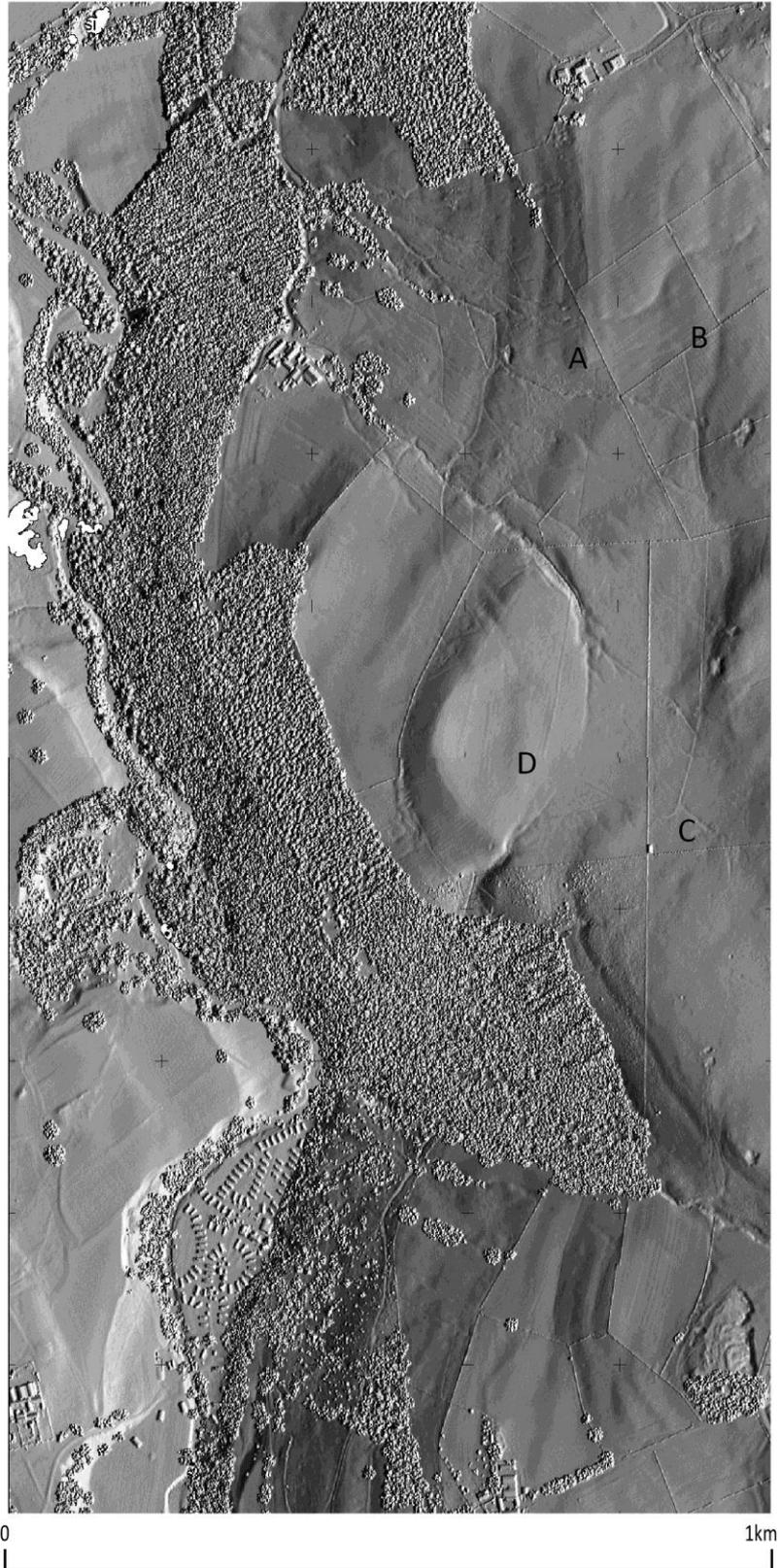


Figure 26: Large enclosure-like field on a terrace above the River East Allen near Bearsbridge (km squares NY7855 and 7856). Its four main corners are marked (A-D). Section A-B has been removed by later ploughing. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

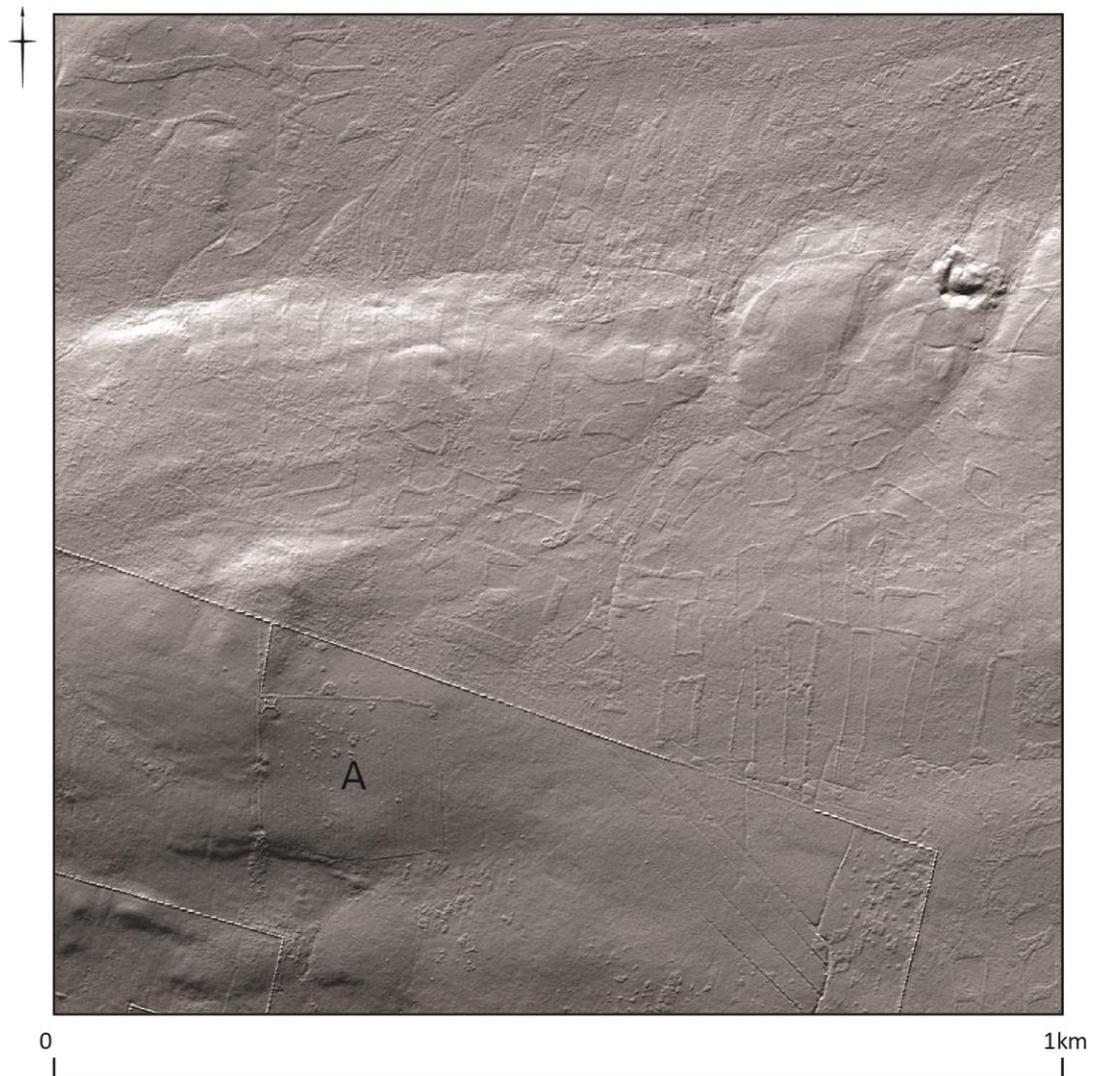


Figure 27: Example of a detached field (A) enclosing ridged cultivation at Black Allotment (km square NY8557). It has later been subsumed within the later walled fields of parliamentary enclosure. Other examples of detached fields and ridged cultivation without plot boundaries can be seen on Figure 24. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

as for example at Black Allotment (see Figure 27), in km square NY8557, north east of Allendale Town (85571), or as groups of more irregularly-shaped fields. Many of these field systems have clear associations with bastles of which there are numerous examples in this landscape and which are known to date to the late 16th and early 17th centuries (RCHME 1970, 61-73). As noted above, at some sites there is evidence for evolution of field systems around a single core area of settlement and some show continuity of settlement in the same location through to modern-day farms.

Other agricultural features were recorded in order to conform with established HER practice. For example fifteen sheepfolds were identified, eleven which are shown on OS First Edition 6-inch scale maps, representing a mixture of circular, rectangular, and three-armed radial plan types. Other features recorded included a washpool.

5.4.3 Routeways

A total of 31 routeways associated with the post-medieval landscape were identified. Most were hollow ways, and as outlined above, only those deemed to be especially significant were recorded. A number of these could be closely linked with industrial sites such as quarries, or lead mining. For example, a considerable number of separate hollow ways are grouped together on either side of a quarry at High Broadwood Hall Plantation, in km square NY8255. All share a common alignment and while they may be associated with the quarrying they may also be part of a more general series of routes running west from Allendale Town (82555). Other hollow ways similarly linked with extractive industries include the numerous examples in Slaley Forest, in km square NY9355, which may be associated with either lead mining or with stone quarrying at Apperley Quarry (93554). As these were obscured by a thick canopy of trees, their identification was only made possible by use of DTM lidar. Other, heavily-braided routes are probably parts of long-distance corridors, such as those across Harwoodshield Fell in km square NY9050 (905013) and across Rebel Hill in km square NY8459 (84591). Another heavily braided route which follows a north to south course across Blanchland Moor in NY9553 (95531) and NY9554 (955448) is named 'Carrier's Way' on the OS First Edition 6-inch scale map and may therefore have been utilised as a packhorse route linked to the lead smelting mills at Acton Mills, although may it have been in use longer than the active life of the mills.

An interesting linear earthwork, which appears to mark the course of a well-engineered but now disused road, can be seen west of Ninebanks, in West Allendale in km squares NY7752, NY7753 and NY7754 (77532). The earthwork is c.6 m wide and runs for a distance of c.2km, from a road junction near Ouston at its southern end (NY77517 52677) and from there northwards to the east of Parmontley Plantation (NY77270 54637) where it may have connected with an east to west route shown on OS First Edition 6-inch scale maps (see Figure 28). This feature, which has not been shown on any OS mapping, appears to pre-date the modern A686 road, which is itself shown on the OS First Edition map, and is thus likely to date earlier than the mid-19th century. In places it overlies curvilinear fields, which themselves, pre-date the fields of parliamentary enclosure, and in one place acts as a boundary for narrow, straight, ridged cultivation normally associated with parliamentary enclosure. North of Ouston, it also seems to cut through numerous hollow ways which lead to mines and quarries, suggesting that it is relatively late in date. The context of the earthwork is unclear but its straight course and consistent form suggests that this was deliberately engineered rather than having evolved over a period of time; its relationship with other earthworks suggests it may relate to an earlier phase of enclosure immediately preceding that represented by the walled fields, and may be late 18th or early 19th century in date.

5.4.4 Industrial

Most of the sites in this category relate to the extractive industries. Where possible, the material being extracted is inferred from the contextual setting of the production site and its proximity to other nearby sites of ostensibly similar character, whether they be lead mines, coal workings or limestone quarries, for example. In many cases it was not possible to determine the nature of the working from the lidar alone, because the physical form of the remains as displayed by shafts and/or waste mounds, can be much the same regardless of what natural resource has been mined, and the same qualification applies where new quarrying sites have been identified.

Lead mining

One limitation of the existing HER is that a single record often applies to a large lead mine or lead mining area with little indication of the location or nature of its component

parts, many of which can be significant landscape features in their own right and not infrequently situated at a distance from the main site. This became clear during the course of the AVH project, where numerous features were identified from the lidar for which no specific record existed. It was therefore decided to generate additional records for those newly identified elements of complex industrial landscapes, such as dams, shafts, and leats - most of which were the result of mining for lead and often distant from the main mining centres. In these cases, it was considered the inclusion of these previously unremarked features in the HER would enhance an understanding of the landscape. As a result of this approach, many newly-identified components of known sites have been added to the record in areas which were previous 'blank' on the HER.

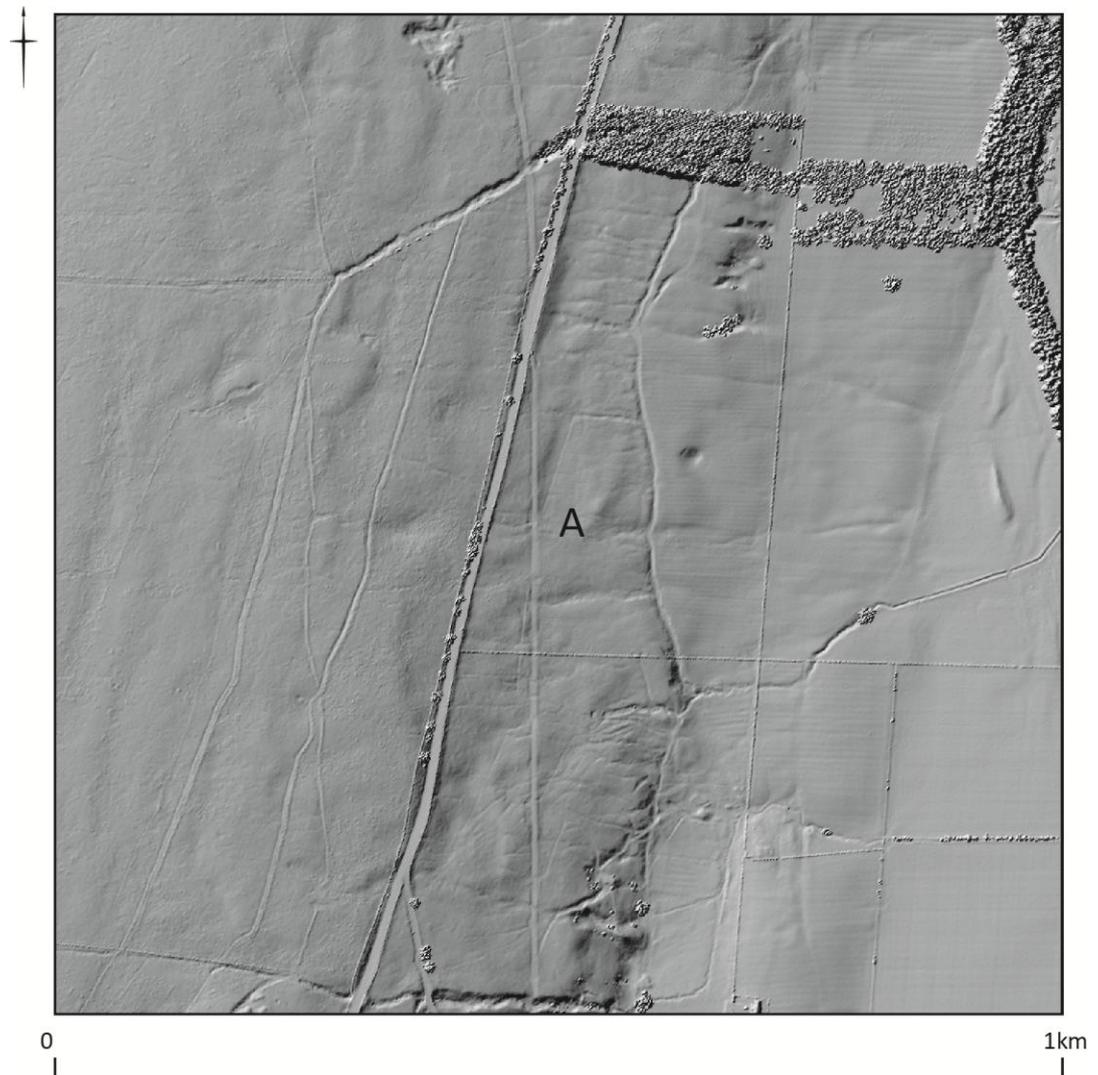


Figure 28: Possible road (A) running north-south for c.2km through km squares NY7752, NY7753 and NY7754. Lidar image: single direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Numerous lead mines were in still in existence at the time of the OS First Edition 6-inch scale mapping and elements of them appear on that and later editions. Others had been abandoned before publication of the OS First Edition maps, and some between the dates of later editions, as is apparent from the cartographers' use of the terms 'Old'

or 'Disused'. By contrast, where these qualifications are lacking it is reasonable to assume that the mines were still in operation when the relevant maps were surveyed. For example, along West Allendale, near Ninebanks, in km square NY7852, a series of low earthworks, visible on the lidar (785228), correspond to the site of Stag Rake, marked as 'Old Level' on the OS First Edition 6-inch scale map. Other earthworks nearby may also be associated with lead mining, including an adit with a substantial finger-like spoil mound to the west of it in km square NY7852 (785233), which is marked 'Entrance to Level', suggesting that it was still in use at the time. By contrast, another site (785216) in the same vicinity is not so marked and therefore had presumably already gone out of use.

Remains associated with lead mining are generally characterised by shafts, waste heaps, leats, reservoirs, dams, hushes, processing areas (dressing floors) and their other associated structures which are often spread over large areas. The majority of the main lead mining complexes within the AVH project area were already recorded in the HER and it was not the intention of the project to re-assess them. However, in addition to those sites which were already known, another 20 new records were created for sites where evidence was visible on the lidar to infer either lead mining or lead working. Of these 20 sites, thirteen are new discoveries, although it is acknowledged that some of these sites may simply be the above-ground evidence for underground workings related to already known mines. For example along the Reeding Burn in km square NY9450 (see Figure 29) is the site of Reedings Mine (HER N22154). Some of the workings are shown on OS First Edition 6-inch scale maps and later editions although it is clear when examining the lidar that the workings are far more extensive than recorded, including a possible trench and a series of scoops (945032), some of which may be shafts, which run in a south-west to north east direction over a distance of c.144m, and further east a similar linear series of workings can be traced over a distance of c.200m (945017). For seven of the new sites, OS First Edition 6-inch scale maps support their interpretation as lead mines, as for example in NY7751 (775118) where the map shows 'Old Lead Workings'. Some of the sites are relatively small-scale and are visible on lidar as shallow, quarry-like scoops, possibly indicative of surface extraction, which may well be earlier in date than the larger-scale activities noted elsewhere. One such site, in NY7751, provides a good morphological benchmark, as it too is recorded as 'Old Lead Workings' on the OS First Edition 6-inch scale map (775118). Three, possibly four examples are evident as linear troughs (open-cuts) or depressions indicative of surface workings. Early dates have been proposed for such features elsewhere (Barnatt and Penny 2004, 7; Jones, Walters and Frost 2004, 9-16) but whether this is the case here remains to be tested. Some examples of the mining remains pre-date boundaries associated with 18th or 19th century parliamentary enclosure, and some post-date ridged cultivation associated with earlier improvement, which as noted above is probably 16th/17th century in date. In general though, the date of the mining cannot be firmly established from lidar evidence alone especially where there is no obvious stratigraphic relationship with other dateable features.

Newly-identified means of access to underground lead workings via adits (alternatively termed levels) were identified at five locations, in km squares NY7856 (78562), NY8059 (805931), NY8256 (825621), NY8645 (86453), and NY9450 (945016). The characteristic earthwork signature for these adits is a finger-like hollow cut into a slope, usually accompanied by a linear mound of spoil below it. From lidar alone it can be difficult to determine whether the adit is for access or drainage although the examples identified are assumed to be related to access.

By far the most common features associated with lead mining were shafts or shaft mounds. 255 examples were recorded which is a significant increase in the numbers previously on record in the HER. Of this number, the great majority (236) are likely to be associated with lead mining and the remainder with coal mining. However, this figure does not accurately reflect the number of new shafts that were discovered. For, where they occur in closely-spaced groups or short linear strings, only one new record was created and thus the true number is actually far higher. Shafts are one of the easiest and most distinctive features to identify using lidar although their form can vary. Typically they show on the lidar as low, doughnut-shaped features comprising a slightly raised ring, or mound, (usually of spoil) around a central depression or crater-like feature, which marks the position of the infilled or collapsed shaft (see Figure 29).

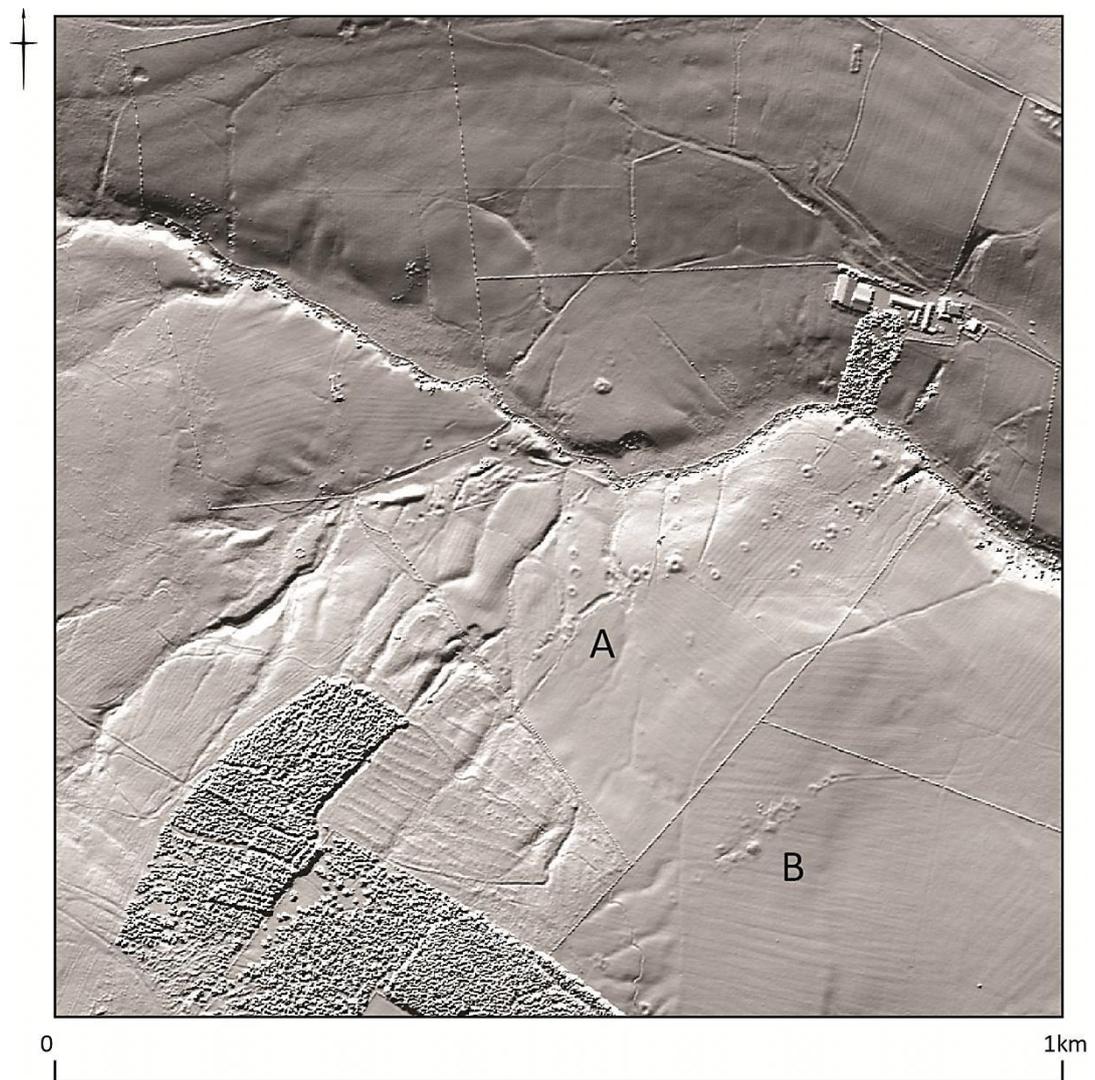


Figure 29: Area of lead mining earthworks at the former site of Reedings Mine, 2km west of Blanchland (km square NY9450). The workings at (A) and (B) as well as many other features, such as shafts, had not appeared on any OS maps. Most of the surface workings clearly post-date the ridged cultivation. Lidar image: 8 direction hillshade PCA

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Crater-like hollows with minimal amounts of spoil were frequently observed, and these may have been trial shafts to test the depth of overburden, or else unproductive shafts

where no mineral ore was discovered. In some cases an interpretation along these lines is supported by the fact that the shafts occurred either in isolation or were widely separated, as in km squares NY9554, NY8645, NY8653, and NY9453, or were not accompanied by further indications of mining activity. Some 40 examples of such possible trial shafts were identified. Other shafts may have large shaft mounds, indicating longevity of use and/or deep workings. Where veins had been followed, shafts are strung out in distinctive lines across the landscape, as for example in km square NY9550 and NY9551, where a line of thirteen, or possibly fourteen, shafts with spoil rings can be seen running in a south-west to north-east direction. These shafts may be associated with the lead mine at Shildon (95505), and although some, but not all, have appeared on historic OS maps, they have no HER entry (see Figure 31).

