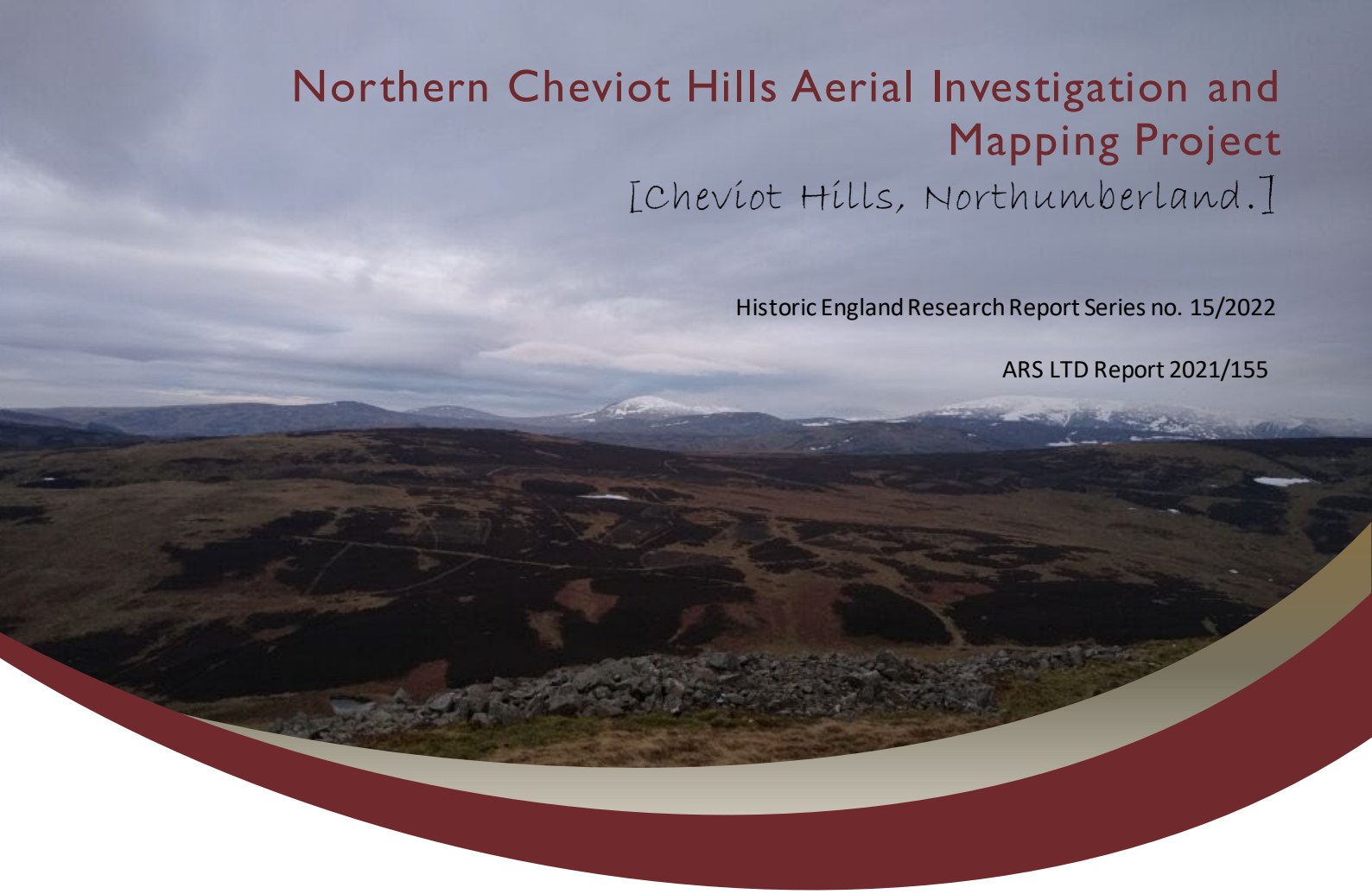

Northern Cheviot Hills Aerial Investigation and Mapping Project

[Cheviot Hills, Northumberland.]