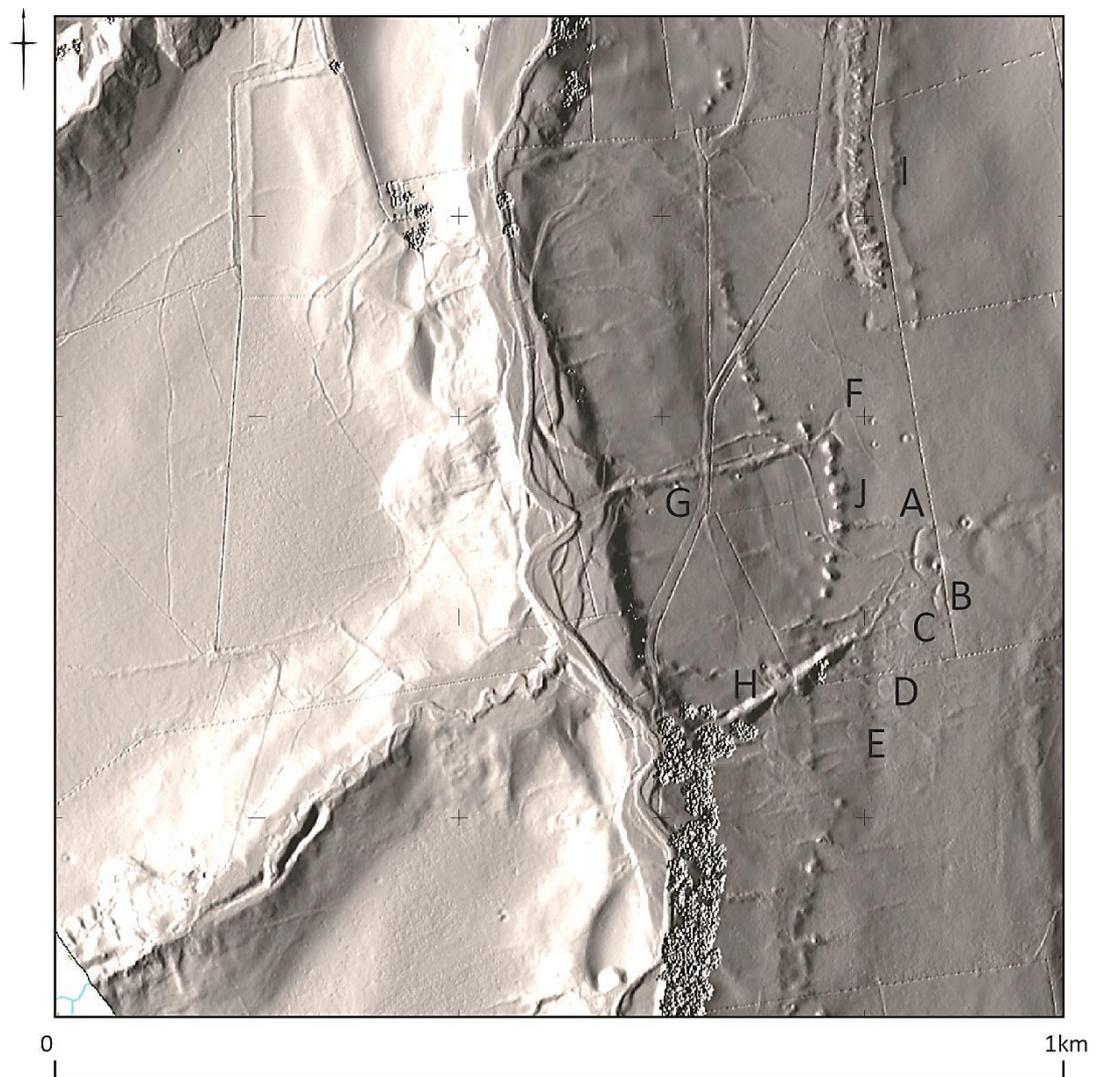


Figure 30: The landscape at Shield Crag (km square NY7749) illustrates the complexity of lead mining remains and problems of interpretation for volunteers. A single entry in the HER identifies lead workings on the east side of the valley and some mining features were recorded on early OS maps. However, examination of lidar revealed evidence for 6 dams (A-F), two hushes (G,H), coal workings (I) as well as many other unrecorded shafts and leats. The natural geology of numerous sink holes (J) adds to the difficulty of interpretation. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

Not all shafts are marked on the OS First Edition 6-inch scale map, but where they are identified as 'Old Shafts' it can be assumed that they were redundant by the mid-19th century. In some cases it is difficult to be sure what material was being extracted. Elsewhere shafts occur in closely-spaced groups. In km square NY8559, three loose clusters of pits or shafts run for c.500m across the landscape, with some 50 plus crater-like depressions visible on the lidar (85999). Little spoil is evident inferring that the shafts are shallow, but whether it was lead or coal that was being extracted cannot be determined from the lidar alone, especially as both occur in the same vicinity. Some of the newly-identified shafts may be air shafts rather than extractive shafts but again the lidar did not allow any firm distinctions to be made on this point.

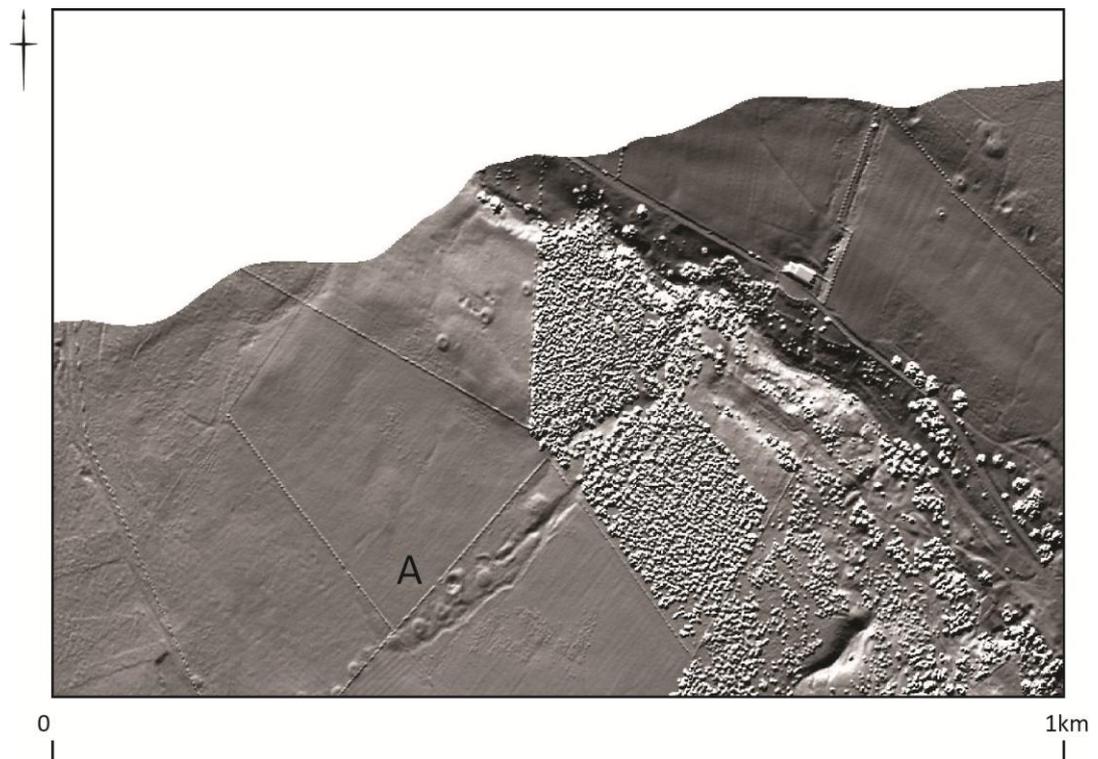


Figure 31: Line of shafts (A) near Shildon Mine (km square NY9551). The line extends to the south into NY9550 (see Figure 3). Lidar image: 8 direction hillshade PCA

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

The use and management of water are activities normally associated with lead mining and ore dressing. A form of mining using water to remove the surface overburden is known as hushing and is a feature recorded in many lead-mining landscapes. In the AVH project area four hushes which still survive were identified in km squares NY7749 (774935 and 774936), NY7751 (775117) and NY8347 (83475). All these could be correlated with OS First Edition 6-inch scale maps on which they are labelled as 'Old Hush' except for one to which a name (Hesleywell Hush) is given (see Figure 30). Water for hushes and other related lead mining activities, such as ore dressing, was routinely stored in ponds or small reservoirs supplied by streams or surface drainage and distributed from there by leats. In the AVH area, thirteen examples of (now dry) storage

ponds and reservoirs have been newly identified. Of these, eleven examples display the kidney-shaped earthwork dam that is the characteristic hallmark of such features. These dams range from c.18m to c.56m in length, with one example in km square NY7749 (774934) possibly measuring as much as 100m, although not as clearly defined as some of the others. Most dams have a levelled area or hollow behind them which indicates the former site of the pond. In km square NY7749 (see Figure 30), a series of dams set out along the contour served nearby hushes (77492) but only one is marked as 'Old Dam' on the OS First Edition 6-inch scale map (774937). Leats that were short, or which formed component parts of sites already recorded in the HER, were not separately recorded. On the other hand, new records were made for nine examples either because of their length, or because they stood out as distinctive and independent elements in the landscape. Such examples include the c.250m long leat which connects a dam to a hush, in km square NY7749 (774938); another, in NY8545 (854541), which can be traced for c.450m and is associated with lead workings; and the remains of an aqueduct which leads to the Allenheads Smelt Mill. The latter is shown on the OS First Edition 6-inch scale map, and survives as an earthwork in km square NY8546 where it can be followed for a distance of c.200m southwards from the main site (854622). In km square NY8545 (854542), an unusual form of leat is traceable for a distance of c.350m as a bank rather than a channel, which is what would normally be expected. It is marked as 'Covered Water Course' on the OS First Edition 6-inch scale map.

Coal mining

Some twenty new areas of coal workings were identified. For five of these, there was some indication on the OS First Edition 6-inch scale map that coal extraction had taken place, and in all these cases 'Old' was prefixed to the descriptive term viz. 'Old Coal Workings' in km squares NY77491 (77491), NY7853 (78532); 'Old Shaft (Coal)' in NY8160 (816029, 816030); and 'Old Level (Coal)' in NY8160 (816032). The use of the term 'Old' indicates that the workings were already abandoned when the OS surveys were undertaken. What was also clear was that the features identified on the map were no more than a sample of those that existed on the ground. In two other examples, both in km square NY8160 (816025, 816028), additional features were shown by hachures but not described.

In the main, the earthwork signatures on the lidar indicative of coal extraction fell into two distinct groups. The first group consists of eight examples, each comprising a belt or strip of adjacent, and sometimes overlapping, finger-like scoops cut into a shallow hillslope. The linear arrangement of these scoops results from following a coal seam along the contour, and each usually has a spoil heap at the open end. Some examples of this type of coal mining extend over quite large areas of ground, as for example on the slopes above the Wellhope Burn near West Allendale, in km square NY7749 (77491), where a north to south line of workings follow the contour for a distance of c.300m. In part they are shown as 'Old Coal Workings' on the OS First Edition 6-inch scale map (see Figure 30). In West Allendale, in km square NY7950, another long strip of scoops can be traced for a distance of c.350m (79501). These linear coal workings are very similar to others identified in the South Tyne valley, near Alston (Hunt 2010; Oakey, Radford and Knight 2012, 58-59). The second group comprises twelve examples, all consisting of groups of shallow pits, shafts and small spoil mounds, which are sometimes packed tightly together and at other times more widely dispersed. At Stobylee Craggs, in km square NY9052, there are three, distinct areas of working, each consisting of between ten and thirty widely-spaced pits or shallow shafts (90521, 90522, 90523). As noted above, nineteen of the new shafts that were identified elsewhere during this project are likely to be associated with coal extraction.

Quarrying

In all, 284 quarries were identified. This represents a significant increase in both the number and geographical distribution of this type of monument in the area covered by the AVH project. Whether large or small, quarries are generally easy to recognise using lidar as they tend to leave distinctive scars in the landscape; and even when covered by trees they can generally be identified on the DTM lidar. For example, in km square NY9449, seven examples were identified spaced out along the contour, though none have ever been mapped by the OS. Quarries identified by the AVH project range in form from small diggings to industrial-scale, 'open-cast' gouges in the landscape, and the majority probably date between the 17th and mid-20th centuries. In the main, limestone and sandstone appear to be the rocks being quarried. Although many examples were mapped by the OS on the First Edition 6-inch scale maps, it is clear that the majority have never been portrayed on published OS maps, probably because they were long redundant by the time of the earliest OS surveys and so were ignored by the surveyors, except where they left dramatic rock faces or scars behind. The smaller quarries and stone pits were most likely to be overlooked. For example, in km square NY7854 in West Allendale, there is a series of quarries, pits and hollow ways (78548) running along a west-facing escarpment for a distance of c.300m, between Mount Pleasant and New Houses, which do not appear on any OS map. As some elements of this quarrying clearly underlie walls that are shown on the OS First Edition 6-inch scale map, it would appear that quarrying had ceased by the time of the first OS survey. Many other examples of redundant quarries were mapped by the OS and are referred to as 'Old Quarry' on the First Edition of the 6-inch scale map. In some cases it is possible to determine when a particular quarry was abandoned by charting its disappearance on subsequent map editions.

Some quarries evidently supplied stone for nearby roads, walls or limekilns. For example, in km square NY8854 four quarry pits are strung out beside a road which maps indicate was constructed in the latter half of the 19th century (88543, 88544, 88545, 88546); and in km square NY7849 a number of small quarries situated close to a limekiln (HER N22713) must be earlier than the late-18th or early 19th century as they clearly pre-date a wall that was built during the era of parliamentary enclosure. Many quarries shown on the OS First Edition maps, but not recorded on the HER, were identified during this project, including a large quarry in NY7995 (795512). It is possible that some of the features identified as quarries may in reality be the remains of lead mining, as both types of activity frequently occur close together in limestone country and often in areas which overlap with each other.

Gravel and clay extraction sites are represented by a small number of generally shallow, scoop-like pits and hollows. Six examples of gravel pits have been identified, four of which were shown on the OS First Edition 6-inch scale maps. Additionally one clay pit, and another ten pit-like features are likely to be indicative of similar extractive activity.

Several other industrial structures were identified which were not represented in the HER. These include two lime kilns, one in km square NY7749 (774920) and the other in NY7852 (785226), both of which are shown on OS First Edition 6-inch scale maps; and earthworks corresponding to the remains of two mills - Ninebank Mill, in West Allendale, in km square NY7852 (78522); and Hackford Mill, in NY9254 (92545). Both these sites now exist only as earthworks, and both have identifiable mill races. The remains of Ninebank Mill are indicated by a distinctive range of linear earthworks traceable over a distance of c.30m. Hackford Mill is less clear but can nevertheless still be detected on DTM lidar under a cover of trees. The tail race of another mill, Blueback

Corn Mill, can also be followed on lidar for a distance of c.100m in km square NY7857 (78574).

5.4.5 Miscellaneous earthworks

Some 34 miscellaneous earthwork sites were recorded. For some, the monument type (i.e. mound) was readily identifiable, such as a series of such features in km square NY7748 (77483). These comprise two, possibly three mounds in a line over a distance of c.70m. On the lidar they do not look typically like shafts but may be related to mining activities which lie to the east. The mounds may have an alternate explanation such as old shooting butts. But for 23 other sites the monument type proved more difficult to interpret, and for these, although there was perhaps confidence of the likely period, function and form were unclear, and for some even whether they were genuine features. These were recorded simply as 'Earthworks' in the project database. Some of these sites proved difficult to interpret either because they were insufficiently clear on the lidar, or were very amorphous or indistinct features. Some were mixed in with the earthworks of other sites and natural topographic features and proved difficult to disentangle from the other components. For others, whilst there was more confidence in the existence of genuine historic features and possible period, assigning a specific monument type was difficult. For example, in km square NY8758 (87584) are a series of largely rectangular-shaped mounds and hollows. There is no obvious pattern to these but they may be indicative of some form of industrial or agricultural activity, possibly a small farmstead. There are some relict field boundaries and drains intermixed with them. The majority of sites in this category would clearly benefit from ground inspection, either to clarify interpretation or eliminate them from the record.

5.5 Sites not assigned to a specific period

Where there was a high level of uncertainty about what period a site should be assigned to, it was recorded as 'Unknown' in the project database. Some 56 sites fell within this category. As can be seen from Table 11, 28 sites displayed sufficient identifiable characteristics to indicate to what monument type it should be assigned, even if the period to which it might belong was ambiguous or difficult to assess. For the remaining 28 sites there was sufficient earthwork signature to create a record, even though the likely monument type or period was difficult to determine. Some of these sites proved difficult to interpret either because they were insufficiently clear on the lidar, had been ploughed down, masked by vegetation, or were very amorphous or indistinct. In other cases no obvious explanation could be offered to account for the visible earthworks, and some may turn out to be natural or an amalgam of non-archaeological features. All of these sites would clearly benefit from further inspection, to either clarify or eliminate them from the record (see Table 11 and Appendix 5).

Of the sites where a plausible monument type could be inferred, thirteen were enclosures of one sort or another. One of the most interesting and unusual of these is represented by a series of earthworks in NY9158, on the wooded slopes above the Ham Burn, near Dalton (91581). Here there is a well-defined rectilinear structure, measuring c.70m by 23m, with what appear to be sub-divisions at both the north and the south ends (see Figure 32). The northern end of the enclosure is generally not as well defined as the southern one. At the south end, the corners protrude outwards and are curved, giving it a somewhat lobed appearance. In the southern end there are indications of a small sub-rectangular structure, possibly the remains of a building or pen with an attached, sunken yard in the south-eastern 'lobe'. Possible further sub-divisions are evident in the northern part of the enclosure. The present field boundary appears to divert to the west in order to skirt around the structure and there is a suggestion that the south-eastern corner of the enclosure may be respected by ridged cultivation,

although this can be no more than a tentative interpretation. The form of this enclosure is unusual and as such its period is uncertain.

Nine mounds or cairn-like features proved difficult to interpret on the lidar. One, in km square NY7757, north of Emley Farm, appears as a small circular mound located close to the highest part of the hill (775715). Its form is distinctive and it does not appear to be a natural feature. An earthwork, suggestive of an old field boundary and possible track, leads south from this mound towards Emley Farm. While it is possible that this is a windmill mound, it may have earlier origins and other interpretations cannot be discounted.

For some earthwork sites lidar alone does not offer an adequate basis on which to assign a likely date, even if the remains seem reasonably diagnostic. Thus, in km square NY7657, west of Bearsbridge, is a complex of what may be small compounds and yards on the east side of a small stream valley. While this is probably the site of 'Dews Green', a farmstead shown as a ruin on the OS First Edition 6-inch map (765721), some elements of it are unexpectedly irregular and may have earlier origins.

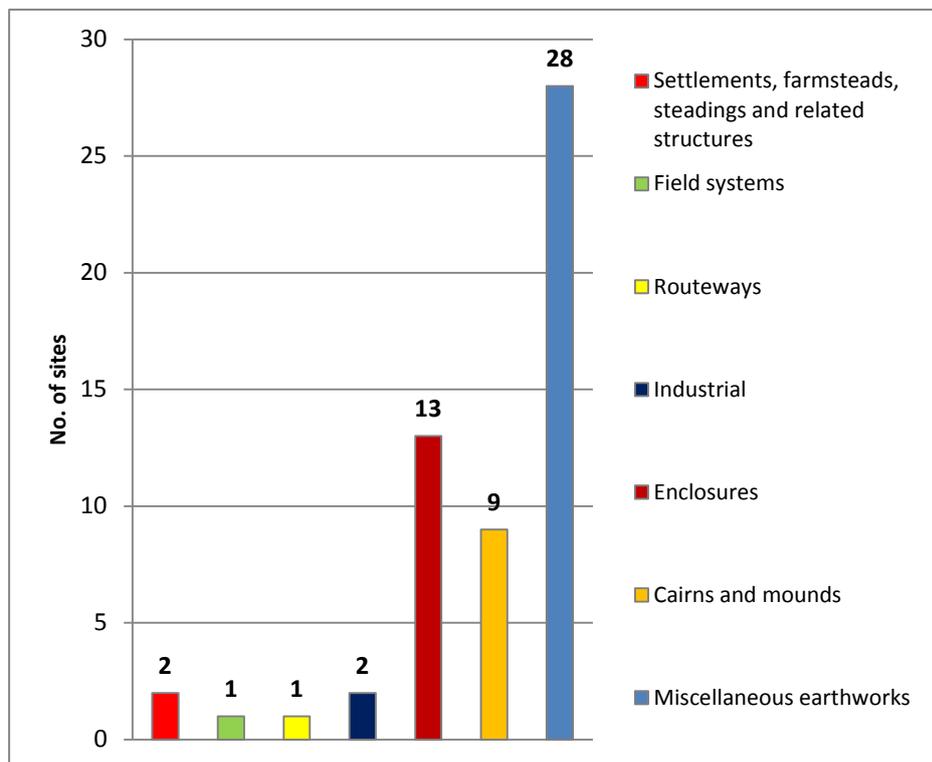


Table 11: Sites not assigned to a specific period

A particularly interesting area of what is probably surface mining can be seen on Blanchland Moor, in km square NY9453, to which it is very difficult to assign a date (94532). Here, an area c.200m in diameter has been heavily pitted, and some of the pits have coalesced into trench-like features (see Figure 33). It is unclear from the lidar what has been extracted or at what date the activity may have taken place. Morphologically similar features have been observed at Battle Green, near Alston, which the NMP programme identified as coal-pits during the Miner-Farmer survey (Pastscape UID 1521535). However, subsequent field survey suggests instead that the pits are more likely to be the remains of hundreds of shallow-shafts and open trenches arising from

the extraction of lead ore from 'flats' i.e. where lead ore has formed in horizontal 'sheets', often close to the surface. Stratigraphically, this is the earliest type of mining identified on Alston Moor and may be at least medieval, or perhaps even earlier, in date. Large numbers small platforms next to the pits are suggestive of working shelters (Ainsworth and Oswald 2012a; Historic England Miner-Farmer database and archive). The presence of stone quarries nearby on the Blanchland Moor example, might indicate that this is a shallow form of stone extraction, although lead extraction, as at Battle Green remains a strong possibility. Again, field inspection would help to clarify the situation.

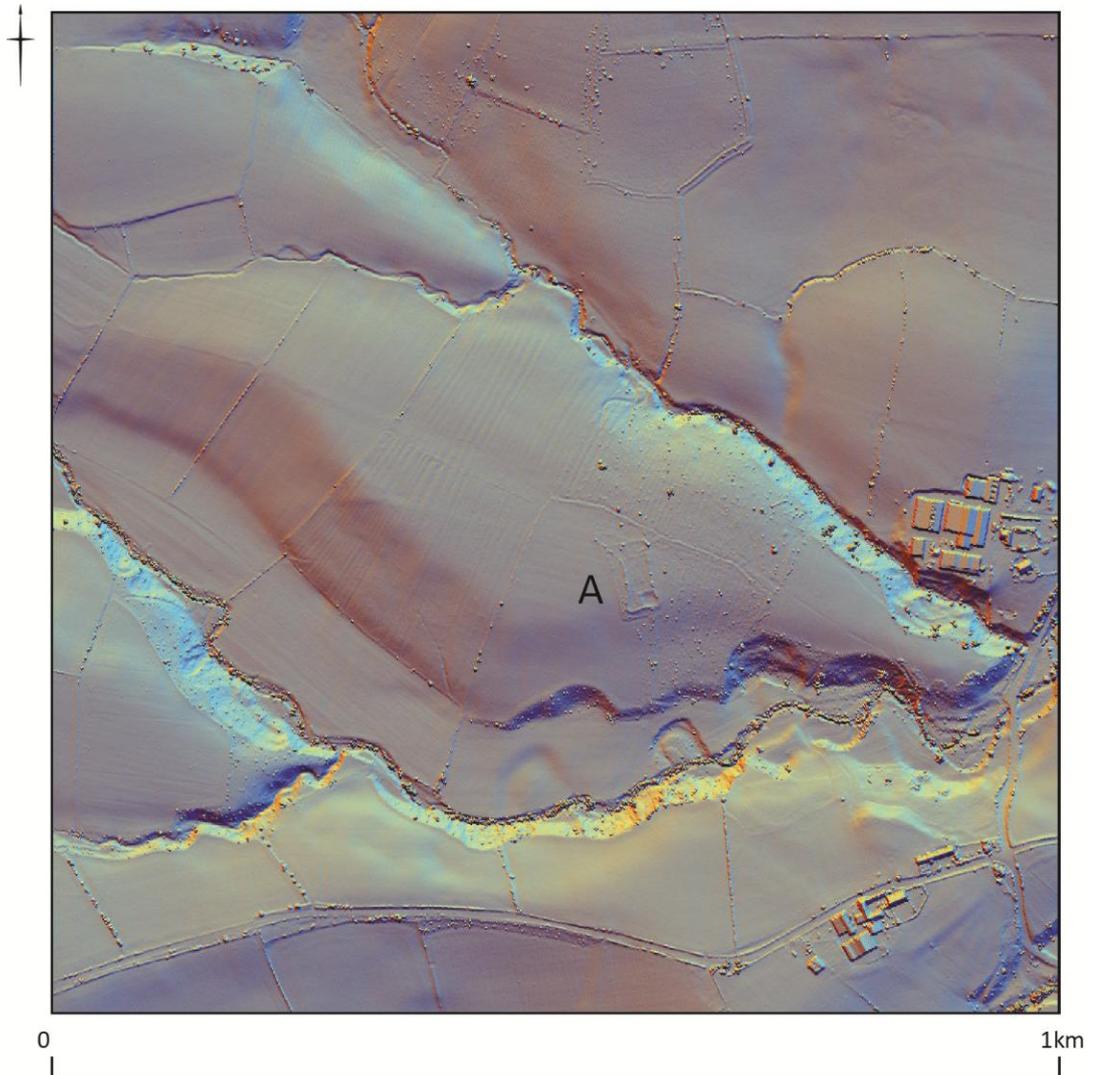


Figure 32: An unusual enclosure above Ham Burn (km square NY9158). The date and function of this enclosure are unclear. Lidar image:16 direction hillshade.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

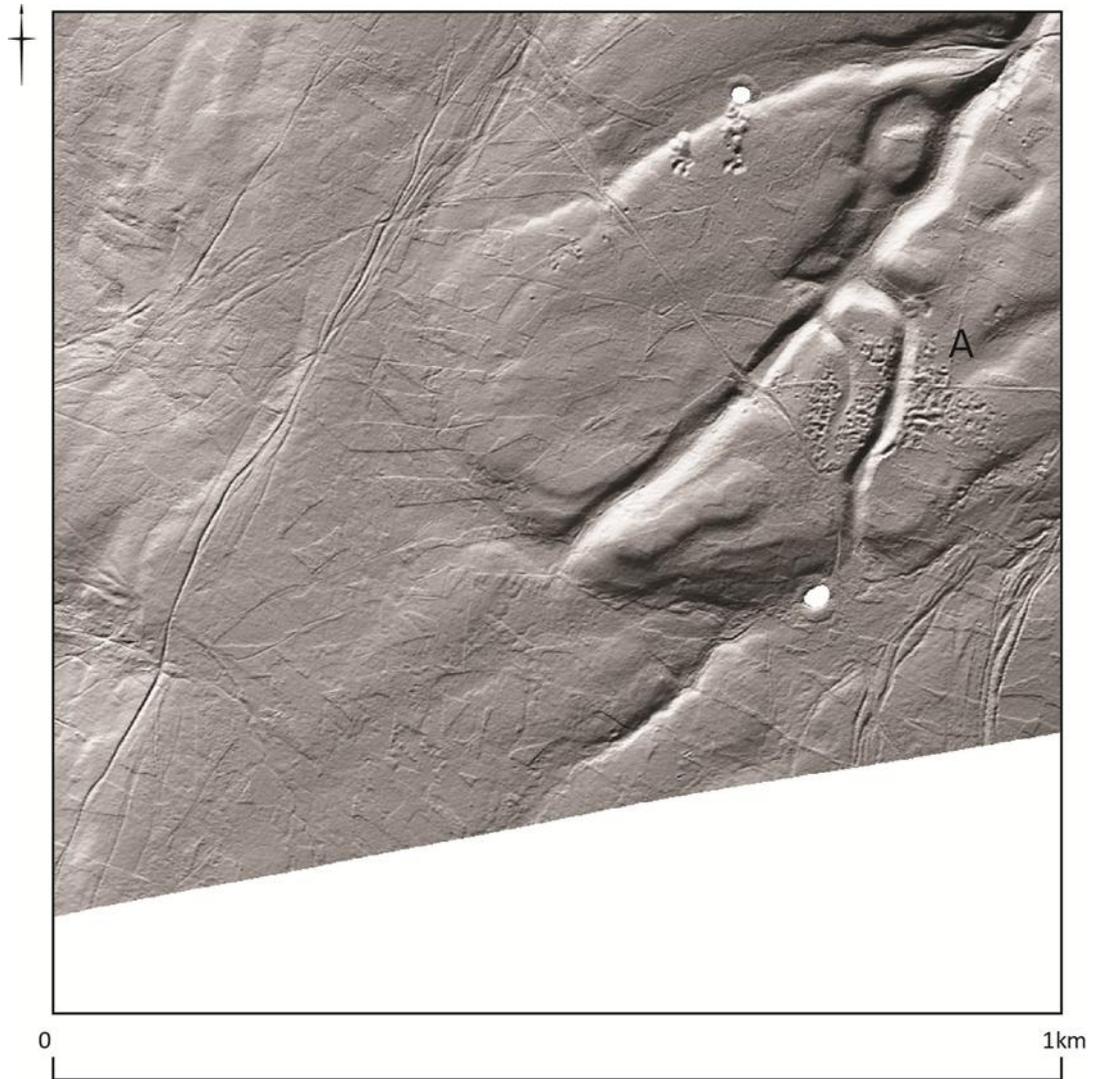


Figure 33: Area of pitting on Blanchland Moor (km square NY9453) which may be related to extraction of lead. Lidar image: 8 direction hillshade PCA.

Source lidar data © Environment Agency copyright and database right 2016. All rights reserved.

6. SUMMARY AND CONCLUSIONS

6.1 Archaeology

The identity of what appears to be the remains of an unusual earthwork at Low Broadwood Hall, provisionally interpreted as the remains of a possible prehistoric hengiform enclosure, remains speculative due to the incomplete and ambiguous nature of the evidence. The earthworks appear to be very low, and only possibly represent part of a larger monument. The site is unique in the landscape covered by this project and no other similar monument (or part of) has been identified. However, a broadly similar, hengiform earthwork enclosure has been recently surveyed and excavated as part of the Miner-Farmer and *Altogether Archaeology* projects only c.15km to the west at Rotherhope in the South Tyne valley near Alston. Partial excavation of this site has shown that its earliest phase, the outer enclosure, which is defined by the very low earthworks of an outer bank and associated internal ditch (with a slight inner bank where sectioned) is Early Bronze Age in date, and even though the earthworks are slight, they are well defined. In contrast, the presence of an inner bank is only hinted at on the surface around the southern arc; around the rest of the circuit there are no surface indications at all. The presence of an outer bank and internal ditch of slight proportions (as well as the lack of an obvious inner bank) are thus common attributes at both sites. Both the enclosures (assuming the example at Low Broadwood Hall was ever complete) also have approximately similar diameters. Perhaps the most obvious difference between the two is the completeness of the circuit. At Rotherhope, the site has not been subjected to later land improvement and is essentially undisturbed. However, at Low Broadwood Hall, significant agricultural activity appears to have impacted on the putative circuit of this monument and its original form at this stage therefore, is a matter of conjecture. The regular curve of the bank and ditch strongly suggest that this is the surviving, truncated western section of a larger circuit. If, as suspected, the circuit had been complete, then the ridged cultivation regimes of the field systems which impinge on it at the south and east (but not the west) would account for its partial destruction. Assuming a complete circuit existed, the lack of an internal bank is at odds with an alternative interpretation as a hillfort (significantly, neither of the AVH or Miner-Farmer projects identified any other similar enclosure or site which could be interpreted as a hillfort despite covering a combined area of 525 square kms on the northern fringes of the North Pennines). Its curved plan-form also contrasts sharply to the straightness of a possible lynchet to which it apparently joins at the south, suggesting that these features are of completely different periods and not parts of a single entity, the lynchet possibly being part of the network of later field systems. Thus, at this stage, an interpretation as a hengiform enclosure, perhaps similar to the one at Rotherhope, remains a possibility, and if so this would potentially make it the oldest monument identified during the AVH project. Whatever the case may be, the earthwork at Low Broadwood Hall remains an enigmatic site in the project area and clearly fieldwork is required to clarify its interpretation.

The North East Regional Research Framework drew attention to the conspicuous lack of prehistoric and Roman period settlements in upland areas of the North Pennines which, it was thought, most probably reflected a lack of sustained research rather than a genuine gap in the settlement pattern (Petts and Gerrard 2006, 53). The results of the AVH project (added to those of the Miner-Farmer project) confirm that this is indeed the case and a fuller picture of late prehistoric settlement and agricultural exploitation of these upland dales is at last beginning to emerge. In the valleys of the River East Allen, River West Allen, and the Devil's Water, the number and distribution of settlement sites and enclosures of probable late prehistoric and Roman date has seen a substantial increase. The settlements, homesteads and enclosures identified by the

project can all be broadly dated to the late prehistoric or Roman periods by analogy with known sites elsewhere in the North and the Borders on account of their morphological similarity. Whether these same settlements etc. were occupied and used throughout the Roman period, or when they were finally abandoned, is of course open to debate. The settlement at Gilderdale Burn near Alston, which is the closest excavated example of this type of settlement to the project area, provided radio-carbon dates which point to occupation between the 1st and early 3rd centuries AD (Ainsworth and Carlton in prep). In the Allen Valleys area, where only one site attributed to the Romano-British period had been previously recorded, fifteen possible additional sites have been added to fill the vacuum which previously existed. Along the Devil's Water and further north, four, possibly five new settlements have been identified and can be added to the four that were previously known. In addition, a number of probably contemporary field systems have also been identified for both areas, so that a more densely settled and farmed landscape can be envisaged along the river valleys than was previously assumed, and presumably involving a mixture of an arable and pastoral farming regimes. These new discoveries mirror a similar pattern of settlement and agriculture as that seen along the South Tyne valley as part of the Miner-Farmer survey where 30 such sites were recently recorded (Ainsworth 2010; Oswald and Oakey 2011; Oakey, Radford and Knight 2012; Historic England Miner-Farmer project database).

It has to be acknowledged that some prehistoric sites, such as small burial mounds and cairns, field clearance cairns, burnt mounds, cord rig, ring grooves etc., being relatively inconspicuous, are difficult to detect using 1m resolution lidar. Only one possible prehistoric funerary monument and one possible burnt mound were recorded in the AVH project, and confidence in the interpretation of these features is low. Even in the NMP element of the Miner-Farmer project, where higher resolution (0.5m) lidar was used, only two new, possible burial cairns were located (Oakey, Radford and Knight 2012, 17-18), and in the area of Annat Walls, near Alston, the lidar analysis failed to identify any of the three burnt mounds that were subsequently discovered there by field survey (Ainsworth and Oswald 2012b; Historic England Miner-Farmer project database). This lack of visibility of ephemeral features on 1m resolution lidar was also noted in another NMP-type upland recording project (Oakey *et al* 2015). Therefore, that only two such sites were recorded by the AVH project is not surprising, and as a consequence, this low figure is unlikely to accurately reflect the true number of sites that may exist in the landscape. It is probable that more prehistoric sites of this order remain yet to be discovered.

Despite the presence of settlements and agricultural activity there is (as noted above) a total lack of hillforts in the AVH project area. Similarly, there is a complete lack of lidar-based evidence for Roman military activity. This, too, mirrored the findings of the Miner-Farmer survey where, apart from the well-known Roman fort at Whitley Castle and the Maiden Way - the Roman road which connects the forts at Kirby Thore and Carvoran - no new Roman military sites emerged during the project. Given that both prehistoric and Roman period earthworks survive in good states of preservation throughout the two project areas, there would seem to be no good reason why further hillforts or military sites, such as forts, fortlets, signal stations, or roads, should not have come to light in either or both of the two project areas had any in fact existed - but none have. This observation further increases the doubts that have in any case already been expressed concerning the existence of an alleged Roman fort at Old Town, which lies within the project area, and the putative road connecting it with Whitley Castle to the west and the Roman supply base at Corbridge to the east, a significant length of which would cross the project area had it existed (see HER N7285 and summary in Went and Ainsworth 2009, 8). Since the completion of the AVH project, however, two of the

AVH volunteers have continued their examination of lidar outside the project area to the north-east across Stublick Moor and have discovered clear evidence of a linear earthwork, seemingly a road with flanking ditches, which runs intermittently in long straight sections for a distance of c.5km across Hexham Fell, following an alignment which might roughly correspond to the eastern end of that alleged Roman road (Green, Finch and Frodsham 2016). The lidar suggests that the feature pre-dates medieval ridge and furrow ploughing at the eastern end, and trial excavations, undertaken in April 2016, have revealed that the feature visible on the lidar was a 6m wide, metalled road or track, accompanied by a roadside ditch on its north side. On the other hand no dating evidence was forthcoming (*ibid*, 14), and the question remains whether this feature is indeed a genuine Roman road. Further excavations by the newly-constituted *Altogether Archaeology* community archaeology group, based in the North Pennines, are planned for later in August 2016 to try and settle this issue.

For the medieval period, the project has revealed possible evidence for the survival of earthworks belonging to four villages otherwise known only from documentary sources. Other components of the medieval landscape that have been newly identified include a park pale at Dotland, probably originating in the 14th century and associated with the hunting lodge of the Priors of Hexham, and structures adjacent to Blanchland Abbey that lie outside the scheduled area but may nevertheless be associated with it. Eight small farmsteads and steadings have been identified which may possibly be medieval in origin, though in most cases it is difficult to be confident about their date. They are mostly characterised by single structures or closely-grouped rectilinear earthworks, representing built structures, yards, pens or compounds, and sometimes with a possible building range, suggesting a domestic/byre structure, at their core. At many of these sites there are sufficient indications of stratigraphy in the earthworks of both settlement and fields to indicate an extended chronology, and make precise dating difficult or impossible on lidar evidence alone. Wherever possible, other evidence of chronology, such as a stratigraphic relationship between the extant structures on the one hand, and classic ridge and furrow cultivation or a demonstrably later field patterns on the other, has been taken into account in assigning a period. This same principle has been applied to those fifteen farmsteads which have been assigned to an uncertain medieval/post-medieval context.

For the post-medieval period, the project has revealed a significant number of sites which appear to provide evidence for agricultural expansion into former moorland areas. In all, 53 farmsteads and steadings have been newly-identified. These are mostly evident as clusters of rectilinear earthworks suggestive of buildings, compounds etc., but are generally larger in scale than those classified as being medieval in date. Most are associated with complex palimpsests of plots and fields consistent with development over long periods of time. These discoveries represent a significant addition to our knowledge of the pattern of dispersed agricultural settlement in the uplands covered by the AVH project. The majority of them have never appeared on any OS maps (see below), and only fourteen could be related to abandoned farmsteads or other structures shown on the OS First Edition 6-inch scale maps. A small number of structures which might be shielings were also identified.

An important discovery of the AVH project is that field systems associated with the post-medieval farmsteads and steadings are often distinctive, with a dominant 'core' area, consisting of a larger, often irregular curvilinear plot with a number of conjoined, similarly-shaped enclosures, plots or fields. Often the farmsteads and steadings appear to be located either within the core or close by it. The overall impression is one of organic and somewhat random growth over time radiating from the core rather than a

farm holding which has been set out in a single operation. The majority of these field systems are demonstrably earlier than the main period of parliamentary enclosure in the late 18th and 19th centuries. In many cases quite complex systems of 'petal-like' plots and rectilinear fields, apparently demarcated by earthen banks rather than stone walls, with or without signs of ridged cultivation, are found mixed together and overlapping with one another, and natural run-off channels and streams are frequently co-opted as boundaries. Field systems of this kind often occur in conjunction with bastles - a distinctive type of building which is known to date from the late 16th and early 17th centuries, although they do not always seem to be the primary form of settlement. In many cases it could well be that the bastle has simply replaced an earlier steading at the core of a field system which grew over a period of time. A similar pattern of settlement continuity exists in the South Tyne valley where occupation sites of multiple periods can be seen around a core area and its penumbra (Historic England Miner-Farmer project database).

Where patterns of ridged cultivation within post-medieval field systems are visible on lidar they are often strikingly complex, with ridges of varying width and steepness of profile, and may be either straight or curved. Even within a single field different types of cultivation may overlap while respecting the same boundaries, suggesting occasional re-organisation of the cultivation regime though not necessarily over a very long period of time. While it was beyond the scope of the project to record these changes separately, the fact that they have been observed throughout the dales and moorland fringes is an important finding, and another important step towards the better understanding of upland agricultural regimes associated with post-medieval farmsteads and steadings in the North Pennines. Similarly complex ridged cultivation systems and field patterns have been recorded and mapped in Menstrie Glen, near Stirling, and which result from an intense period of agricultural exploitation of the uplands in the 17th century and reaching a peak in the early part of the 18th century (RCAHMS 2001, 62-3) and it is possible that the examples in the AVH project area are of broadly the same date. As noted above, many of the newly-identified field systems (and their associated farmsteads) can clearly be shown to pre-date walled fields created by parliamentary enclosure in the late 18th and early 19th centuries. Where this is the case an origin somewhere between the end of the Middle Ages and the late 18th century can be assumed although most probably date to the latter end of this period. This is very much in line with other upland areas in northern Britain when the 17th and 18th centuries saw a number of important changes in land tenure, marked particularly by a move away from customary to leasehold tenure resulting in the creation of larger farms, and the division of what had formerly been common land into separate landholdings (Winchester 2000, 68-73; see also RCHME 1970; RCAHMS 2001).

Head dykes form another element of this complex, pre-parliamentary enclosure agricultural landscape, and they too appear to have changed and adapted over time as the field systems developed. Fourteen linear boundaries have been tentatively identified in this project as head dykes rather than simply longer stretches of evolving field or tenancy/ownership boundaries. Whether linear boundaries or head dykes, they are not susceptible to close dating by lidar inspection alone and while some may be medieval in origin most seem likely to belong in the post-medieval period. All the linear features tentatively identified as head dykes are marked by sinuous banks and ditches and most are traceable over longer distances than would be expected of a simple field boundary. Occasionally, watercourses or other natural features appear to have been utilised in place of earthen banks or ditches or to act as terminals. Where land has been taken in at the moorland edge, and absorbed into a pre-existing field system, this may have involved a radical re-alignment of field boundaries as well as adjustments to

the head dyke. As a result, redundant fragments of the old head dyke may have been absorbed and re-used to demarcate new fields or else over-ploughed and obliterated. At other times, retreat rather than expansion may have taken place, involving the construction of a new head dyke cutting off land that was previously cultivated but since then lay abandoned beyond the limits of the shrunken field system. In practice, such periodic episodes of expansion and/or contraction at the moorland edge make it difficult to disentangle sequential patterns of fields and head dykes, or to discover how head dykes may have moved their position over time. Many detached, enclosure-like fields have also been noted on the higher moorlands above head dykes without any obvious associated dwelling.

Those farmsteads of the post-medieval period recorded during this project which never appeared on any published map presumably represent losses that took place before the earliest OS surveys in the mid-19th century. While parliamentary enclosure may be a possible reason for this apparent decrease in numbers it would be unwise to attribute a single cause to what may be a complicated process of economic and social change. It is clear that the post-medieval landscape agricultural exploitation of the upland was severely under-represented in the HER prior to this project, and the number and distribution of farmsteads and field systems newly recorded in the AVH project will contribute to a greater understanding of this phenomenon. Upland intakes and field systems of this period undoubtedly have complex histories which lie beyond the scope of this project, although it is hoped the new discoveries will prompt further research and fieldwork on this topic in the future.

The AVH project area is rich in mineral resources and has a long history of mining, yet apart from the Miner-Farmer survey little landscape-scale assessment has been done on these industries in the North Pennines. In these circumstances it is therefore hardly surprising that a majority of sites newly identified by the AVH project relate to the post-medieval extractive industries. Of the 649 post-medieval industrial sites that have been recorded, 319 relate in some way or other to the lead industry, 284 to stone quarrying and 20 to coal mining. The remaining 26 sites represent a variety of types and include a small number of extractive sites where the mineral resource has not been determined, as well as two mills and two limekilns. Where lead-mining complexes had already been recorded on the HER they were not re-examined, although some of their components were added to the database where it was considered that they were deserving of further recognition as features in their own right, resulting in a filling up of areas that had previously appeared as blank on HER maps. Most of the newly-recorded features are mine shafts, of which 236 examples, both single and in groups, probably relate to lead mining. Given the large number of shafts and other industrial sites which are visible on the lidar but not portrayed on First Edition 6-inch scale OS maps, it is clear that these maps in particular (and all subsequent editions) cannot be considered as more than a very incomplete guide to the location or distribution of industrial sites and monuments generally, many examples of which certainly existed when the surveys took place but which were not recorded on the resulting maps. With regard to lead mining, the other features most commonly identified included adits, and those connected with water management, such as hushes, dams and leat systems. Water management systems in particular can often be both extensive and complex, being subject to frequent changes over time and only the more significant examples were recorded as part of the AVH project.

A large number of quarries were also identified, varying from small-scale diggings to larger, industrial scale open-cast workings. Again the majority have never appeared on any OS maps, further reinforcing the view that OS First Edition maps do not present a

reliable on to present a picture of landscape as it was in the middle of the 19th century. Many of the smaller-scale quarries probably relate to the building of structures such as farms, steadings, dykes, lime-kilns etc. as well as to the large number of drystone walls created as a result of enclosure by Act of Parliament or private treaty in the 18th and 19th centuries. Larger quarries, on the other hand, probably reflect the demand for stone for a variety of industrial purposes, most notably from the mid-19th century onwards. As has already been acknowledged in the North East Regional Research Framework, the present understanding of the industrial landscape of the North Pennines, and their extractive industries is patchy at best, reflecting both the incomplete nature of the evidence and the variable quality of the research that has been devoted to it (Petts and Gerrard 2006, 177). Against this background, the AVH project will make a significant contribution to the better understanding of the wider industrial landscape. The identification of the distinctive area of pitting on Blanchland Moor, which has analogies with early, possibly medieval, lead mining at Battle Green, near Alston, illustrates how little attention has been paid to such features and how little they are understood. The results of the AVH project demonstrate clearly that lidar is a primary evidence source for the identification of the extents and complexities of industrial landscapes, and allows the large gaps which exist in the HER system, particularly for extensive lead-mining landscapes, to be populated with evidence-based recording.

Finally, there are a number of sites which cannot readily be assigned to a specific period, either because their form did not match that of any recognised type of site or because the nature of the earthworks was unclear, as was the case with the enclosure at Ardley Dean. There is little doubt that many of these uncertainties could yet be resolved by fieldwork.

6.2 Methodology

Remotely-captured imagery, such as lidar and aerial photographs, has strengths and weaknesses when used to detect archaeological sites. Lidar is particularly suited to upland landscapes where there tends to be a high level of earthwork survival, and thus a better chance of upstanding features being visible. This is not always so with aerial photography (both historic and modern) where vegetation coverage, such as long heather, bracken and long moorland grasses, can seriously reduce the visibility of archaeological features. However, historic aerial photographs can show sites that have been destroyed in the past, before the availability of lidar, and can be used to document land-use change in a way that lidar cannot. In reality, if both lidar and aerial photography sources are readily available then a combination of the two is ideal for interpreting archaeological sites (see Oakey *et al* 2015). In the case of the AVH project, however, the availability of aerial photographs was limited to modern imagery only. Despite this restriction, the results of this project demonstrated clearly that volunteers with a basic home computer and appropriate software, who have access to lidar and modern aerial imagery in a form that they can easily access and work with, can use these assets to discover new archaeological sites. At the same time, they learn new skills, given a little professional support and guidance in the use of the basic source materials.

This project was primarily an exercise in using lidar data that was freely available. Although volunteers were guided towards other readily available web-based sources to develop their awareness, such as *Keys to the Past* and *Google Earth*, and shown how this could contribute to interpretation, the project was designed to enable volunteers to use lidar as the primary source and understand how it could reveal new archaeological sites. The project was not intended to be a comprehensive survey utilising multiple

sources and archives. The lidar data supplied to volunteers was at two levels, as 2D PCA processed greyscale images supplied as jpegs (i.e. static images analogous to aerial photographs), and 3D data for 'real-time' manipulation in 3D modelling software. Although a number of volunteers downloaded the 3D data and modelling software, and used this to aid interpretation, the majority restricted themselves to working with the 2D imagery. As has been demonstrated in a number of publications (e.g. Crutchley and Crow 2009; Opitz and Cowley 2013), there are several ways in which lidar can be processed to produce images, of which hillshade is the mostly commonly used, with PCA being a variant on this. Again, each has its own strengths and weaknesses for interpretation of archaeological features depending on a variety of factors, such as geology, topography, and the particularly the experience level of the user. One of the negative aspects of hillshade and PCA imagery is that it can show too much detail in relief, including all the natural undulations and non-archaeological features. This wealth of detail on the imagery can be confusing, and identifying genuine archaeological features from this 'noisy' background can be very challenging for volunteers with no experience. This is less of an issue for the professional sector, where the experience level is higher and the methodology may be more sophisticated, depending on the product. For example, the NMP element of the Miner-Farmer project, undertaken by professional image interpreters, in which mapping of features was an essential product (unlike the AVH project), used hillshaded images in combination with a range of historical aerial photographs (Oakey, Radford and Knight 2012). In a more recent, similarly resourced Historic England project, a variation of the same methodology was employed, except that both PCA and 16-direction hillshaded images derived from 1m resolution lidar were used over a wide area of landscape. When the results of the two approaches undertaken were compared, it was found that the 16-direction hillshades were better for distinguishing between embanked and cut features for mapping purposes (Oakey *et al* 2015, 62). That project also concluded that 1m resolution Environment Agency lidar was adequate for the purposes of archaeological recording to NMP standards (*ibid*, 65). Whilst other processing methods (such as local relief models and slope models - which are often used by professionals) can further refine image outputs, these usually require a deeper understanding of lidar data and the results are often not as easy to assimilate as intuitively as are hillshaded (single or multiple direction) and PCA images. In summary, hillshade and PCA methods produce images that perhaps have the most important attribute - that they reproduce landform relief and feature character of earthworks by light and shadow in a way that is easily understood, not only by the professional but also the untrained eye - this being particularly important for volunteers who are new to the subject.

Feedback from the volunteers in the AVH project was very positive about the ease of use of the PCA imagery, despite the level of detail it contained. For future volunteer lidar projects which cover large areas that include mixed topography, PCA imagery is therefore recommended, but it is important that some level of testing on sample data is undertaken beforehand to ensure the most appropriate processing method is chosen. Indeed, a combination of methods may be necessary depending on the type of landscape. As a final comment on lidar, the AVH project has demonstrated that 1m resolution data, freely available from the Environment Agency, is a rich resource that can be used by volunteer groups as well as professional bodies.

The AVH project has led to the identification of 1,027 new archaeological sites and monuments in an area covering 285 km squares of the North Pennines, all of which have been recorded in a format suitable for inclusion on the HER. However, it should not be assumed that this project has recorded all archaeological sites visible as earthworks within the project boundaries. There are three main reasons why this would

be an invalid assumption. Firstly, the coverage of the lidar within the AVH project area was not complete: only 63% of the km squares had full lidar coverage; 17% had between full and half coverage; and 20% had less than half coverage. Accordingly, the desk-based assessment of many of the km squares within the project area was only partial. Secondly, this was a project undertaken by volunteers most of who had no previous experience of using lidar, or had undertaken any form of landscape interpretation. The landscape in the project area was also complex, containing a variety of land uses ranging from open moorland to heavily-farmed dales and improved fields, and a mixture of complicated industrial and agricultural features. Volunteers therefore had to develop an ability to recognise patterns made by archaeological features against the background of a complex and varying landscape independent of any previous underlying knowledge of the physical form of archaeological monuments. Developing this pattern awareness was the main aim of the workshop sessions and feedback (i.e. initially identifying shapes or patterns that were interesting to volunteers, then building on that to relate these patterns and shapes to a range of archaeological features). The success of this approach in developing new interpretative skills is illustrated by the fact that one in four of the features identified by the volunteers turned out to be a *bone fide* archaeological site. There is little point in producing average figures of sites found per km square for all those that were examined by volunteers, given the varied nature of the project landscape and the incomplete coverage of lidar. On the other hand, it is appropriate to note that only one volunteer out of the 34 found no new sites to record in the square allocated, while, at the other end of the scale, another volunteer examined 24 km squares and generated 117 new sites. But the true value of the exercise lies not in numbers but in the methodology that was adopted - everyone who took part went through the same process of examining the landscape through the new medium of lidar, regardless of the number of new sites that were found. In the end, the primary aim of the project was achieved, namely to engage a new audience with the landscape and to discover new ways of looking at it; if a volunteer found a new archaeological site to add to the HER that was an additional benefit. Thirdly, sites can simply be missed. The validation process, an essential part of the quality control mechanism, aimed to minimise this, but it is inevitable that some sites will not have been recognised. Whilst hopefully, no significant or larger sites will have escaped attention, experience has shown that smaller features which exist on the ground can often be misrepresented or eliminated entirely by the data processing techniques used by the Environment Agency to generate the type of imagery used in this project.

Quality control is an essential element of any project, and especially so in a project like this where interpretation of lidar data is undertaken by volunteers, many new to the subject. The validation process was therefore crucially important for not only the interpretation of the lidar, but also for the feedback and training of volunteers, as well as the credibility of the final HER record. For the AVH project, every km square and provisional record submitted by volunteers was assessed and where necessary records were sifted-out or revised to ensure consistency in the final database. However, this process of validation is itself also detached from the 'real' archaeology as it exists on the ground and follow-on field inspection was not undertaken. There is no doubt that targeted fieldwork on some of the 191 sites identified as requiring some level of clarification within the area covered by the AVH project would certainly lead to a desirable enhancement of the records derived solely from the examination of the lidar data.

In summary, the main advantage of lidar for use in landscape archaeology recording projects by volunteers is that it enables large areas to be assessed rapidly in a way that would not otherwise be possible, except at much greater cost in time and money. It

allows a wide range of volunteers to take part regardless of age or infirmity from the comfort of their own home, or share experiences within groups in workshop sessions. In contrast, field inspection, which is considered to be an essential part of the interpretation and validation process, can demand higher levels of mobility and fortitude, and can sometimes be exclusive rather than inclusive. Thus, both to maximise the potential levels of input and number of volunteers, as well as produce results for HER use, the use of home-based lidar for future projects should be viewed as the first stage in a two stage process, with the second stage being a field programme designed to inspect a selected sample of sites which may require clarification of the interpretation. This 'follow on' fieldwork also provides an opportunity for volunteers to see the results of their labours as 'real' archaeology in its landscape context, and enhance the experience of discovery.

Conclusion

Finally, it is important to re-emphasise the significant contribution that the volunteer recording and validation exercise undertaken during the AVH project has made in enhancing our archaeological knowledge of the region. This project has clearly helped to fill some of the gaps in themes and research identified by the North East Regional Research Framework. It is also important to recognise that this contribution was made almost entirely by a team of volunteers, many with little or no experience of archaeology and only a limited amount of professional help, using a single lidar dataset. The methodology is not directly comparable with that used on NMP projects, for example, which differed in having a significant organisational infrastructure, experienced professional teams, mapping outcomes, and ready access to historical aerial photography and archive resources, but the results demonstrate what can be achieved with limited resources and willing volunteers. To identify 1,027 new sites within the HER sphere of interest is a magnificent result, and highlights the contribution that volunteers supported by the Heritage Lottery Fund, can make to the understanding of the landscape. As well as informing future research, bodies with responsibility for the historic environment in the Allen Valleys and the Hexhamshire area of the North Pennines AONB, such as Historic England and Northumberland County Council, now have a much better record base to inform conservation and management decisions.

REFERENCES

- Ainsworth, S 2008 'Miner-Farmer Landscapes of the North Pennines Area of Outstanding Natural Beauty (AONB): Project Design'. English Heritage Research Department Project Design.
- Ainsworth, S 2009 'Miner-Farmer Landscapes of the North Pennines Area of Outstanding Natural Beauty (AONB)', *English Heritage Research News* **11**, 12-16. Portsmouth: English Heritage
- Ainsworth, S 2010 'Miner-Farmer Landscapes. New research in the North Pennines AONB' in *Archaeology in Northumberland* **19**, 14-15
- Ainsworth, S 2013 Hexhamshire and the Allen Valleys Lidar Recording Project: Recording Manual
- Ainsworth, S, Bowden, MCB, McOmish, DS, and Pearson, T 2007 *Understanding the archaeology of landscapes: a guide to good recording practice*. Swindon: English Heritage
- Ainsworth, S and Oswald, A 2012a Battle Green: Historic England Miner-Farmer project database and Level 3 survey
- Ainsworth, S and Oswald, A 2012b Annat Walls: Historic England Miner-Farmer project database and Level 3 archaeological survey
- Ainsworth, S, Oswald, A, and Went, D 2013 'Remotely acquired, not remotely sensed: using lidar as a field survey tool', in *Interpreting Archaeological Topography*, 206-222, (eds) Optiz, S and Cowley, D
- Ainsworth, S, Gates, T, and Oswald, A 2015 'Swaledale's 'Early Medieval Kingdom' Revisited' in *Landscapes* **16**, 3-17
- Ainsworth, S and Carlton, R in prep 'Excavation of a Roman Iron Age settlement at Gilderdale Burn, Northumberland'
- Ainsworth, S and Went, D 2012 Historic England Miner-Farmer project database and Level 3 survey
- Aston, M 1985 *Interpreting the Landscape: Landscape Archaeology in Local Studies*. London: Batsford
- Barnatt, J and Penny, R 2004 *The Lead Legacy: The prospects for the Peak District's Lead Mining Heritage*. Buxton: Peak District National Park
- Boutwood, Y 2005 Hadrian's Wall NMP Project: Bowness on Solway to Carlisle, Cumbria. English Heritage internal report AER/03/2005
- Bowden, M 1999 *Unravelling the Landscape: An Inquisitive Approach to Archaeology*. Stroud: Tempus
- Claydon, M 2014 *Dry Burn enclosure near Garrigill, Cumbria: archaeological evaluation*. Archaeological Services Durham University report 3236

- Claydon, M 2016 *Dry Burn enclosure near Garrigill, Cumbria: post-excavation and full analysis*. Archaeological Services Durham University report 4042
- Crutchley, S, and Crow, P 2009 *The Light Fantastic: Using airborne lidar in archaeological survey*. Swindon: English Heritage
- Gates, T 1999 'Hadrian's Wall amid fields of corn' in *British Archaeology* No 49, 6-7. York: CBA
- Gates, T 2004 *The Hadrian's Wall Landscape from Chesters to Greenhead: An Air Photographic Survey*. Unpublished report for the Northumberland National Park Authority
- Green, M, Finch, G and Frodsham, P 2016 *Altogether Archaeology 2016: Lost Roads on Hexham Fell*. Altogether Archaeology project design
- Hunt, A 2010 Historic England Miner-Farmer project database MFID 417
- Jessop, L, Whitfield, M 2010 *The Parish of Alston Moor, Cumbria: Historic Area Assessment*. English Heritage Research Department Report Series no. 064-2010. Portsmouth: English Heritage
- Jessop, L, Whitfield, M and Davison, A 2013 *Alston Moor, Cumbria. Buildings in a North Pennine Landscape*. Swindon: English Heritage
- Jobey, G 1960 'Some rectangular settlements of the Roman period in Northumberland Part 1'. *Archaeologica Aeliana* 4th Series **38**, 1-38
- Jobey, G 1964 'Enclosed stone-built settlements in North Northumberland'. *Archaeologica Aeliana* 4th Series **42**, 41-64
- Jobey, G 1966 'Homesteads and settlements of the Frontier area' in Thomas C (ed) *Rural Settlements in Roman Britain*. CBA Research Report **7**, 1-14. London: Council for British Archaeology
- Jones, N, Walters, M and Frost, P 2004 *Mountains and Orefields: metal-mining landscapes of mid and north-east Wales*. CBA Research Report **142**. York: Council for British Archaeology
- Kincey, M, Batty, L, Chapman, H, Geary, B, Ainsworth, S, Challis, K 2014 'Assessing the changing condition of industrial remains on Alston Moor, UK, using multisensory remote sensing', *Journal of Archaeological Science*, **45**, 36-51
- Natural England 2013 National Character Area Profile 10. North Pennines (NE428). Published online at <http://publications.naturalengland.or.uk/publication/5682293?category=587130> (accessed 13 July 2016)
- Oakey, M 2009 *Hadrian's Wall World Heritage Site National Mapping Programme Project, Summary Report*. English Heritage Report Series no. 73-2009. Portsmouth: English Heritage
- Oakey, M, Radford, S and Knight, D 2012 *Alston Moor, North Pennines. Miner-Farmer Landscapes of the North Pennines AONB NMP*. English Heritage Research Report Series no. 4-2912. Portsmouth: English Heritage

- Oakey, M Jecock, M, Hazell, Z, Linford, P and Payne, A 2015 *Cumbria and Lancashire, National Archaeological Identification Survey: Upland Pilot*. English Heritage Report Series no 10-2015 Portsmouth: Historic England
- Opitz, R and Cowley, D 2013 (eds) 2013 *Interpreting Archaeological Topography: 3D Data, Visualisation and Observation*. Oxford: Oxbow
- Oswald, A 2009 Historic England Miner-Farmer project database MFID 1278 and Level 3 archaeological survey
- Oswald, A 2010 Corby Gates: Historic England Miner-Farmer project database and Level 3 archaeological survey
- Oswald, A and Oakey, M 2011 'Putting the prehistory of the North Pennines on the map' *Research News* **16**, 18-21. Portsmouth: English Heritage
- Payne, A 2011 *Rotherhope, Alston, Cumbria. Report on geophysical survey November 2010*. English Heritage Research Department Report Series no. 49-2011
- Petts, D and Gerrard, C 2006 *Shared Visions: The North East Regional Research Framework for the Historic Environment*. Durham: Durham County Council
- RCHME 1970 *Shielings and Bastles*. London: HMSO
- RCAHMS 1967 *Peebleshire Vol 1*. Edinburgh: HMSO
- RCAHMS 2001 *'Well Shelterd & Watered': Menstrie Glen, a farming landscape near Stirling*. Edinburgh: RCAHM
- Schofield, P and Vannan, A 2011 *Altogether Archaeology: Holwick, Upper Teesdale, County Durham*. Oxford Archaeology North Report
- Small, 2008 *Hadrian's Wall NMP Project: Brampton to Birdoswald*. English Heritage Research Department Report Series no. 69-2008
- Stiperstones and Cordon Hill Landscape Partnership Scheme, 2016 Programme 2: Land between Lands <http://www.stiperstonesandcordon.co.uk/programme-2-land-between-lands/> (accessed 12 July 2016)
- Swann, N and Hale, D 2012 *Gossipgate, Harbut Lodge and Bridge End Farm, Alston, Cumbria: geophysical survey*. Archaeological Services Durham University report 2882
- Went, D and Ainsworth, S 2009 *Whitley Castle, Tynedale, Northumberland: An Archaeological Investigation of the Roman Fort and its Setting*. English Heritage Research Department Report Series no. 89-2009. Portsmouth: English Heritage
- Went, D and Ainsworth, S 2013 'Whitley Castle, Northumberland: An Analytical Survey of the Fort and its Setting'. *Britannia* **44**, 93-143
- Winchester, AJL 2000 *The Harvest of the Hills. Rural life in Northern England and the Scottish Borders, 1400-1700*. Edinburgh: University Press

APPENDIX 1: *Altogether Archaeology* fieldwork modules

Summarised from

<http://www.northpennines.org.uk/Pages/AltogetherArchaeologyFieldworkModules.aspx>

(accessed 26 June 2016)

Module 1. Early Farmers. The Neolithic.

Fieldwork to investigate Neolithic (c4,000-2,000BC) sites and landscapes throughout the North Pennines.

- Dyburn 'henge', Garrigill, excavation
- Long Meg stone circle, survey
- Tortie Stone, Hallbankgate, excavation

Module 2. Round cairns and round houses. The Bronze Age.

Fieldwork to investigate Bronze Age (c.2,400-700BC) sites and landscapes throughout the North Pennines.

- Brackenber Rigg, Appleby
- Kirkhaugh Cairns, Alston

Module 3. The Maiden Way Roman road.

Investigations along the Maiden Way over the wilds of the North Pennines from Kirkby Thore in the south, past Whitley Castle (Alston) to Carvoran on Hadrian's Wall.

- Epiacum (Whitley Castle) Roman fort
- Kirkby Thore, Roman road

Module 4. The Missing Centuries.

Initiatives aimed at improving the understanding of the North Pennines throughout Anglo-Saxon and Viking times, a period about which little is known.

- The Chapel of Saint Botolph, Frosterley
- Placenames survey

Module 5. Holwick, Upper Teesdale.

Furthering the understanding of the multi-period archaeological landscape at Holwick, near Middleton in Teesdale.

- Holwick archaeological survey

Module 6. Medieval Forests and Parks.

This module aims to map medieval forests and parks, and investigate particular aspects of them.

- Muggleswick Grange
- Westgate Castle, Weardale

Module 7. Allen Valleys and Hexhamshire landscape surveys.

Investigation of the archaeology of previously unrecorded landscapes of Hexhamshire and the Allen Valleys using lidar and aerial photography.

- The Allen Valleys
- Hexhamshire

Module 8. North of the Wall.

Working in partnership with the Northumberland National Park Authority, volunteers will complete a range of fieldwork projects to survey and investigate aspects of the little-studied landscapes north of Hadrian's Wall.

- Ravensheugh landscape survey
- Standingstones Rigg survey
- Hadrian's Wall milecastles project

Module 9. Industrial archaeology.

The post-medieval industrial heritage of the North Pennines is of international importance. This module includes small-scale survey and excavation projects at important industrial sites.

- Killhope Buddle House, Weardale
- Shildon Little Engine House, Blanchland
- Dukesfield Smeltnill, Hexhamshire

APPENDIX 2: Lidar Landscapes Recording Form

Table 1: monument location	
1:10,000 map sheet	
Km square	
NGR	
Monument number	

Table 2: monument classification			
New site	Yes	No	
HER site	Yes	No	
OS map site	Yes	No	
Monument type			
Monument period			
Monument form			
Feature	Point	Line	Area

Table 3: image source		
Lidar	DSM	DTM
Aerial Photography	Google	Other

Table 4: confidence factor			
Scoring	A	B	C

Table 5: compiler details	
Name	
Date	

Table 6: description

APPENDIX 3: Project database fields

Database Header	Description
km_square	OS National Grid square.
contributor_site_no	Sequential number allocated by the contributor to each site recorded.
validator_site_no	Sequential number allocated to additional sites identified by the validator during the validation process.
project_id_no	Number allocated to sites accepted as suitable for submission to the HER. Numeric Km square number followed by relevant sequential number (contributor or validator) for that km.
New_HER_no	To be allocated by HER. Not completed at validation stage.
alias_1	Alternate classification of monument_type.
alias_2	Alternate classification of monument_type.
monument_type	Monument type as defined in NMR Thesaurus.
monument_period	Monument period as defined in NMR Thesaurus
monument_form	Monument form as defined in NMR Thesaurus.
eastings	OS National Grid 6 figure numeric reference (1m).
northings	OS National Grid 6 figure numeric reference (1m).
monument_accepted	Whether site accepted by validator for submission to the HER.
field_visit_reqd	Whether site classification might be significantly clarified by a field visit.
highlight_site	Site which is a good example of a type.
contributor	Name of contributor.
database_validation_date	Date of database validation
source	Description for the project activity.
related event	Related event record for the project.
nil_record	<p>Clarification code for feedback purposes of the status of sites identified by contributors which had not been accepted as suitable for inclusion on HER. Codes used as follows;</p> <p>ON HER – already recorded on the HER</p> <p>NON ANT – non antiquity (i.e. not an archaeological feature or of no archaeological significance)</p> <p>PRE ENCL RC – pre Enclosure period ridged cultivation</p> <p>POST ENCL RC - post Enclosure period ridged cultivation</p> <p>RIDGE AND FURROW – ridge and furrow cultivation typical of the medieval period</p> <p>PART OF – part of another record created during the validation process</p> <p>NO SITES – no sites recorded in the km square</p>
validator_notes_not-for-record	Clarification of the nil_record entry for feedback purposes.

Note: shaded fields were used for the recording of non-HER information.

APPENDIX 4: List of sites submitted for inclusion in the HER

KM SQUARE	PROJECT ID	MONUMENT TYPE	MONUMENT PERIOD	E	N
NY7552	75524	QUARRY	POST MEDIEVAL	375892	552369
NY7553	75531	QUARRY	POST MEDIEVAL	375017	553887
NY7554	75542	FIELD SYSTEM	POST MEDIEVAL	375712	554905
NY7556	75562	BOUNDARY BANK	POST MEDIEVAL	375742	556210
NY7649	76491	MINE SHAFT	POST MEDIEVAL	376979	549176
NY7650	76502	MINE SHAFT	POST MEDIEVAL	376655	550129
NY7650	76503	EXTRACTIVE PIT	POST MEDIEVAL	376674	550321
NY7650	76504	ADIT	POST MEDIEVAL	376958	550486
NY7650	76505	QUARRY	POST MEDIEVAL	376438	550949
NY7650	76508	QUARRY	POST MEDIEVAL	376414	550780
NY7651	76511	ENCLOSURE	POST MEDIEVAL	376561	551848
NY7651	76516	DAM	POST MEDIEVAL	376412	551295
NY7651	76517	LEAD WORKINGS	POST MEDIEVAL	376876	551231
NY7651	76518	LEAD WORKINGS	POST MEDIEVAL	376896	551008
NY7651	765111	MINE SHAFT	POST MEDIEVAL	376532	551697
NY7651	765112	MINE SHAFT	POST MEDIEVAL	376924	551328
NY7651	765113	MINE SHAFT	POST MEDIEVAL	376917	551277
NY7651	765114	MINE SHAFT	POST MEDIEVAL	376599	551626
NY7651	765115	MINE SHAFT	POST MEDIEVAL	376881	551062
NY7651	765116	MINE SHAFT	POST MEDIEVAL	376904	551042
NY7651	765117	DAM	POST MEDIEVAL	376982	551340
NY7652	76521	QUARRY	POST MEDIEVAL	376682	552804
NY7652	76523	QUARRY	POST MEDIEVAL	376839	552438
NY7652	76524	MINE SHAFT	POST MEDIEVAL	376584	552369
NY7652	76529	MINE SHAFT	POST MEDIEVAL	376955	552260
NY7652	765210	MINE SHAFT	POST MEDIEVAL	376817	552165
NY7652	765211	MINE SHAFT	POST MEDIEVAL	376521	552330
NY7652	765212	MINE SHAFT	POST MEDIEVAL	376514	552321
NY7653	76531	QUARRY	POST MEDIEVAL	376858	553851
NY7653	76532	QUARRY	POST MEDIEVAL	376650	553628
NY7653	76533	QUARRY	POST MEDIEVAL	376841	553647
NY7653	76534	QUARRY	POST MEDIEVAL	376742	553262
NY7654	765414	FIELD SYSTEM	POST MEDIEVAL	376758	554972
NY7654	765415	QUARRY	POST MEDIEVAL	376726	554141
NY7654	765416	QUARRY	POST MEDIEVAL	376786	554397
NY7656	76561	QUARRY	POST MEDIEVAL	376046	556582
NY7656	76562	EARTHWORK	UNKNOWN	376568	556748
NY7656	76565	EARTHWORK	UNKNOWN	376923	556220
NY7656	76568	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	376434	556527
NY7657	76571	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	376645	557653
NY7657	76572	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	376758	557715
NY7657	76573	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	376823	557601
NY7657	765713	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	376977	557767
NY7657	765715	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	376822	557638
NY7657	765721	SETTLEMENT	UNKNOWN	376770	557451
NY7657	765722	MOUND	UNKNOWN	376669	557685
NY7657	765723	MOUND	UNKNOWN	376764	557621
NY7658	76582	FIELD SYSTEM	POST MEDIEVAL	376877	558923
NY7658	76584	FARMSTEAD	POST MEDIEVAL	376939	558766
NY7658	765813	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	376851	558160
NY7658	765814	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	376941	558029
NY7659	76596	FIELD SYSTEM	POST MEDIEVAL	376945	559742
NY7659	76598	FIELD SYSTEM	POST MEDIEVAL	376587	559339
NY7659	765917	QUARRY	POST MEDIEVAL	376334	559275
NY7660	76601	SHIELING	POST MEDIEVAL	376565	560042
NY7747	77471	MINE SHAFT	POST MEDIEVAL	377841	547755
NY7747	77472	ADIT	POST MEDIEVAL	377937	547808
NY7747	77473	ADIT	POST MEDIEVAL	377940	547880
NY7747	77474	COAL WORKINGS	POST MEDIEVAL	377941	547839
NY7748	77481	ADIT	POST MEDIEVAL	377958	548124
NY7748	77482	MOUND	POST MEDIEVAL	377219	548972
NY7748	77483	MOUND	POST MEDIEVAL	377667	548069
NY7748	77484	QUARRY	POST MEDIEVAL	377930	548239
NY7748	77485	LEAD MINE	POST MEDIEVAL	377942	548059
NY7748	77486	MINE SHAFT	POST MEDIEVAL	377206	548832
NY7748	77487	MINE SHAFT	POST MEDIEVAL	377187	548867

NY7749	77491	COAL WORKINGS	POST MEDIEVAL	377792	549841
NY7749	77492	LEAD MINE	POST MEDIEVAL	377734	549569
NY7749	77493	LEAD WORKINGS	POST MEDIEVAL	377977	549332
NY7749	77497	EARTHWORK	UNKNOWN	377400	549258
NY7749	77498	QUARRY	POST MEDIEVAL	377497	549193
NY7749	774910	ENCLOSURE	UNKNOWN	377412	549545
NY7749	774912	FIELD SYSTEM	POST MEDIEVAL	377196	549849
NY7749	774913	MINE SHAFT	POST MEDIEVAL	377981	549560
NY7749	774914	MINE SHAFT	POST MEDIEVAL	377987	549548
NY7749	774915	MINE SHAFT	POST MEDIEVAL	377945	549518
NY7749	774916	MINE SHAFT	POST MEDIEVAL	377899	549495
NY7749	774917	MINE SHAFT	POST MEDIEVAL	377871	549453
NY7749	774918	MINE SHAFT	POST MEDIEVAL	377847	549433
NY7749	774919	MINE SHAFT	POST MEDIEVAL	377792	549355
NY7749	774920	LIME KILN	POST MEDIEVAL	377703	549347
NY7749	774921	MINE SHAFT	POST MEDIEVAL	377844	549576
NY7749	774922	MINE SHAFT	POST MEDIEVAL	377810	549594
NY7749	774923	MINE SHAFT	POST MEDIEVAL	377747	549609
NY7749	774924	MINE SHAFT	POST MEDIEVAL	377811	549572
NY7749	774925	MINE SHAFT	POST MEDIEVAL	377676	549540
NY7749	774926	MINE SHAFT	POST MEDIEVAL	377615	549531
NY7749	774927	MINE SHAFT	POST MEDIEVAL	377589	549503
NY7749	774928	MINE SHAFT	POST MEDIEVAL	377744	549482
NY7749	774929	DAM	POST MEDIEVAL	377870	549423
NY7749	774930	DAM	POST MEDIEVAL	377847	549461
NY7749	774931	DAM	POST MEDIEVAL	377836	549397
NY7749	774932	DAM	POST MEDIEVAL	377815	549330
NY7749	774933	DAM	POST MEDIEVAL	377783	549287
NY7749	774934	DAM	POST MEDIEVAL	377923	549494
NY7749	774935	HUSH	POST MEDIEVAL	377734	549337
NY7749	774936	HUSH	POST MEDIEVAL	377662	549557
NY7749	774937	DAM	POST MEDIEVAL	377770	549589
NY7749	774938	LEAT	POST MEDIEVAL	377742	549549
NY7749	774939	LEAT	POST MEDIEVAL	377823	549419
NY7749	774940	MINE SHAFT	POST MEDIEVAL	377009	549158
NY7749	774941	MINE SHAFT	POST MEDIEVAL	377254	549328
NY7750	77507	EARTHWORK	POST MEDIEVAL	377105	550616
NY7750	775027	EARTHWORK	UNKNOWN	377904	550863
NY7750	775029	MINE SHAFT	POST MEDIEVAL	377087	550774
NY7750	775030	MINE SHAFT	POST MEDIEVAL	377081	550694
NY7750	775031	MINE SHAFT	POST MEDIEVAL	377049	550537
NY7750	775032	MINE SHAFT	POST MEDIEVAL	377106	555057
NY7751	77511	MINE SHAFT	POST MEDIEVAL	377179	551811
NY7751	77512	MINE SHAFT	POST MEDIEVAL	377235	551863
NY7751	77513	MINE SHAFT	POST MEDIEVAL	377585	551670
NY7751	77514	MINE SHAFT	POST MEDIEVAL	377630	551643
NY7751	77515	MINE SHAFT	POST MEDIEVAL	377694	551637
NY7751	77516	MINE SHAFT	POST MEDIEVAL	377728	551633
NY7751	77517	MINE SHAFT	POST MEDIEVAL	377471	551599
NY7751	77518	MINE SHAFT	POST MEDIEVAL	377486	551574
NY7751	77519	MINE SHAFT	POST MEDIEVAL	377542	551543
NY7751	775110	MINE SHAFT	POST MEDIEVAL	377607	551512
NY7751	775111	MINE SHAFT	POST MEDIEVAL	377315	551660
NY7751	775112	MINE SHAFT	POST MEDIEVAL	377314	551693
NY7751	775113	MINE SHAFT	POST MEDIEVAL	377004	551324
NY7751	775114	MINE SHAFT	POST MEDIEVAL	377007	551363
NY7751	775115	MINE SHAFT	POST MEDIEVAL	377087	551414
NY7751	775116	MINE SHAFT	POST MEDIEVAL	377100	551424
NY7751	775117	HUSH	POST MEDIEVAL	377344	551512
NY7751	775118	LEAD WORKINGS	POST MEDIEVAL	377149	551485
NY7751	775119	MINE SHAFT	POST MEDIEVAL	377451	551482
NY7751	775120	BUILDING	POST MEDIEVAL	377351	551696

NY7752	77522	QUARRY	POST MEDIEVAL	377382	552896
NY7752	77526	ENCLOSURE	UNKNOWN	377575	552273
NY7752	775215	QUARRY	POST MEDIEVAL	377385	552470
NY7752	775216	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	377391	552451
NY7752	775222	ADIT	POST MEDIEVAL	377056	552148
NY7752	775225	QUARRY	POST MEDIEVAL	377184	552946
NY7752	775226	QUARRY	POST MEDIEVAL	377163	552624
NY7752	775227	QUARRY	POST MEDIEVAL	377531	552458
NY7753	77532	ROAD	POST MEDIEVAL	377462	553446
NY7753	77534	QUARRY	POST MEDIEVAL	377632	553556
NY7753	77535	EARTHWORK	POST MEDIEVAL	377665	553742
NY7754	77541	QUARRY	POST MEDIEVAL	377182	554380
NY7754	77542	QUARRY	POST MEDIEVAL	377049	554241
NY7754	77543	MOUND	POST MEDIEVAL	377881	554589
NY7754	77544	ENCLOSURE	UNKNOWN	377945	554719
NY7754	77545	FARMSTEAD	MEDIEVAL	377728	554570
NY7754	77546	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	377697	554425
NY7755	77557	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	377893	555317
NY7755	775513	DESERTED SETTLEMENT	MEDIEVAL	377915	555447
NY7756	77565	STEADING	MEDIEVAL/POST MEDIEVAL	377571	556770
NY7757	77572	STRUCTURE	MEDIEVAL/POST MEDIEVAL	377095	557916
NY7757	77577	QUARRY	POST MEDIEVAL	377813	557631
NY7757	77578	LYNCHET	MEDIEVAL/POST MEDIEVAL	377813	557566
NY7757	775715	MOUND	UNKNOWN	377782	557230
NY7757	775716	SETTLEMENT	PREHISTORIC/ROMAN	377776	557034
NY7758	77587	DESERTED SETTLEMENT	MEDIEVAL	377772	558545
NY7758	775810	EARTHWORK	UNKNOWN	377278	558524
NY7758	775820	STEADING	MEDIEVAL/POST MEDIEVAL	377316	558374
NY7760	77602	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	377808	560670
NY7760	77603	FIELD SYSTEM	POST MEDIEVAL	377500	560192
NY7761	77613	QUARRY	POST MEDIEVAL	377050	561355
NY7761	77615	FIELD SYSTEM	POST MEDIEVAL	377534	561301
NY7848	78481	MINE SHAFT	POST MEDIEVAL	378060	548022
NY7849	78491	QUARRY	POST MEDIEVAL	378212	549204
NY7849	78492	QUARRY	POST MEDIEVAL	378059	549191
NY7849	78493	QUARRY	POST MEDIEVAL	378114	549796
NY7849	78494	MINE SHAFT	POST MEDIEVAL	378011	549571
NY7849	78495	QUARRY	POST MEDIEVAL	378113	549445
NY7849	78496	QUARRY	POST MEDIEVAL	378942	549382
NY7849	78498	FARMSTEAD	POST MEDIEVAL	378604	549880
NY7849	784910	ENCLOSURE	UNKNOWN	378836	549979
NY7849	784912	MINE SHAFT	POST MEDIEVAL	378084	549504
NY7849	784913	MINE SHAFT	POST MEDIEVAL	378038	549481
NY7850	78507	QUARRY	POST MEDIEVAL	378440	550062
NY7850	785014	QUARRY	POST MEDIEVAL	378920	550821
NY7851	78513	FIELD SYSTEM	MEDIEVAL	378257	551376
NY7851	78515	SHEEP FOLD	POST MEDIEVAL	378307	551174
NY7851	785114	FIELD SYSTEM	MEDIEVAL	378532	551292
NY7851	785125	FIELD SYSTEM	POST MEDIEVAL	378667	551481
NY7851	785126	EARTHWORK	POST MEDIEVAL	378561	551897
NY7851	785128	QUARRY	POST MEDIEVAL	378993	551337
NY7851	785129	QUARRY	POST MEDIEVAL	378946	551470
NY7851	785131	QUARRY	POST MEDIEVAL	378919	551981
NY7851	785132	MINE SHAFT	POST MEDIEVAL	378486	551354
NY7851	785133	LEAD MINE	POST MEDIEVAL	379341	551938
NY7852	78522	CORN MILL	POST MEDIEVAL	378160	552626
NY7852	785215	FARMSTEAD	POST MEDIEVAL	378604	552659
NY7852	785216	LEAD MINE	POST MEDIEVAL	378586	552081
NY7852	785223	QUARRY	POST MEDIEVAL	378647	552454
NY7852	785224	QUARRY	POST MEDIEVAL	378884	552592
NY7852	785225	QUARRY	POST MEDIEVAL	378772	552194
NY7852	785226	LIME KILN	POST MEDIEVAL	378784	552199

NY7852	785227	QUARRY	POST MEDIEVAL	378732	552101
NY7852	785228	LEAD MINE	POST MEDIEVAL	378492	552003
NY7852	785229	QUARRY	POST MEDIEVAL	378534	552949
NY7852	785230	QUARRY	POST MEDIEVAL	378932	552080
NY7852	785231	QUARRY	POST MEDIEVAL	378535	552775
NY7852	785232	QUARRY	POST MEDIEVAL	378510	552883
NY7852	785233	LEAD MINE	POST MEDIEVAL	378296	552213
NY7852	785234	LEAD MINE	POST MEDIEVAL	378256	552162
NY7853	78532	COAL MINE	POST MEDIEVAL	378354	553217
NY7853	78534	QUARRY	POST MEDIEVAL	378204	553085
NY7853	78537	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	378518	553881
NY7853	785317	SETTLEMENT	PREHISTORIC/ROMAN	378564	553821
NY7854	78543	ENCLOSURE	PREHISTORIC/ROMAN	378683	554288
NY7854	78545	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	378640	554145
NY7854	78547	EXTRACTIVE PIT	MEDIEVAL/POST MEDIEVAL	378733	554071
NY7854	78548	QUARRY	POST MEDIEVAL	378922	554197
NY7854	78549	CULTIVATION TERRACE	MEDIEVAL	378353	554796
NY7854	785418	FARMSTEAD	POST MEDIEVAL	378399	554838
NY7854	785424	DAM	POST MEDIEVAL	378682	554966
NY7854	785425	MINE SHAFT	POST MEDIEVAL	378909	554661
NY7855	78559	FARMSTEAD	MEDIEVAL	378092	555534
NY7855	785519	QUARRY	POST MEDIEVAL	378532	555793
NY7855	785521	QUARRY	POST MEDIEVAL	378434	555783
NY7855	785522	QUARRY	POST MEDIEVAL	378434	555714
NY7855	785524	MINE SHAFT	POST MEDIEVAL	378922	555907
NY7855	785526	MINE SHAFT	POST MEDIEVAL	378919	555816
NY7855	785527	MINE SHAFT	POST MEDIEVAL	378946	555737
NY7855	785528	MINE SHAFT	POST MEDIEVAL	378960	555710
NY7855	785529	MINE SHAFT	POST MEDIEVAL	378881	555682
NY7855	785530	MINE SHAFT	POST MEDIEVAL	378916	555602
NY7855	785531	QUARRY	POST MEDIEVAL	378973	555476
NY7855	785532	MINE SHAFT	POST MEDIEVAL	378820	555515
NY7855	785533	MINE SHAFT	POST MEDIEVAL	378711	555662
NY7856	78562	ADIT	POST MEDIEVAL	378453	556808
NY7856	78563	QUARRY	POST MEDIEVAL	378725	556812
NY7856	78564	QUARRY	POST MEDIEVAL	378605	556994
NY7856	78565	QUARRY	POST MEDIEVAL	378944	556932
NY7856	785614	QUARRY	POST MEDIEVAL	378658	556531
NY7856	785616	FIELD SYSTEM	POST MEDIEVAL	378727	556149
NY7856	785618	QUARRY	POST MEDIEVAL	378962	556430
NY7856	785623	QUARRY	POST MEDIEVAL	378386	556107
NY7856	785627	COAL WORKINGS	POST MEDIEVAL	378607	556177
NY7856	785628	QUARRY	POST MEDIEVAL	378930	556121
NY7856	785629	MINE SHAFT	POST MEDIEVAL	378961	556957
NY7857	78571	HOLLOW WAY	POST MEDIEVAL	378941	557952
NY7857	78574	MILL LEAT	POST MEDIEVAL	378280	557566
NY7857	78579	QUARRY	POST MEDIEVAL	378901	557320
NY7857	785710	ENCLOSURE	PREHISTORIC/ROMAN	378904	557435
NY7858	78585	FARMSTEAD	POST MEDIEVAL	378217	558492
NY7858	785814	MOUND	POST MEDIEVAL	378057	558275
NY7859	78596	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	378270	559416
NY7859	785912	EARTHWORK	UNKNOWN	378579	559391
NY7861	78612	STEADING	MEDIEVAL	378667	561236
NY7946	79461	MINE SHAFT	POST MEDIEVAL	379984	546848
NY7946	79462	MINE SHAFT	POST MEDIEVAL	379756	546790
NY7947	79471	QUARRY	POST MEDIEVAL	379432	547618
NY7948	79483	FIELD SYSTEM	POST MEDIEVAL	379177	548792
NY7950	79501	COAL WORKINGS	POST MEDIEVAL	379270	550187
NY7950	79502	QUARRY	POST MEDIEVAL	379721	550475
NY7951	79511	QUARRY	POST MEDIEVAL	379065	551764
NY7951	79512	QUARRY	POST MEDIEVAL	379117	551606
NY7951	79513	QUARRY	POST MEDIEVAL	379163	551439

NY7951	79515	QUARRY	POST MEDIEVAL	379291	551026
NY7951	79516	QUARRY	POST MEDIEVAL	379331	551214
NY7951	79519	QUARRY	POST MEDIEVAL	379039	551915
NY7951	795110	COAL WORKINGS	POST MEDIEVAL	379239	551763
NY7951	795111	MINE SHAFT	POST MEDIEVAL	379443	551443
NY7952	79521	QUARRY	POST MEDIEVAL	379168	552595
NY7952	79522	QUARRY	POST MEDIEVAL	379024	552068
NY7952	79523	QUARRY	POST MEDIEVAL	379096	552147
NY7954	79542	QUARRY	POST MEDIEVAL	379047	554179
NY7954	79543	QUARRY	POST MEDIEVAL	379026	554615
NY7954	79544	QUARRY	POST MEDIEVAL	379298	554861
NY7954	79545	QUARRY	POST MEDIEVAL	379523	554683
NY7954	79546	QUARRY	POST MEDIEVAL	379602	554952
NY7954	79547	COAL WORKINGS	POST MEDIEVAL	379088	554991
NY7955	79552	QUARRY	POST MEDIEVAL	379063	555930
NY7955	79554	QUARRY	POST MEDIEVAL	379157	555639
NY7955	79556	QUARRY	POST MEDIEVAL	379058	555273
NY7955	79557	QUARRY	POST MEDIEVAL	379415	555529
NY7955	795510	QUARRY	POST MEDIEVAL	379422	555441
NY7955	795511	QUARRY	POST MEDIEVAL	379266	555437
NY7955	795512	QUARRY	POST MEDIEVAL	379494	555810
NY7956	79564	QUARRY	POST MEDIEVAL	379073	556784
NY7956	79565	QUARRY	POST MEDIEVAL	379280	556015
NY7957	79571	EARTHWORK	UNKNOWN	379120	557783
NY7957	79528	MOUND	UNKNOWN	379652	557086
NY7957	79529	QUARRY	POST MEDIEVAL	379622	557010
NY7957	795210	QUARRY	POST MEDIEVAL	379185	557406
NY7957	795211	STRUCTURE	POST MEDIEVAL	379156	557343
NY7957	795727	EARTHWORK	POST MEDIEVAL	379228	557380
NY7957	795728	FIELD SYSTEM	POST MEDIEVAL	379145	557142
NY7958	79581	FIELD SYSTEM	POST MEDIEVAL	379332	558782
NY7958	795810	FIELD SYSTEM	MEDIEVAL	379824	558366
NY7958	795816	STEADING	POST MEDIEVAL	379253	558700
NY7958	795817	EARTHWORK	UNKNOWN	379349	558626
NY7958	795819	EARTHWORK	UNKNOWN	379509	558892
NY7958	795828	ENCLOSURE	PREHISTORIC	379964	558408
NY7959	79598	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	379537	559573
NY7960	79602	FARMSTEAD	MEDIEVAL	379225	560208
NY7961	79615	STRUCTURE	MEDIEVAL	379132	561114
NY7961	79616	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	379206	561219
NY7961	79617	DESERTED SETTLEMENT	MEDIEVAL	379102	561165
NY7962	796212	FARMSTEAD	POST MEDIEVAL	379107	562275
NY8046	80464	MINE SHAFT	POST MEDIEVAL	380106	546988
NY8046	80465	LEAD WORKINGS	POST MEDIEVAL	380220	546910
NY8046	80466	MINE SHAFT	POST MEDIEVAL	380275	546912
NY8046	80469	QUARRY	POST MEDIEVAL	380475	546938
NY8046	804610	MINE SHAFT	POST MEDIEVAL	380548	546952
NY8046	804613	QUARRY	POST MEDIEVAL	380454	546797
NY8046	804616	QUARRY	POST MEDIEVAL	380250	546777
NY8046	804617	MINE WORKINGS	POST MEDIEVAL	380210	546721
NY8046	804623	EARTHWORK	UNKNOWN	380250	546078
NY8046	804624	LEAT	POST MEDIEVAL	380109	546761
NY8046	804644	QUARRY	POST MEDIEVAL	380404	546495
NY8046	804645	QUARRY	POST MEDIEVAL	380369	546471
NY8046	804646	QUARRY	POST MEDIEVAL	380381	546353
NY8046	804655	MINE SHAFT	POST MEDIEVAL	380148	546860
NY8046	804656	RESERVOIR	POST MEDIEVAL	380166	546713
NY8047	80471	HOLLOW WAY	POST MEDIEVAL	380454	547779
NY8047	80475	MINE SHAFT	POST MEDIEVAL	380772	547262
NY8047	80476	EXTRACTIVE PIT	POST MEDIEVAL	380524	547049
NY8047	80477	MINE SHAFT	POST MEDIEVAL	380146	547037
NY8047	80479	QUARRY	POST MEDIEVAL	380670	547553

NY8047	804712	QUARRY	POST MEDIEVAL	380776	547218
NY8047	804713	MINE SHAFT	POST MEDIEVAL	380189	547117
NY8047	804714	RESERVOIR	POST MEDIEVAL	380389	547044
NY8047	804715	EXTRACTIVE PIT	POST MEDIEVAL	380059	547195
NY8048	80481	QUARRY	POST MEDIEVAL	380639	548878
NY8048	80484	ROAD	POST MEDIEVAL	380495	548924
NY8048	80485	QUARRY	POST MEDIEVAL	380708	548692
NY8048	80487	ENCLOSURE	UNKNOWN	380069	548872
NY8048	804811	QUARRY	POST MEDIEVAL	380327	548146
NY8049	80492	QUARRY	POST MEDIEVAL	380406	549529
NY8049	80493	QUARRY	POST MEDIEVAL	380519	549299
NY8049	80494	QUARRY	POST MEDIEVAL	380614	549328
NY8049	80496	MINE SHAFT	POST MEDIEVAL	380471	549302
NY8049	80497	MINE SHAFT	POST MEDIEVAL	380192	549951
NY8049	80498	MINE SHAFT	POST MEDIEVAL	380357	549604
NY8049	80499	MINE SHAFT	POST MEDIEVAL	380563	549015
NY8049	804910	QUARRY	POST MEDIEVAL	380235	549509
NY8049	804911	QUARRY	POST MEDIEVAL	380039	549957
NY8054	80542	MINE SHAFT	POST MEDIEVAL	380772	554708
NY8054	80543	MINE SHAFT	POST MEDIEVAL	380780	554648
NY8054	80544	MINE SHAFT	POST MEDIEVAL	380776	554594
NY8054	80545	MINE SHAFT	POST MEDIEVAL	380789	554118
NY8054	80546	MINE SHAFT	POST MEDIEVAL	380806	554136
NY8054	80547	MINE SHAFT	POST MEDIEVAL	380773	554098
NY8054	80548	MINE SHAFT	POST MEDIEVAL	380781	554127
NY8054	80549	MINE SHAFT	POST MEDIEVAL	380787	554179
NY8055	80552	FIELD SYSTEM	POST MEDIEVAL	380379	555867
NY8056	80561	DESERTED SETTLEMENT	MEDIEVAL	380366	556699
NY8057	805723	STEADING	POST MEDIEVAL	380888	557243
NY8057	805725	FIELD SYSTEM	POST MEDIEVAL	380277	557506
NY8058	80582	QUARRY	POST MEDIEVAL	380720	558836
NY8058	8583	MINE SHAFT	MEDIEVAL/POST MEDIEVAL	380165	558230
NY8058	80587	EARTHWORK	UNKNOWN	380735	558898
NY8058	80588	EARTHWORK	UNKNOWN	380030	558371
NY8058	80589	EARTHWORK	MEDIEVAL/POST MEDIEVAL	380984	558262
NY8059	80896	EARTHWORK	POST MEDIEVAL	380384	559078
NY8059	80598	QUARRY	POST MEDIEVAL	380746	559118
NY8059	805910	QUARRY	POST MEDIEVAL	380659	559732
NY8059	805912	MINE SHAFT	POST MEDIEVAL	380858	559729
NY8059	805916	CULTIVATION TERRACE	MEDIEVAL/POST MEDIEVAL	380452	559196
NY8059	805923	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	380727	559797
NY8059	805929	EARTHWORK	UNKNOWN	380464	559341
NY8059	805930	QUARRY	POST MEDIEVAL	380654	559439
NY8059	805931	ADIT	POST MEDIEVAL	380898	559824
NY8061	80617	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	380634.00	561671.00
NY8061	806122	QUARRY	POST MEDIEVAL	380215	561212
NY8061	806123	QUARRY	POST MEDIEVAL	380290	661270
NY8061	806124	QUARRY	POST MEDIEVAL	380281	561185
NY8061	806125	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	380455	561263
NY8061	806126	QUARRY	POST MEDIEVAL	380538	561155
NY8061	806127	QUARRY	POST MEDIEVAL	380538	561155
NY8061	806128	MOUND	UNKNOWN	380453	561119
NY8061	806129	EARTHWORK	UNKNOWN	380964	561421
NY8061	806130	SHIELING	POST MEDIEVAL	380597	561864
NY8061	806131	MINE SHAFT	POST MEDIEVAL	380064	561864
NY8061	806132	MINE SHAFT	POST MEDIEVAL	380080	561913
NY8062	80621	FARMSTEAD	POST MEDIEVAL	380315	562898
NY8062	80622	QUARRY	POST MEDIEVAL	380279	562851
NY8062	80623	QUARRY	POST MEDIEVAL	380108	562861
NY8063	80631	QUARRY	POST MEDIEVAL	380075	563006
NY8152	81521	QUARRY	POST MEDIEVAL	381543	552954
NY8152	81523	LEAD MINE	POST MEDIEVAL	381854	552899

NY8152	81526	MINE SHAFT	POST MEDIEVAL	381621	552512
NY8152	81528	MINE SHAFT	POST MEDIEVAL	381499	552588
NY8152	81529	MINE SHAFT	POST MEDIEVAL	381328	552427
NY8152	815210	QUARRY	POST MEDIEVAL	381097	552925
NY8153	81536	HOLLOW WAY	MEDIEVAL	381567	553821
NY8153	815316	STRUCTURE	POST MEDIEVAL	381966	553648
NY8153	815321	HOLLOW WAY	POST MEDIEVAL	381146	553252
NY8153	815322	EARTHWORK	POST MEDIEVAL	381192	553263
NY8153	815324	BUILDING	POST MEDIEVAL	381525	553268
NY8153	815331	BOUNDARY BANK	POST MEDIEVAL	381489	553643
NY8153	815333	MINE SHAFT	POST MEDIEVAL	381374	553068
NY8153	815334	MINE SHAFT	POST MEDIEVAL	381141	553007
NY8153	815335	MINE SHAFT	POST MEDIEVAL	381190	553035
NY8153	815336	QUARRY	POST MEDIEVAL	381697	553922
NY8153	815337	QUARRY	POST MEDIEVAL	381486	553922
NY8153	815338	EARTHWORK	UNKNOWN	381843	553527
NY8153	815339	EARTHWORK	UNKNOWN	381417	553827
NY8154	81544	FIELD SYSTEM	MEDIEVAL	381896	554927
NY8154	81545	BOUNDARY BANK	POST MEDIEVAL	381438	554367
NY8155	81554	FIELD SYSTEM	POST MEDIEVAL	381277	555785
NY8155	81555	QUARRY	POST MEDIEVAL	381620	555989
NY8155	81556	QUARRY	POST MEDIEVAL	381868	555773
NY8155	81557	QUARRY	POST MEDIEVAL	381752	555682
NY8155	81558	QUARRY	POST MEDIEVAL	381628	555523
NY8155	81559	QUARRY	POST MEDIEVAL	381462	555449
NY8155	815510	QUARRY	POST MEDIEVAL	381473	555546
NY8155	815511	QUARRY	POST MEDIEVAL	381567	555648
NY8155	815412	QUARRY	POST MEDIEVAL	381351	555393
NY8155	815513	QUARRY	POST MEDIEVAL	381181	555199
NY8155	815514	QUARRY	POST MEDIEVAL	381216	555300
NY8155	815515	BOUNDARY BANK	POST MEDIEVAL	381094	555673
NY8155	815516	FIELD SYSTEM	POST MEDIEVAL	381774	555021
NY8156	81568	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	381651	556216
NY8156	815619	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	381702	556544
NY8156	815620	STEADING	MEDIEVAL/POST MEDIEVAL	381598	556546
NY8156	815636	FIELD SYSTEM	POST MEDIEVAL	381266	556126
NY8156	815637	EARTHWORK	POST MEDIEVAL	381536	556090
NY8156	815644	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	381776	556073
NY8156	815650	STEADING	POST MEDIEVAL	381876	556074
NY8158	81581	FIELD SYSTEM	PREHISTORIC/ROMAN	381134	558900
NY8158	815810	ENCLOSURE	PREHISTORIC/ROMAN	381289	558230
NY8158	815813	FIELD SYSTEM	POST MEDIEVAL	381438	558706
NY8158	815814	FARMSTEAD	POST MEDIEVAL	381804	558451
NY8159	81591	QUARRY	POST MEDIEVAL	381099	559353
NY8159	81592	QUARRY	POST MEDIEVAL	381633	559879
NY8159	81593	QUARRY	POST MEDIEVAL	381421	559683
NY8159	81594	QUARRY	POST MEDIEVAL	381361	559112
NY8159	81597	QUARRY	POST MEDIEVAL	381883	559276
NY8159	81598	QUARRY	POST MEDIEVAL	381732	559723
NY8159	81599	STEADING	POST MEDIEVAL	381396	559968
NY8159	815910	FIELD SYSTEM	POST MEDIEVAL	381436	559516
NY8159	815911	STEADING	POST MEDIEVAL	381505	559467
NY8160	81604	LINEAR EARTHWORK	UNKNOWN	381112	560078
NY8160	816011	MINE SHAFT	POST MEDIEVAL	381665	560444
NY8160	816014	HOLLOW WAY	POST MEDIEVAL	381611	560811
NY8160	816016	ROAD	POST MEDIEVAL	381385	560849
NY8160	816020	HOLLOW WAY	UNKNOWN	381379	560233
NY8160	816021	FIELD SYSTEM	POST MEDIEVAL	381485	560341
NY8160	816022	COAL WORKINGS	POST MEDIEVAL	381554	560730
NY8160	816025	COAL WORKINGS	POST MEDIEVAL	381219	560836
NY8160	816026	HOLLOW WAY	POST MEDIEVAL	381763	560684
NY8160	816027	QUARRY	POST MEDIEVAL	381398	560388

NY8160	816028	COAL WORKINGS	POST MEDIEVAL	381508	560825
NY8160	816029	COAL WORKINGS	POST MEDIEVAL	381574	560859
NY8160	816030	COAL WORKINGS	POST MEDIEVAL	381472	560649
NY8160	816031	COAL WORKINGS	POST MEDIEVAL	381789	560693
NY8160	816032	COAL WORKINGS	POST MEDIEVAL	381462	560693
NY8160	816033	COAL WORKINGS	POST MEDIEVAL	381949	560028
NY8160	816034	COAL WORKINGS	POST MEDIEVAL	381843	560028
NY8161	81611	QUARRY	POST MEDIEVAL	381241	561042
NY8246	82461	MINE SHAFT	POST MEDIEVAL	382757	546633
NY8247	82471	SHEEP FOLD	POST MEDIEVAL	382952	547206
NY8248	82481	SHEEP FOLD	POST MEDIEVAL	382743	548515
NY8251	82511	QUARRY	POST MEDIEVAL	382125	551693
NY8253	82533	FIELD SYSTEM	POST MEDIEVAL	382857	553581
NY8253	82535	MOUND	UNKNOWN	382451	553716
NY8253	82538	EARTHWORK	UNKNOWN	382421	553110
NY8253	825310	EARTHWORK	POST MEDIEVAL	382450	553195
NY8253	825311	BOUNDARY BANK	POST MEDIEVAL	382487	553437
NY8254	82544	STRUCTURE	POST MEDIEVAL	382866	554534
NY8254	82547	FARMSTEAD	POST MEDIEVAL	382750	554053
NY8254	82549	QUARRY	POST MEDIEVAL	382612	554129
NY8254	825410	HOLLOW WAY	POST MEDIEVAL	382786	554418
NY8254	825411	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	382357	554324
NY8254	825416	STEADING	POST MEDIEVAL	382949	554191
NY8255	82553	CONDENSING FLUE	POST MEDIEVAL	382025	555540
NY8255	82554	QUARRY	POST MEDIEVAL	382238	555522
NY8255	82555	HOLLOW WAY	POST MEDIEVAL	382132	555483
NY8255	82556	QUARRY	POST MEDIEVAL	382297	555988
NY8255	82558	PARK PALE	MEDIEVAL	382406	555624
NY8255	825510	QUARRY	POST MEDIEVAL	382272	555002
NY8255	825513	FIELD SYSTEM	MEDIEVAL	382639	555602
NY8255	825515	POND	POST MEDIEVAL	382852	555545
NY8255	825516	FARMSTEAD	POST MEDIEVAL	382652	555885
NY8255	825523	SETTLEMENT	PREHISTORIC/ROMAN	382741	555860
NY8255	825524	ENCLOSURE	MEDIEVAL	382368	555421
NY8255	825525	BOUNDARY BANK	POST MEDIEVAL	382925	555539
NY8255	825526	STRUCTURE	POST MEDIEVAL	382658	555647
NY8256	82561	CONDENSING FLUE	POST MEDIEVAL	382840	556151
NY8256	82562	CONDENSING FLUE	POST MEDIEVAL	382485	556027
NY8256	82565	QUARRY	POST MEDIEVAL	382494	556973
NY8256	82568	QUARRY	POST MEDIEVAL	382055	556809
NY8256	82569	QUARRY	POST MEDIEVAL	382533	556535
NY8256	825612	QUARRY	POST MEDIEVAL	382125	556131
NY8256	825615	STRUCTURE	POST MEDIEVAL	382062	556518
NY8256	825621	ADIT	POST MEDIEVAL	382739	556881
NY8256	825622	ENCLOSURE	PREHISTORIC/ROMAN	382256	556240
NY8256	825623	PLATFORM	UNKNOWN	382485	556447
NY8257	82571	ENCLOSURE	UNKNOWN	382941	557948
NY8257	82573	HOLLOW WAY	MEDIEVAL	382429	557806
NY8257	82576	FIELD SYSTEM	MEDIEVAL	382470	557528
NY8257	82577	ENCLOSURE	MEDIEVAL	382969	557264
NY8257	825710	EARTHWORK	POST MEDIEVAL	382552	557288
NY8257	825711	QUARRY	POST MEDIEVAL	382369	557314
NY8257	825712	ENCLOSURE	UNKNOWN	382756	555506
NY8257	825713	QUARRY	POST MEDIEVAL	382273	557335
NY8258	82585	FIELD SYSTEM	POST MEDIEVAL	382278	558612
NY8258	825812	FIELD SYSTEM	POST MEDIEVAL	382517	558178
NY8258	825813	QUARRY	POST MEDIEVAL	382505	558427
NY8260	82601	QUARRY	POST MEDIEVAL	382037	560123
NY8260	82602	QUARRY	POST MEDIEVAL	382114	560188
NY8345	83451	AQUEDUCT	POST MEDIEVAL	383815	545848
NY8346	83462	EARTHWORK	POST MEDIEVAL	383806	546365
NY8346	83465	QUARRY	POST MEDIEVAL	383663	546255

NY8346	83466	MINE SHAFT	POST MEDIEVAL	383106	546972
NY8346	83467	MINE SHAFT	POST MEDIEVAL	383145	546939
NY8346	83468	BOUNDARY BANK	UNKNOWN	383053	546805
NY8346	83469	QUARRY	POST MEDIEVAL	383177	546650
NY8346	834610	QUARRY	POST MEDIEVAL	383159	546613
NY8346	834611	QUARRY	POST MEDIEVAL	383423	546973
NY8346	834612	MINE SHAFT	POST MEDIEVAL	383454	546984
NY8346	834613	MINE SHAFT	POST MEDIEVAL	383805	546822
NY8346	834614	MINE SHAFT	POST MEDIEVAL	383852	546862
NY8346	834615	MINE SHAFT	POST MEDIEVAL	383894	546957
NY8346	834616	MINE SHAFT	POST MEDIEVAL	383956	546922
NY8346	178346	MINE SHAFT	POST MEDIEVAL	383906	546729
NY8346	834618	QUARRY	POST MEDIEVAL	383879	546499
NY8347	83473	HOLLOW WAY	POST MEDIEVAL	383419	547954
NY8347	83474	EARTHWORK	POST MEDIEVAL	383440	547924
NY8347	83475	HUSH	POST MEDIEVAL	383140	547580
NY8347	83476	QUARRY	POST MEDIEVAL	383949	547539
NY8347	83477	BOUNDARY BANK	MEDIEVAL	383214	547540
NY8347	834710	LEAT	POST MEDIEVAL	383116	547467
NY8347	834711	MINE SHAFT	MEDIEVAL/POST MEDIEVAL	383136	547651
NY8347	834712	LEAD MINE	POST MEDIEVAL	383150	547527
NY8347	834713	ENCLOSURE	POST MEDIEVAL	383289	547676
NY8347	834714	EARTHWORK	POST MEDIEVAL	383700	547997
NY8347	158347	QUARRY	POST MEDIEVAL	383859	547196
NY8347	834716	QUARRY	POST MEDIEVAL	383686	547151
NY8347	834717	MINE SHAFT	POST MEDIEVAL	383127	547032
NY8347	834718	QUARRY	POST MEDIEVAL	385542	547037
NY8347	834719	FIELD SYSTEM	POST MEDIEVAL	383663	547653
NY8348	83481	QUARRY	POST MEDIEVAL	383514	54867
NY8348	83482	QUARRY	POST MEDIEVAL	383679	548451
NY8348	83483	QUARRY	POST MEDIEVAL	383679	548451
NY8348	83484	QUARRY	POST MEDIEVAL	383595	548048
NY8349	83491	EARTHWORK	POST MEDIEVAL	383602	549384
NY8350	83501	QUARRY	POST MEDIEVAL	383228	550831
NY8354	835481	QUARRY	POST MEDIEVAL	383850	554792
NY8354	835487	EARTHWORK	UNKNOWN	383601	554611
NY8354	835488	QUARRY	POST MEDIEVAL	383788	554943
NY8354	835489	STRUCTURE	POST MEDIEVAL	383930	5546881
NY8354	835490	ENCLOSURE	PREHISTORIC/ROMAN	383224	554953
NY8355	83553	FIELD SYSTEM	MEDIEVAL	383107	555701
NY8355	83554	ENCLOSURE	PREHISTORIC	383047	555689
NY8355	835512	QUARRY	POST MEDIEVAL	383930	555282
NY8355	835513	EARTHWORK	MEDIEVAL/POST MEDIEVAL	383027	555389
NY8356	83564	QUARRY	POST MEDIEVAL	383245	556703
NY8356	83568	DISUSED RAILWAY	POST MEDIEVAL	383208	556731
NY8356	83569	HOLLOW WAY	POST MEDIEVAL	383283	556616
NY8356	835616	EARTHWORK	MEDIEVAL	383584	556395
NY8356	835617	ENCLOSURE	MEDIEVAL	383734	556526
NY8356	835618	ENCLOSURE	UNKNOWN	383928	556730
NY8356	835619	EARTHWORK	POST MEDIEVAL	383073	556452
NY8356	835620	EARTHWORK	POST MEDIEVAL	383226	556245
NY8357	83571	SETTLEMENT	PREHISTORIC/ROMAN	383619	557195
NY8357	83575	EARTHWORK	UNKNOWN	383935	557430
NY8357	83577	EARTHWORK	UNKNOWN	383077	557826
NY8358	83585	EARTHWORK	POST MEDIEVAL	383845	558715
NY8359	83591	ROAD	POST MEDIEVAL	383390	359430
NY8359	83592	COAL WORKINGS	POST MEDIEVAL	383466	559562
NY8359	83593	QUARRY	POST MEDIEVAL	383837	559659
NY8446	84461	QUARRY	POST MEDIEVAL	384499	546844
NY8446	84462	QUARRY	POST MEDIEVAL	384544	546899
NY8446	84463	QUARRY	POST MEDIEVAL	384597	546966
NY8446	84464	QUARRY	POST MEDIEVAL	384398	546121

NY8446	84465	LEAT	POST MEDIEVAL	384913	546584
NY8447	84471	QUARRY	POST MEDIEVAL	384462	547123
NY8447	84472	QUARRY	POST MEDIEVAL	384380	547110
NY8447	84473	QUARRY	POST MEDIEVAL	384505	547017
NY8447	84474	QUARRY	POST MEDIEVAL	384617	547044
NY8447	84475	QUARRY	POST MEDIEVAL	384711	547207
NY8447	84476	BOUNDARY BANK	POST MEDIEVAL	384816	547693
NY8448	84481	BOUNDARY BANK	POST MEDIEVAL	384731	548338
NY8449	84493	QUARRY	POST MEDIEVAL	384563	549914
NY8449	84495	STEADING	POST MEDIEVAL	384253	549642
NY8449	84496	STEADING	POST MEDIEVAL	384221	549663
NY8449	84498	ENCLOSURE	PREHISTORIC	384732	549463
NY8449	84499	MINE SHAFT	POST MEDIEVAL	384322	549232
NY8449	844913	QUARRY	POST MEDIEVAL	384985	549421
NY8449	844914	ENCLOSURE	POST MEDIEVAL	384819	549616
NY8450	8450	QUARRY	POST MEDIEVAL	384774	550728
NY8452	84522	SETTLEMENT	PREHISTORIC/ROMAN	384521	552809
NY8452	84523	FIELD SYSTEM	POST MEDIEVAL	384770	552144
NY8452	84524	EARTHWORK	POST MEDIEVAL	384185	552124
NY8452	84527	QUARRY	POST MEDIEVAL	384406	552748
NY8452	84528	SETTLEMENT	PREHISTORIC/ROMAN	384098	552783
NY8453	84532	FIELD SYSTEM	POST MEDIEVAL	384558	553157
NY8453	84535	ENCLOSURE	PREHISTORIC/ROMAN	384531	553020
NY8453	845310	HOLLOW WAY	POST MEDIEVAL	384726	553896
NY8453	845314	STEADING	MEDIEVAL/POST MEDIEVAL	384476	553350
NY8453	845316	ENCLOSURE	UNKNOWN	384207	553964
NY8455	84554	HOLLOW WAY	POST MEDIEVAL	384111	555438
NY8455	84555	QUARRY	POST MEDIEVAL	384153	555739
NY8455	84556	FIELD SYSTEM	MEDIEVAL	384094	555452
NY8455	845516	EARTHWORK	POST MEDIEVAL	384728	555930
NY8455	845526	BOUNDARY BANK	MEDIEVAL	384134	555163
NY8455	845533	ENCLOSURE	UNKNOWN	384051	555575
NY8455	845536	FIELD SYSTEM	POST MEDIEVAL	384309	555070
NY8455	845537	STEADING	POST MEDIEVAL	384169	555224
NY8455	845538	BOUNDARY BANK	MEDIEVAL	384784	555896
NY8455	845539	BOUNDARY BANK	MEDIEVAL	384061	555109
NY8455	845540	BOUNDARY BANK	MEDIEVAL	384161	555454
NY8456	845634	FIELD SYSTEM	PREHISTORIC	384113	556812
NY8456	845640	EARTHWORK	UNKNOWN	384747	556965
NY8456	845643	ENCLOSURE	MEDIEVAL	384964	556044
NY8456	845646	EARTHWORK	UNKNOWN	384489	556794
NY8456	845647	TRACKWAY	POST MEDIEVAL	384934	556125
NY8456	845648	SETTLEMENT	POST MEDIEVAL	384143	556589
NY8456	845649	FIELD SYSTEM	POST MEDIEVAL	384829	556562
NY8456	845650	EARTHWORK	POST MEDIEVAL	384953	556187
NY8456	845651	HOLLOW WAY	POST MEDIEVAL	384925	556101
NY8456	845652	QUARRY	POST MEDIEVAL	384583	556094
NY8456	845653	EARTHWORK	POST MEDIEVAL	384843	556019
NY8456	845654	BOUNDARY BANK	POST MEDIEVAL	384441	556859
NY8456	845655	FIELD SYSTEM	PREHISTORIC	384110	556511
NY8457	84574	STRUCTURE	POST MEDIEVAL	384770	557624
NY8457	84579	QUARRY	POST MEDIEVAL	384609	557105
NY8457	845710	QUARRY	POST MEDIEVAL	384150	557879
NY8457	845711	BOUNDARY BANK	POST MEDIEVAL	384112	557274
NY8458	84581	CAIRN	UNKNOWN	384942	558314
NY8458	84583	QUARRY	POST MEDIEVAL	384153	558698
NY8458	84584	HOLLOW WAY	POST MEDIEVAL	384218	558435
NY8458	84585	FIELD SYSTEM	POST MEDIEVAL	384418	558291
NY8458	84588	QUARRY	POST MEDIEVAL	384761	558304
NY8458	84589	QUARRY	POST MEDIEVAL	384694	558103
NY8459	84591	HOLLOW WAY	POST MEDIEVAL	384470	559496
NY8459	84594	QUARRY	POST MEDIEVAL	384090	559316

NY8545	85453	TRACKWAY	POST MEDIEVAL	385633	545932
NY8545	85455	MINE SHAFT	POST MEDIEVAL	385879	545979
NY8545	85458	BOUNDARY BANK	MEDIEVAL	385845	545812
NY8545	85459	BOUNDARY BANK	MEDIEVAL	385817	545781
NY8545	854510	QUARRY	POST MEDIEVAL	385866	545780
NY8545	854511	QUARRY	POST MEDIEVAL	385980	545975
NY8545	854513	MINE SHAFT	POST MEDIEVAL	385449	545679
NY8545	854515	MINE SHAFT	POST MEDIEVAL	385051	545525
NY8545	854516	MINE SHAFT	POST MEDIEVAL	385015	545467
NY8545	854517	MINE SHAFT	POST MEDIEVAL	385003	545425
NY8545	854518	MINE SHAFT	POST MEDIEVAL	385743	545601
NY8545	854519	SPOIL HEAP	POST MEDIEVAL	385903	545298
NY8545	854520	MINE SHAFT	POST MEDIEVAL	385258	545389
NY8545	854521	POND	POST MEDIEVAL	385400	545235
NY8545	854522	QUARRY	POST MEDIEVAL	385318	545168
NY8545	854524	QUARRY	POST MEDIEVAL	385752	545176
NY8545	854526	QUARRY	POST MEDIEVAL	385848	545062
NY8545	854527	QUARRY	POST MEDIEVAL	385909	545969
NY8545	854528	BOUNDARY BANK	MEDIEVAL	385916	545892
NY8545	854529	STRUCTURE	MEDIEVAL/POST MEDIEVAL	385615	545945
NY8545	854530	MINE SHAFT	POST MEDIEVAL	385465	545995
NY8545	854531	MINE SHAFT	POST MEDIEVAL	385497	545966
NY8545	854532	MINE SHAFT	POST MEDIEVAL	385529	545929
NY8545	854533	MINE SHAFT	POST MEDIEVAL	385563	545900
NY8545	854534	MINE SHAFT	POST MEDIEVAL	385602	545871
NY8545	854535	MINE SHAFT	POST MEDIEVAL	385581	545826
NY8545	854536	MINE SHAFT	POST MEDIEVAL	385030	545629
NY8545	854537	QUARRY	POST MEDIEVAL	385005	545571
NY8545	854538	MINE SHAFT	POST MEDIEVAL	385140	545252
NY8545	854539	MINE SHAFT	POST MEDIEVAL	385059	545328
NY8545	854540	MINE SHAFT	POST MEDIEVAL	385190	545367
NY8545	854541	LEAT	POST MEDIEVAL	385253	545318
NY8545	854542	LEAT	POST MEDIEVAL	385154	545560
NY8545	854543	LEAT	POST MEDIEVAL	385493	545228
NY8546	85466	EARTHWORK	POST MEDIEVAL	385132	546152
NY8546	854610	RING BANK	UNKNOWN	385071	546867
NY8546	854611	QUARRY	POST MEDIEVAL	385970	546914
NY8546	854612	QUARRY	POST MEDIEVAL	385953	546068
NY8546	854613	MINE SHAFT	POST MEDIEVAL	385189	546710
NY8546	854614	MINE SHAFT	POST MEDIEVAL	385198	546462
NY8546	854615	MINE SHAFT	POST MEDIEVAL	385364	546093
NY8546	854616	MINE SHAFT	POST MEDIEVAL	385401	546063
NY8546	854617	MINE SHAFT	POST MEDIEVAL	385424	546029
NY8546	854618	STRUCTURE	POST MEDIEVAL	385735	546133
NY8546	854619	MINE SHAFT	POST MEDIEVAL	385163	546841
NY8546	854620	MINE SHAFT	POST MEDIEVAL	385171	546878
NY8546	854621	MINE SHAFT	POST MEDIEVAL	385180	546946
NY8546	854622	LEAT	POST MEDIEVAL	385066	546277
NY8547	854711	AIR SHAFT	POST MEDIEVAL	385527	547679
NY8547	854712	MINE SHAFT	POST MEDIEVAL	385428	547711
NY8547	854713	MINE SHAFT	POST MEDIEVAL	385755	547398
NY8548	85481	QUARRY	POST MEDIEVAL	385344	548933
NY8548	85482	BUILDING	POST MEDIEVAL	385197	548888
NY8548	85483	BUILDING	POST MEDIEVAL	385092	548377
NY8548	85484	QUARRY	POST MEDIEVAL	385438	548128
NY8549	85495	STEADING	POST MEDIEVAL	385090	549203
NY8549	85496	QUARRY	POST MEDIEVAL	385281	549028
NY8549	854911	QUARRY	POST MEDIEVAL	385151	549292
NY8549	854916	QUARRY	POST MEDIEVAL	385196	549217
NY8549	854920	QUARRY	POST MEDIEVAL	385132	549341
NY8549	854921	QUARRY	POST MEDIEVAL	385120	549389
NY8549	854922	QUARRY	POST MEDIEVAL	385167	549610

NY8549	854923	QUARRY	POST MEDIEVAL	385366	549624
NY8549	854924	QUARRY	POST MEDIEVAL	385025	549468
NY8549	854925	QUARRY	POST MEDIEVAL	385042	549279
NY8549	854926	QUARRY	POST MEDIEVAL	385052	549222
NY8549	854927	MINE SHAFT	POST MEDIEVAL	385300	549568
NY8549	854928	QUARRY	POST MEDIEVAL	385440	549965
NY8549	854929	QUARRY	POST MEDIEVAL	385266	549905
NY8549	854930	MINE SHAFT	POST MEDIEVAL	385240	549940
NY8549	854931	MINE SHAFT	POST MEDIEVAL	385575	549856
NY8552	85525	MINE SHAFT	UNKNOWN	385937	552498
NY8552	85527	FARMSTEAD	MEDIEVAL	385155	552422
NY8552	855212	QUARRY	POST MEDIEVAL	385886	552334
NY8552	855213	MINE SHAFT	POST MEDIEVAL	385930	552513
NY8552	855214	MINE SHAFT	POST MEDIEVAL	385953	552570
NY8552	855215	MINE SHAFT	POST MEDIEVAL	385945	552607
NY8552	855216	QUARRY	POST MEDIEVAL	385249	552137
NY8552	855217	MINE SHAFT	POST MEDIEVAL	385932	552805
NY8552	855218	MINE SHAFT	POST MEDIEVAL	385354	552092
NY8553	85531	SHEEP FOLD	POST MEDIEVAL	385376	553095
NY8553	85532	QUARRY	POST MEDIEVAL	385446	553630
NY8553	85533	HOLLOW WAY	POST MEDIEVAL	385640	553168
NY8553	85535	QUARRY	POST MEDIEVAL	385410	553353
NY8553	85536	FIELD SYSTEM	POST MEDIEVAL	385454	553897
NY8553	85537	BOUNDARY BANK	MEDIEVAL	385279	553912
NY8553	85538	STEADING	POST MEDIEVAL	385419	553990
NY8553	85539	STEADING	POST MEDIEVAL	385122	553968
NY8553	855310	ENCLOSURE	POST MEDIEVAL	385152	553758
NY8553	855312	STRUCTURE	POST MEDIEVAL	385192	553946
NY8553	855313	QUARRY	POST MEDIEVAL	385583	553813
NY8553	855314	HOLLOW WAY	MEDIEVAL	385803	553440
NY8553	855315	MINE SHAFT	POST MEDIEVAL	385891	553483
NY8553	855316	MINE SHAFT	POST MEDIEVAL	385715	553739
NY8553	855317	MINE SHAFT	POST MEDIEVAL	385808	553606
NY8554	85541	QUARRY	POST MEDIEVAL	385598	554400
NY8555	85554	QUARRY	POST MEDIEVAL	385659	555069
NY8555	85555	BOUNDARY BANK	POST MEDIEVAL	385118	555338
NY8556	85561	EARTHWORK	POST MEDIEVAL	385040	556090
NY8556	85562	FIELD SYSTEM	POST MEDIEVAL	385208	556305
NY8556	85563	FIELD SYSTEM	POST MEDIEVAL	385823	556798
NY8557	85571	FIELD SYSTEM	POST MEDIEVAL	385247	557318
NY8559	88593	MINE SHAFT	POST MEDIEVAL	385099	559865
NY8559	88595	MINE SHAFT	POST MEDIEVAL	385184	559677
NY8559	88596	QUARRY	POST MEDIEVAL	385048	559671
NY8559	88599	MINE SHAFT	POST MEDIEVAL	385345	559554
NY8559	885910	QUARRY	POST MEDIEVAL	385085	559460
NY8559	885911	MINE SHAFT	POST MEDIEVAL	385070	559209
NY8559	885912	MINE SHAFT	POST MEDIEVAL	385334	559324
NY8644	86441	BUILDING	POST MEDIEVAL	386334	544738
NY8645	86451	MINE SHAFT	POST MEDIEVAL	386376	545824
NY8645	86452	MINE SHAFT	POST MEDIEVAL	386265	545880
NY8645	86453	ADIT	POST MEDIEVAL	386073	545739
NY8650	86501	MINE SHAFT	POST MEDIEVAL	388434	550163
NY8652	86522	EXTRACTIVE PIT	POST MEDIEVAL	386024	552946
NY8653	86531	MINE SHAFT	POST MEDIEVAL	386431	553417
NY8653	86532	MINE SHAFT	POST MEDIEVAL	386378	553359
NY8653	86533	MINE SHAFT	POST MEDIEVAL	386349	553354
NY8653	86534	MINE SHAFT	POST MEDIEVAL	386343	553385
NY8653	86535	MINE SHAFT	POST MEDIEVAL	386290	553402
NY8653	86536	MINE SHAFT	POST MEDIEVAL	386262	553414
NY8653	86539	MINE SHAFT	POST MEDIEVAL	386298	553509
NY8653	86538	SHIELING	POST MEDIEVAL	386248	553738
NY8654	86541	QUARRY	POST MEDIEVAL	386056	554717

NY8655	86553	QUARRY	POST MEDIEVAL	386026	555618
NY8655	86554	HOLLOW WAY	POST MEDIEVAL	386472	555664
NY8656	86561	FIELD SYSTEM	POST MEDIEVAL	386582	556710
NY8659	86591	CAIRN	UNKNOWN	386083	559122
NY8659	86593	FIELD SYSTEM	POST MEDIEVAL	386679	559722
NY8744	87441	MINE SHAFT	POST MEDIEVAL	387554	544395
NY8745	87451	BOUNDARY CROSS	POST MEDIEVAL	387157	545041
NY8752	87521	QUARRY	POST MEDIEVAL	387248	552870
NY8752	87522	QUARRY	POST MEDIEVAL	387237	552806
NY8755	87551	CAIRN	PREHISTORIC	387303	555500
NY8757	87571	FIELD SYSTEM	POST MEDIEVAL	387912	557004
NY8758	87584	EARTHWORK	POST MEDIEVAL	387633	558901
NY8759	87591	FIELD SYSTEM	POST MEDIEVAL	387816	559812
NY8759	87592	FIELD SYSTEM	POST MEDIEVAL	387650	559320
NY8759	87593	FIELD SYSTEM	MEDIEVAL/POST MEDIEVAL	387762	559136
NY8848	88481	SHEEP FOLD	POST MEDIEVAL	388524	548729
NY8848	88482	MINE SHAFT	POST MEDIEVAL	388157	548891
NY8848	88483	MINE SHAFT	POST MEDIEVAL	388208	548904
NY8849	88491	SHEEP FOLD	POST MEDIEVAL	388132	549947
NY8849	88492	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	388641	549227
NY8849	88493	FIELD SYSTEM	POST MEDIEVAL	388836	549057
NY8854	88541	BOUNDARY BANK	POST MEDIEVAL	388274	554921
NY8854	88542	STRUCTURE	POST MEDIEVAL	388052	554570
NY8854	88543	QUARRY	POST MEDIEVAL	388806	554773
NY8854	88544	QUARRY	POST MEDIEVAL	388749	554717
NY8854	88545	QUARRY	POST MEDIEVAL	388562	554466
NY8854	88546	QUARRY	POST MEDIEVAL	388423	554195
NY8854	88547	QUARRY	POST MEDIEVAL	388366	554194
NY8854	88548	FIELD SYSTEM	POST MEDIEVAL	388794	554540
NY8855	88551	FIELD SYSTEM	POST MEDIEVAL	388537	555589
NY8856	88561	HOLLOW WAY	POST MEDIEVAL	388905	556556
NY8856	88562	QUARRY	POST MEDIEVAL	388598	556640
NY8857	88571	FIELD SYSTEM	POST MEDIEVAL	388620	557778
NY8858	88581	QUARRY	POST MEDIEVAL	388269	558280
NY8858	88582	FIELD SYSTEM	POST MEDIEVAL	388874	558115
NY8858	88584	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	388308	558878
NY8858	88587	QUARRY	POST MEDIEVAL	388190	558606
NY8859	88591	FIELD SYSTEM	POST MEDIEVAL	388873	559946
NY8859	88594	FIELD SYSTEM	POST MEDIEVAL	388725	559739
NY8859	88597	FARMSTEAD	POST MEDIEVAL	388640	559346
NY8948	89481	FARMSTEAD	MEDIEVAL	389941	548895
NY8948	89484	SHEEP FOLD	POST MEDIEVAL	389711	548823
NY8948	89485	FARMSTEAD	POST MEDIEVAL	389193	548424
NY8948	89487	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	389627	548565
NY8948	89488	MINE SHAFT	POST MEDIEVAL	389971	548707
NY8950	89501	SHEEP FOLD	POST MEDIEVAL	389182	550959
NY8950	89502	SHEEP FOLD	POST MEDIEVAL	389031	550476
NY8951	89511	FIELD SYSTEM	POST MEDIEVAL	389214	551233
NY8951	89512	STEADING	POST MEDIEVAL	389026	551244
NY8953	89531	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	389533	553695
NY8954	89541	GRAVEL PIT	POST MEDIEVAL	389802	554668
NY8954	89542	FIELD SYSTEM	POST MEDIEVAL	389688	554757
NY8955	89553	QUARRY	POST MEDIEVAL	389669	555982
NY8956	89561	FIELD SYSTEM	POST MEDIEVAL	389584	556565
NY8956	89562	FIELD SYSTEM	POST MEDIEVAL	389295	556874
NY8958	89588	ENCLOSURE	UNKNOWN	389836	558553
NY8959	89591	FIELD SYSTEM	PREHISTORIC/ROMAN	389240	559938
NY9049	90491	FARMSTEAD	POST MEDIEVAL	390150	549480
NY9049	90492	STEADING	POST MEDIEVAL	390226	549549
NY9050	90508	MOUND	UNKNOWN	390356	550245
NY9050	905012	STEADING	POST MEDIEVAL	390610	550847
NY9050	905013	HOLLOW WAY	POST MEDIEVAL	390708	550079

NY9051	90511	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	390792	551335
NY9051	90517	SHEEP FOLD	POST MEDIEVAL	390042	551382
NY9052	90521	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	390565	552743
NY9052	90522	COAL WORKINGS	POST MEDIEVAL	390392	552385
NY9052	90523	COAL WORKINGS	POST MEDIEVAL	390633	552484
NY9052	90524	COAL WORKINGS	POST MEDIEVAL	390165	552324
NY9052	90525	QUARRY	POST MEDIEVAL	390740	552805
NY9052	90526	QUARRY	POST MEDIEVAL	390959	552688
NY9052	90527	QUARRY	POST MEDIEVAL	390977	552438
NY9053	90531	QUARRY	POST MEDIEVAL	390807	553761
NY9054	90541	STRUCTURE	POST MEDIEVAL	390493	554814
NY9054	90542	EXTRACTIVE PIT	POST MEDIEVAL	390167	554418
NY9054	90543	HOLLOW WAY	POST MEDIEVAL	390145	554331
NY9054	90544	FIELD SYSTEM	POST MEDIEVAL	390436	554112
NY9054	90545	FIELD SYSTEM	POST MEDIEVAL	390221	554898
NY9056	90561	FARMSTEAD	UNKNOWN	390707	556235
NY9056	90562	EARTHWORK	UNKNOWN	390567	556014
NY9056	90563	GRAVEL PIT	POST MEDIEVAL	390990	556731
NY9059	90592	MOUND	PREHISTORIC	390878	559942
NY9059	90594	FIELD SYSTEM	MEDIEVAL	390594	559610
NY9059	905910	HOLLOW WAY	MEDIEVAL/POST MEDIEVAL	390751	559147
NY9059	905912	CLAY PIT	POST MEDIEVAL	390560	559513
NY9150	91501	SHEEP FOLD	POST MEDIEVAL	391417	550369
NY9151	91513	ENCLOSURE	PREHISTORIC/ROMAN	391041	551859
NY9151	91515	ENCLOSURE	POST MEDIEVAL	391415	551952
NY9151	91517	MINE SHAFT	POST MEDIEVAL	391969	551791
NY9152	91521	SETTLEMENT	PREHISTORIC/ROMAN	391928	552407
NY9153	91531	STRUCTURE	POST MEDIEVAL	391519	553670
NY9153	91532	FIELD SYSTEM	POST MEDIEVAL	391498	553474
NY9158	91581	ENCLOSURE	UNKNOWN	391577	558434
NY9249	92491	MINE SHAFT	POST MEDIEVAL	392313	549254
NY9249	92492	MINE SHAFT	POST MEDIEVAL	392337	549290
NY9249	92493	MINE SHAFT	POST MEDIEVAL	392121	549426
NY9249	92494	MINE SHAFT	POST MEDIEVAL	392841	549352
NY9249	92495	MINE SHAFT	POST MEDIEVAL	392779	549294
NY9249	92496	MINE SHAFT	POST MEDIEVAL	392764	549302
NY9249	92497	SHEEP FOLD	POST MEDIEVAL	392551	549489
NY9249	92498	MINE SHAFT	POST MEDIEVAL	392906	549392
NY9249	92499	LEAD WORKINGS	POST MEDIEVAL	392930	549420
NY9249	924910	SHEEP FOLD	POST MEDIEVAL	392997	549839
NY9250	92501	EXTRACTIVE PIT	POST MEDIEVAL	392215	550411
NY9250	92502	EXTRACTIVE PIT	POST MEDIEVAL	392705	550300
NY9250	92503	EXTRACTIVE PIT	POST MEDIEVAL	392655	550158
NY9251	92511	MINE SHAFT	POST MEDIEVAL	392162	551503
NY9251	92512	MINE SHAFT	POST MEDIEVAL	392638	551778
NY9251	92513	MINE SHAFT	POST MEDIEVAL	392664	551796
NY9251	92514	MINE SHAFT	POST MEDIEVAL	392848	551896
NY9251	92515	FIELD SYSTEM	POST MEDIEVAL	392233	551712
NY9252	92521	FIELD SYSTEM	PREHISTORIC/ROMAN	392901	552278
NY9252	92522	ENCLOSURE	UNKNOWN	392369	552622
NY9252	92523	SETTLEMENT	PREHISTORIC/ROMAN	392000	552739
NY9254	92541	MINE SHAFT	POST MEDIEVAL	392434	554162
NY9254	92542	MINE SHAFT	POST MEDIEVAL	392464	554112
NY9254	92543	MINE SHAFT	POST MEDIEVAL	392486	554072
NY9254	92544	MINE SHAFT	POST MEDIEVAL	392509	554050
NY9254	92545	MILL	POST MEDIEVAL	392533	554342
NY9255	92551	BUILDING	POST MEDIEVAL	392115	555033
NY9258	92581	BUILDING	POST MEDIEVAL	392652	558595
NY9258	92582	BUILDING	POST MEDIEVAL	392667	558628
NY9259	92592	PARK PALE	MEDIEVAL	392764	559912
NY9259	92593	STEADING	POST MEDIEVAL	392762	559846
NY9259	92595	TRACKWAY	MEDIEVAL	392525	559400

NY9259	925910	ANIMAL POUND	POST MEDIEVAL	392297	559583
NY9349	93491	MINE SHAFT	POST MEDIEVAL	393359	549182
NY9349	93492	SHEEP FOLD	POST MEDIEVAL	393458	549107
NY9349	93493	LEAD MINE	POST MEDIEVAL	393567	549324
NY9349	93494	QUARRY	POST MEDIEVAL	393883	549269
NY9350	93501	BOUNDARY BANK	POST MEDIEVAL	393908	550528
NY9352	93521	ENCLOSURE	PREHISTORIC/ROMAN	393028	552156
NY9532	95322	FIELD SYSTEM	POST MEDIEVAL	393200	552314
NY9353	93531	ENCLOSURE	PREHISTORIC/ROMAN	393399	553835
NY9353	93532	MINE SHAFT	POST MEDIEVAL	393006	553266
NY9353	93533	QUARRY	POST MEDIEVAL	393460	553026
NY9353	93534	BOUNDARY BANK	POST MEDIEVAL	393044	553463
NY9354	93542	GRAVEL PIT	POST MEDIEVAL	393174	554021
NY9354	93543	FIELD SYSTEM	POST MEDIEVAL	393410	554499
NY9354	93545	EXTRACTIVE PIT	POST MEDIEVAL	393451	554785
NY9354	93546	HOLLOW WAY	POST MEDIEVAL	393839	554350
NY9354	93547	QUARRY	POST MEDIEVAL	393121	554221
NY9354	935410	QUARRY	POST MEDIEVAL	393772	554909
NY9354	935415	WASH POOL	POST MEDIEVAL	393679	554371
NY9355	93552	BOUNDARY BANK	MEDIEVAL/POST MEDIEVAL	393104	555574
NY9355	93553	EARTHWORK	UNKNOWN	393141	555755
NY9355	93554	HOLLOW WAY	POST MEDIEVAL	393305	555922
NY9356	93561	QUARRY	POST MEDIEVAL	393049	556987
NY9356	93563	QUARRY	POST MEDIEVAL	393041	556755
NY9356	93565	QUARRY	POST MEDIEVAL	393035	556652
NY9356	93566	EARTHWORK	MEDIEVAL	393418	556589
NY9356	935614	QUARRY	POST MEDIEVAL	393095	556100
NY9449	94491	QUARRY	POST MEDIEVAL	394224	549526
NY9449	94492	QUARRY	POST MEDIEVAL	394366	549614
NY9449	94493	QUARRY	POST MEDIEVAL	394142	549983
NY9449	94494	QUARRY	POST MEDIEVAL	394186	549910
NY9449	94495	QUARRY	POST MEDIEVAL	394120	549817
NY9449	94496	QUARRY	POST MEDIEVAL	394146	549655
NY9449	94497	QUARRY	POST MEDIEVAL	394025	549595
NY9450	94501	SHEEP FOLD	POST MEDIEVAL	394139	550374
NY9450	94502	MINE SHAFT	POST MEDIEVAL	394278	550495
NY9450	94503	MINE SHAFT	POST MEDIEVAL	394331	550547
NY9450	94504	MINE SHAFT	POST MEDIEVAL	394372	550574
NY9450	94505	MINE SHAFT	POST MEDIEVAL	394437	550571
NY9450	94506	MINE SHAFT	POST MEDIEVAL	394544	550628
NY9450	94507	MINE SHAFT	POST MEDIEVAL	394611	550672
NY9450	94508	MINE SHAFT	POST MEDIEVAL	394446	550345
NY9450	94509	MINE SHAFT	POST MEDIEVAL	394477	550359
NY9450	945010	MINE SHAFT	POST MEDIEVAL	394494	550381
NY9450	945011	MINE SHAFT	POST MEDIEVAL	394511	550392
NY9450	945012	MINE SHAFT	POST MEDIEVAL	394514	550425
NY9450	945013	MINE SHAFT	POST MEDIEVAL	394520	550445
NY9450	945014	MINE SHAFT	POST MEDIEVAL	394517	550461
NY9450	945015	MINE SHAFT	POST MEDIEVAL	394513	550496
NY9450	945016	ADIT	POST MEDIEVAL	394526	550519
NY9450	945017	LEAD WORKINGS	POST MEDIEVAL	394692	550183
NY9450	945018	MINE SHAFT	POST MEDIEVAL	394582	550438
NY9450	945019	MINE SHAFT	POST MEDIEVAL	394617	550451
NY9450	945020	MINE SHAFT	POST MEDIEVAL	394618	550492
NY9450	945021	MINE SHAFT	POST MEDIEVAL	394617	550517
NY9450	945022	MINE SHAFT	POST MEDIEVAL	394655	550442
NY9450	945023	MINE SHAFT	POST MEDIEVAL	394684	550470
NY9450	945024	MINE SHAFT	POST MEDIEVAL	394712	550505
NY9450	945025	MINE SHAFT	POST MEDIEVAL	394745	550547
NY9450	945026	MINE SHAFT	POST MEDIEVAL	394778	550585
NY9450	945027	MINE SHAFT	POST MEDIEVAL	394817	550554
NY9450	945028	MINE SHAFT	POST MEDIEVAL	394793	550506

NY9450	945029	MINE SHAFT	POST MEDIEVAL	394699	550398
NY9450	945030	MINE SHAFT	POST MEDIEVAL	394628	550376
NY9450	945031	MINE SHAFT	POST MEDIEVAL	394628	550376
NY9450	945032	LEAD WORKINGS	POST MEDIEVAL	394552	550422
NY9450	945033	MINE SHAFT	POST MEDIEVAL	394544	550056
NY9450	945034	MINE SHAFT	POST MEDIEVAL	394584	550008
NY9450	945035	QUARRY	POST MEDIEVAL	394979	550896
NY9450	945036	QUARRY	POST MEDIEVAL	394598	550789
NY9451	94511	QUARRY	POST MEDIEVAL	394583	551014
NY9453	94531	EXTRACTIVE PIT	POST MEDIEVAL	394529	553760
NY9453	94532	EXTRACTIVE PIT	UNKNOWN	394811	553613
NY9453	94533	MINE SHAFT	POST MEDIEVAL	394948	553889
NY9453	94534	MINE SHAFT	POST MEDIEVAL	394961	553868
NY9453	94535	MINE SHAFT	POST MEDIEVAL	394966	553849
NY9453	94536	MINE SHAFT	POST MEDIEVAL	394940	553749
NY9453	94537	QUARRY	POST MEDIEVAL	394954	553927
NY9454	94545	QUARRY	POST MEDIEVAL	394955	554272
NY9548	95481	QUARRY	POST MEDIEVAL	395249	548315
NY9548	95482	MINE SHAFT	POST MEDIEVAL	395798	548141
NY9548	95483	MINE SHAFT	POST MEDIEVAL	395833	548138
NY9549	954915	QUARRY	POST MEDIEVAL	395478	549112
NY9549	954916	QUARRY	POST MEDIEVAL	395830	549080
NY9549	954917	QUARRY	POST MEDIEVAL	395877	549705
NY9549	954918	QUARRY	POST MEDIEVAL	395957	549808
NY9549	954919	QUARRY	POST MEDIEVAL	395971	549838
NY9549	954920	QUARRY	POST MEDIEVAL	395716	549778
NY9549	954921	QUARRY	POST MEDIEVAL	395784	549731
NY9550	95505	MINE SHAFT	POST MEDIEVAL	395254	550990
NY9550	95506	MINE SHAFT	POST MEDIEVAL	395518	550792
NY9550	95509	QUARRY	POST MEDIEVAL	395089	550293
NY9550	955010	QUARRY	POST MEDIEVAL	395274	550143
NY9550	955011	POND	POST MEDIEVAL	395141	550821
NY9550	955012	POND	POST MEDIEVAL	395001	550885
NY9551	95511	MINE SHAFT	POST MEDIEVAL	395244	551003
NY9551	95512	MINE SHAFT	POST MEDIEVAL	395280	551003
NY9551	95513	MINE SHAFT	POST MEDIEVAL	395299	551022
NY9551	95514	MINE SHAFT	POST MEDIEVAL	395339	551044
NY9551	95515	MINE SHAFT	POST MEDIEVAL	395361	551057
NY9551	95516	MINE SHAFT	POST MEDIEVAL	395386	551070
NY9551	95517	MINE SHAFT	POST MEDIEVAL	395398	551090
NY9551	95518	SHAFT MOUND	POST MEDIEVAL	395425	551097
NY9551	95519	LEAD WORKINGS	POST MEDIEVAL	395493	551142
NY9551	955110	MINE SHAFT	POST MEDIEVAL	395386	551290
NY9551	955111	MINE SHAFT	POST MEDIEVAL	395425	551311
NY9551	955112	MINE SHAFT	POST MEDIEVAL	395469	551332
NY9551	955113	MINE SHAFT	POST MEDIEVAL	395875	551397
NY9551	955114	MINE SHAFT	POST MEDIEVAL	395896	551422
NY9551	955115	MINE SHAFT	POST MEDIEVAL	395927	551463
NY9551	955116	MINE SHAFT	POST MEDIEVAL	395941	551400
NY9551	955117	MINE SHAFT	POST MEDIEVAL	395966	551375
NY9551	955118	MINE SHAFT	POST MEDIEVAL	395966	551375
NY9553	95531	HOLLOW WAY	POST MEDIEVAL	395101	553840
NY9553	95532	HOLLOW WAY	POST MEDIEVAL	395621	553753
NY9553	95534	MINE SHAFT	POST MEDIEVAL	395006	553884
NY9554	95541	QUARRY	POST MEDIEVAL	395250	554952
NY9554	95546	MINE SHAFT	POST MEDIEVAL	395220	554414
NY9554	95547	QUARRY	POST MEDIEVAL	395004	554276
NY9554	95548	HOLLOW WAY	POST MEDIEVAL	395110	554113
NY9554	955410	MINE SHAFT	POST MEDIEVAL	395414	554583
NY9554	955412	MINE SHAFT	POST MEDIEVAL	395221	554413
NY9554	955413	MINE SHAFT	POST MEDIEVAL	395070	554365
NY9554	955414	MINE SHAFT	POST MEDIEVAL	395070	554291

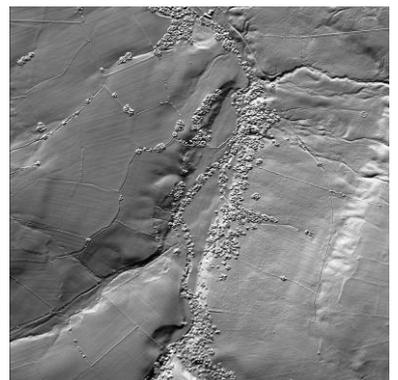
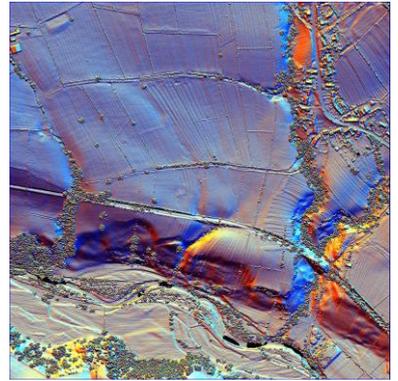
NY9554	955415	MINE SHAFT	POST MEDIEVAL	395038	554192
NY9554	955416	MINE SHAFT	POST MEDIEVAL	395062	554143
NY9554	955417	MINE SHAFT	POST MEDIEVAL	395093	554097
NY9554	955418	MINE SHAFT	POST MEDIEVAL	395117	554066
NY9554	955419	MINE SHAFT	POST MEDIEVAL	395149	554029
NY9648	96482	QUARRY	POST MEDIEVAL	396304	548992
NY9648	96484	QUARRY	POST MEDIEVAL	396246	548693
NY9648	96485	GRAVEL PIT	POST MEDIEVAL	396188	548549
NY9648	96486	GRAVEL PIT	POST MEDIEVAL	396190	548455
NY9648	96487	QUARRY	POST MEDIEVAL	396642	548071
NY9648	96488	GRAVEL PIT	POST MEDIEVAL	396342	548307
NY9648	96489	DAM	POST MEDIEVAL	396066	548123
NY9648	964810	QUARRY	POST MEDIEVAL	396038	548495
NY9648	964811	DRAIN	POST MEDIEVAL	396417	548104
NY9648	964812	MINE SHAFT	POST MEDIEVAL	396556	548067
NY9648	964813	CULVERT	POST MEDIEVAL	396162	548643
NY9649	96494	FIELD SYSTEM	POST MEDIEVAL	396631	549315
NY9649	96495	QUARRY	POST MEDIEVAL	396555	549140
NY9649	96496	QUARRY	POST MEDIEVAL	396449	549080
NY9649	96497	QUARRY	POST MEDIEVAL	396305	549609
NY9650	96503	EARTHWORK	UNKNOWN	396262	550550
NY9650	96504	QUARRY	POST MEDIEVAL	396704	550851
NY9650	96508	QUARRY	POST MEDIEVAL	396211	550807
NY9650	965011	ABBEY	MEDIEVAL	396728	550358
NY9650	965012	QUARRY	POST MEDIEVAL	396684	550622
NY9650	965013	QUARRY	POST MEDIEVAL	396470	550804
NY9650	965014	QUARRY	POST MEDIEVAL	396514	550641
NY9650	965015	QUARRY	POST MEDIEVAL	396223	550896
NY9651	96511	LEAD WORKINGS	POST MEDIEVAL	396058	551183
NY9651	96512	MINE SHAFT	POST MEDIEVAL	396097	551335
NY9651	96513	QUARRY	POST MEDIEVAL	396366	551122

APPENDIX 5: List of sites where interpretation would benefit from field inspection

KM SQUARE	PROJECT ID	MONUMENT TYPE	MONUMENT PERIOD	E	N
NY7650	76504	ADIT	POST MEDIEVAL	376958	550486
NY7651	76517	LEAD WORKINGS	POST MEDIEVAL	376876	551231
NY7651	76518	LEAD WORKINGS	POST MEDIEVAL	376896	551008
NY7651	765111	MINE SHAFT	POST MEDIEVAL	376532	551697
NY7651	765117	DAM	POST MEDIEVAL	376982	551340
NY7656	76565	EARTHWORK	UNKNOWN	376923	556220
NY7657	765713	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	376977	557767
NY7657	765715	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	376822	557638
NY7657	765721	SETTLEMENT	UNKNOWN	376770	557451
NY7657	765722	MOUND	UNKNOWN	376669	557685
NY7657	765723	MOUND	UNKNOWN	376764	557621
NY7658	76584	FARMSTEAD	POST MEDIEVAL	376939	558766
NY7660	76601	SHIELING	POST MEDIEVAL	376565	560042
NY7748	77482	MOUND	POST MEDIEVAL	377219	548972
NY7748	77483	MOUND	POST MEDIEVAL	377667	548069
NY7748	77484	QUARRY	POST MEDIEVAL	377930	548239
NY7749	77497	EARTHWORK	UNKNOWN	377400	549258
NY7749	774910	ENCLOSURE	UNKNOWN	377412	549545
NY7750	77507	EARTHWORK	POST MEDIEVAL	377105	550616
NY7750	775027	EARTHWORK	UNKNOWN	377904	550863
NY7752	77526	ENCLOSURE	UNKNOWN	377575	552273
NY7754	77545	FARMSTEAD	MEDIEVAL	377728	554570
NY7755	775513	DESERTED SETTLEMENT	MEDIEVAL	377915	555447
NY7756	77565	STEADING	MEDIEVAL/POST MEDIEVAL	377571	556770
NY7757	77572	STRUCTURE	MEDIEVAL/POST MEDIEVAL	377095	557916
NY7757	775715	MOUND	UNKNOWN	377782	557230
NY7757	775716	SETTLEMENT	PREHISTORIC/ROMAN	377776	557034
NY7758	775810	EARTHWORK	UNKNOWN	377278	558524
NY7758	775820	STEADING	MEDIEVAL/POST MEDIEVAL	377316	558374
NY7849	784910	ENCLOSURE	UNKNOWN	378836	549979
NY7852	78522	CORN MILL	POST MEDIEVAL	378160	552626
NY7852	785233	LEAD MINE	POST MEDIEVAL	378296	552213
NY7853	785317	SETTLEMENT	PREHISTORIC/ROMAN	378564	553821
NY7854	78543	ENCLOSURE	PREHISTORIC/ROMAN	378683	554288
NY7854	78547	EXTRACTIVE PIT	MEDIEVAL/POST MEDIEVAL	378733	554071
NY7855	78559	FARMSTEAD	MEDIEVAL	378092	555534
NY7855	785532	MINE SHAFT	POST MEDIEVAL	378820	555515
NY7855	785533	MINE SHAFT	POST MEDIEVAL	378711	555662
NY7856	78562	ADIT	POST MEDIEVAL	378453	556808
NY7857	78571	HOLLOW WAY	POST MEDIEVAL	378941	557952
NY7857	785710	ENCLOSURE	PREHISTORIC/ROMAN	378904	557435
NY7858	78585	FARMSTEAD	POST MEDIEVAL	378217	558492
NY7859	785912	EARTHWORK	UNKNOWN	378579	559391
NY7861	78612	STEADING	MEDIEVAL	378667	561236
NY7951	79511	QUARRY	POST MEDIEVAL	379065	551764
NY7951	79512	QUARRY	POST MEDIEVAL	379117	551606
NY7957	79571	EARTHWORK	UNKNOWN	379120	557783
NY7957	79528	MOUND	UNKNOWN	379652	557086
NY7957	795727	EARTHWORK	POST MEDIEVAL	379228	557380
NY7958	795816	STEADING	POST MEDIEVAL	379253	558700
NY7958	795817	EARTHWORK	UNKNOWN	379349	558626
NY7958	795819	EARTHWORK	UNKNOWN	379509	558892
NY7958	795828	ENCLOSURE	PREHISTORIC	379964	558408
NY7959	79598	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	379537	559573
NY7960	79602	FARMSTEAD	MEDIEVAL	379225	560208
NY7961	79615	STRUCTURE	MEDIEVAL	379132	561114
NY7961	79617	DESERTED SETTLEMENT	MEDIEVAL	379102	561165
NY8046	804617	MINE WORKINGS	POST MEDIEVAL	380210	546721
NY8046	804623	EARTHWORK	UNKNOWN	380250	546078
NY8048	80487	ENCLOSURE	UNKNOWN	380069	548872
NY8056	80561	DESERTED SETTLEMENT	MEDIEVAL	380366	556699
NY8058	8583	MINE SHAFT	MEDIEVAL/POST MEDIEVAL	380165	558230
NY8058	80587	EARTHWORK	UNKNOWN	380735	558898
NY8058	80588	EARTHWORK	UNKNOWN	380030	558371
NY8059	80896	EARTHWORK	POST MEDIEVAL	380384	559078
NY8059	805929	EARTHWORK	UNCERTAIN	380464	559341
NY8061	80617	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	380634	561671

NY8061	806125	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	380455	561263
NY8061	806128	MOUND	UNKNOWN	380453	561119
NY8152	81521	QUARRY	POST MEDIEVAL	381543	552954
NY8152	81529	MINE SHAFT	POST MEDIEVAL	381328	552427
NY8153	815316	STRUCTURE	POST MEDIEVAL	381966	553648
NY8153	815322	EARTHWORK	POST MEDIEVAL	381192	553263
NY8153	815333	MINE SHAFT	POST MEDIEVAL	381374	553068
NY8153	815337	QUARRY	POST MEDIEVAL	381486	553922
NY8153	815338	EARTHWORK	UNKNOWN	381843	553527
NY8153	815339	EARTHWORK	UNKNOWN	381417	553827
NY8156	815620	STEADING	MEDIEVAL/POST MEDIEVAL	381598	556546
NY8158	815810	ENCLOSURE	PREHISTORIC/ROMAN	381289	558230
NY8159	81599	STEADING	POST MEDIEVAL	381396	559968
NY8159	815910	FIELD SYSTEM	POST MEDIEVAL	381436	559516
NY8159	815911	STEADING	POST MEDIEVAL	381505	559467
NY8160	81604	LINEAR EARTHWORK	UNKNOWN	381112	560078
NY8160	816014	HOLLOW WAY	POST MEDIEVAL	381611	560811
NY8253	82535	MOUND	UNKNOWN	382451	553716
NY8253	82538	EARTHWORK	UNKNOWN	382421	553110
NY8253	825310	EARTHWORK	POST MEDIEVAL	382450	553195
NY8254	82547	FARMSTEAD	POST MEDIEVAL	382750	554053
NY8254	82549	QUARRY	POST MEDIEVAL	382612	554129
NY8254	825416	STEADING	POST MEDIEVAL	382949	554191
NY8255	82558	PARK PALE	MEDIEVAL	382406	555624
NY8255	825513	FIELD SYSTEM	MEDIEVAL	382639	555602
NY8255	825516	FARMSTEAD	POST MEDIEVAL	382652	555885
NY8255	825523	SETTLEMENT	PREHISTORIC/ROMAN	382741	555860
NY8255	825524	ENCLOSURE	MEDIEVAL	382368	555421
NY8255	825526	STRUCTURE	POST MEDIEVAL	382658	555647
NY8256	825615	STRUCTURE	POST MEDIEVAL	382062	556518
NY8256	825621	ADIT	POST MEDIEVAL	382739	556881
NY8256	825622	ENCLOSURE	PREHISTORIC/ROMAN	382256	556240
NY8256	825623	PLATFORM	UNKNOWN	382485	556447
NY8257	82571	ENCLOSURE	UNKNOWN	382941	557948
NY8257	82577	ENCLOSURE	MEDIEVAL	382969	557264
NY8257	825710	EARTHWORK	POST MEDIEVAL	382552	557288
NY8257	825711	QUARRY	POST MEDIEVAL	382369	557314
NY8257	825712	ENCLOSURE	UNKNOWN	382756	555506
NY8257	825713	QUARRY	POST MEDIEVAL	382273	557335
NY8346	83462	EARTHWORK	POST MEDIEVAL	383806	546365
NY8346	83465	QUARRY	POST MEDIEVAL	383663	546255
NY8347	83474	EARTHWORK	POST MEDIEVAL	383440	547924
NY8347	83476	QUARRY	POST MEDIEVAL	383949	547539
NY8347	834713	ENCLOSURE	POST MEDIEVAL	383289	547676
NY8347	834714	EARTHWORK	POST MEDIEVAL	383700	547997
NY8354	835487	EARTHWORK	UNKNOWN	383601	554611
NY8354	835489	STRUCTURE	POST MEDIEVAL	383930	5546881
NY8354	835490	ENCLOSURE	PREHISTORIC/ROMAN	383224	554953
NY8355	83554	ENCLOSURE	PREHISTORIC	383047	555689
NY8355	835513	EARTHWORK	MEDIEVAL/POST MEDIEVAL	383027	555389
NY8356	83564	QUARRY	POST MEDIEVAL	383245	556703
NY8356	835616	EARTHWORK	MEDIEVAL	383584	556395
NY8356	835617	ENCLOSURE	MEDIEVAL	383734	556526
NY8356	835618	ENCLOSURE	UNKNOWN	383928	556730
NY8356	835619	EARTHWORK	POST MEDIEVAL	383073	556452
NY8357	83571	SETTLEMENT	PREHISTORIC/ROMAN	383619	557195
NY8357	83575	EARTHWORK	UNKNOWN	383935	557430
NY8357	83577	EARTHWORK	UNKNOWN	383077	557826
NY8449	84498	ENCLOSURE	PREHISTORIC	384732	549463
NY8452	84522	SETTLEMENT	PREHISTORIC/ROMAN	384521	552809
NY8452	84524	EARTHWORK	POST MEDIEVAL	384185	552124
NY8452	84528	SETTLEMENT	PREHISTORIC/ROMAN	384098	552783
NY8453	84535	ENCLOSURE	PREHISTORIC/ROMAN	384531	553020
NY8453	845314	STEADING	MEDIEVAL/POST MEDIEVAL	384476	553350
NY8453	845316	ENCLOSURE	UNKNOWN	384207	553964
NY8455	845533	ENCLOSURE	UNKNOWN	384051	555575
NY8456	845640	EARTHWORK	UNKNOWN	384747	556965
NY8456	845643	ENCLOSURE	MEDIEVAL	384964	556044
NY8457	84574	STRUCTURE	POST MEDIEVAL	384770	557624
NY8457	84579	QUARRY	POST MEDIEVAL	384609	557105
NY8458	84581	CAIRN	UNKNOWN	384942	558314

NY8545	854519	SPOIL HEAP	POST MEDIEVAL	385903	545298
NY8545	854520	MINE SHAFT	POST MEDIEVAL	385258	545389
NY8545	854529	STRUCTURE	MEDIEVAL/POST MEDIEVAL	385615	545945
NY8546	85466	EARTHWORK	POST MEDIEVAL	385132	546152
NY8546	854610	RING BANK	UNKNOWN	385071	546867
NY8549	85495	STEADING	POST MEDIEVAL	385090	549203
NY8552	85527	FARMSTEAD	MEDIEVAL	385155	552422
NY8553	85536	FIELD SYSTEM	POST MEDIEVAL	385454	553897
NY8553	85537	BOUNDARY BANK	MEDIEVAL	385279	553912
NY8553	85538	STEADING	POST MEDIEVAL	385419	553990
NY8553	85539	STEADING	POST MEDIEVAL	385122	553968
NY8553	855310	ENCLOSURE	POST MEDIEVAL	385152	553758
NY8553	855312	STRUCTURE	POST MEDIEVAL	385192	553946
NY8556	85561	EARTHWORK	POST MEDIEVAL	385040	556090
NY8559	88596	QUARRY	POST MEDIEVAL	385048	559671
NY8559	88599	MINE SHAFT	POST MEDIEVAL	385345	559554
NY8559	885912	MINE SHAFT	POST MEDIEVAL	385334	559324
NY8645	86453	ADIT	POST MEDIEVAL	386073	545739
NY8659	86591	CAIRN	UNKNOWN	386083	559122
NY8755	87551	CAIRN	PREHISTORIC	387303	555500
NY8758	87584	EARTHWORK	POST MEDIEVAL	387633	558901
NY8854	88542	STRUCTURE	POST MEDIEVAL	388052	554570
NY8858	88584	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	388308	558878
NY8948	89481	FARMSTEAD	MEDIEVAL	389941	548895
NY8958	89588	ENCLOSURE	UNKNOWN	389836	558553
NY9049	90491	FARMSTEAD	POST MEDIEVAL	390150	549480
NY9049	90492	STEADING	POST MEDIEVAL	390226	549549
NY9050	90508	MOUND	UNKNOWN	390356	550245
NY9051	90511	FARMSTEAD	MEDIEVAL/POST MEDIEVAL	390792	551335
NY9054	90541	STRUCTURE	POST MEDIEVAL	390493	554814
NY9056	90561	FARMSTEAD	UNKNOWN	390707	556235
NY9056	90562	EARTHWORK	UNKNOWN	390567	556014
NY9059	90592	MOUND	PREHISTORIC	390878	559942
NY9151	91513	ENCLOSURE	PREHISTORIC/ROMAN	391041	551859
NY9152	91521	SETTLEMENT	PREHISTORIC/ROMAN	391928	552407
NY9153	91531	STRUCTURE	POST MEDIEVAL	391519	553670
NY9158	91581	ENCLOSURE	UNKNOWN	391577	558434
NY9249	92499	LEAD WORKINGS	POST MEDIEVAL	392930	549420
NY9252	92521	FIELD SYSTEM	PREHISTORIC/ROMAN	392901	552278
NY9252	92522	ENCLOSURE	UNKNOWN	392369	552622
NY9252	92523	SETTLEMENT	PREHISTORIC/ROMAN	392000	552739
NY9258	92581	BUILDING	POST MEDIEVAL	392652	558595
NY9258	92582	BUILDING	POST MEDIEVAL	392667	558628
NY9259	925910	ANIMAL POUND	POST MEDIEVAL	392297	559583
NY9349	93493	LEAD MINE	POST MEDIEVAL	393567	549324
NY9352	93521	ENCLOSURE	PREHISTORIC/ROMAN	393028	552156
NY9353	93531	ENCLOSURE	PREHISTORIC/ROMAN	393399	553835
NY9355	93553	EARTHWORK	UNKNOWN	393141	555755
NY9356	93566	EARTHWORK	MEDIEVAL	393418	556589
NY9450	945016	ADIT	POST MEDIEVAL	394526	550519
NY9453	94532	EXTRACTIVE PIT	UNKNOWN	394811	553613
NY9650	96503	EARTHWORK	UNKNOWN	396262	550550
NY9650	965011	ABBAY	MEDIEVAL	396728	550358



Altogether
Archaeology