Historic England Research Report Series no. 15/2022

ARS LTD Report 2021/155

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Date of compilation:	12/2021
Compiled by:	Joel Goodchild
Checked by:	Robin Holgate
Approved for issue by:	Historic England
Local Authority:	Northumberland
Site central NGR:	39383 62737

EXECUTIVE SUMMARY

Project Name:	**Northern Cheviot Hills Aerial Investigation and Mapping Project**
Planning Authority:	Northumberland
Bedrock Geology:	Sandstone and Granite
Superficial Geology:	Glacial till, Sand and gravel
Soils:	Freely draining acid loamy and sandy soils
Site central NGR:	NT 9282 2737
Date of Report:	10/12/21

SUMMARY

This report describes the methodology and discusses the results of the Northern Cheviot Hills Aerial Investigation and Mapping Project. Aerial photographs and lidar images were used to map archaeological features in the northern Cheviot Hills. The project was completed to Historic England (HE) standards and was funded by HE through the National Heritage Protection Commissions Programme (NHPCP).

The project was carried out by an Archaeological Research Services Ltd (ARS Ltd) Projects Officer, based with HE's Aerial Investigation & Mapping Team (North) in York.

The survey covered a total of 104 Ordnance Survey kilometre grid squares. This includes the northern Cheviot Hills incorporating the Glen, College Burn and Coldgate Water valleys. The area incorporates one of the least understood but best-preserved prehistoric landscapes in Britain and is facing development pressures from afforestation and mineral extraction.

The main products of the project were digital transcriptions of the form and extent of archaeological features seen on aerial images with supporting descriptions in the Historic England Research Records (formerly the National Record of the Historic Environment). These are available from the HE Archive and were supplied to the Northumberland Historic Environment Record (HER). Monument records are available online on the Heritage Gateway website (https://www.heritagegateway.org.uk/gateway/).

CONTRIBUTORS

Mapping was undertaken by Joel Goodchild (ARS Ltd), while the project was managed by Robin Holgate (ARS Ltd).

ACKNOWLEDGEMENTS

Thanks are due to Jonathan Last for his support in delivering the project through a difficult period
.
Quality Assurance and guidance was supplied by members of Historic England's York-based Aerial Investigation & Mapping Team (North): Matthew Oakey and Sally Evans.

Thanks are also due to Tim Gates for granting permission to use his photographs, as well as providing an introduction to the archaeology of the area.

ARCHIVE LOCATION

Historic England Archive Services, The Engine House, Firefly Avenue, Swindon, SN2 2EH
Archive@HistoricEngland.org.uk

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INTRODUCTION

Northumberland is a county with a rich and unique archaeological resource, yet aerial investigation and mapping to consistent standards has limited, with sporadic attention paid to the uplands of the Cheviot Hills and the Northumberland National Park. Previous projects covering northern Northumberland include the Till-Tweed project (Deegan 2003; Passmore and Waddington 2009; 2012) and the North-East Rapid Coastal Zone Assessment Survey (Bacillieri, Knight and Radford 2008).

The Northern Cheviot Hills Aerial Investigation and Mapping Project was developed by Archaeological Research Services Ltd (ARS Ltd) and Historic England in consultation with Northumberland National Park (NNP) and the Northumberland Historic Environment Record (HER). The project provides a number of benefits: to update and enhance the HER with improved spatial data; to update and enhance the Historic England Research Records; to assist with maintaining the Heritage at Risk Register and National Heritage List for England (NHLE) for monitoring of scheduled monuments.

The project partly mitigates a number of threats to the county's archaeological resource by identifying and mapping archaeological remains within the study area. The largest potential threat is the government encouragement of forestry expansion in upland areas to secure the adoption of a net-zero approach to farming by landowners in the region. The change in approach is expected to have a significant impact on the landscape, with a strong desire to restore ancient habitats and stimulate ecological processes as part of a natural capital approach to land management. Mineral extraction and small-scale housing development also constitute risk factors.

In addition to mitigating risk, the project also has the potential to increase our understanding of research priorities identified as part of the North East Regional Research Framework for the Historic Environment and the Archaeological Research Framework for Northumberland National Park (Petts and Gerrard 2006; Young et al 2004) as follows:

- Expansion into the uplands during the Bronze Age
- Morphology and extent of Bronze Age field systems in the uplands
- Possible agricultural functions of hillforts in later prehistory
- The development and nature of transhumance in medieval and post-medieval times

Though subject to intensive aerial reconnaissance for decades, many archaeological sites within the study area have up until now only been mapped by ground survey. In response to this, the project focused on connecting and enhancing the two study areas of the Till Tweed Project (Fig 1). The aerial survey carried out has the advantage of comprehensively mapping archaeological landscapes to a consistent standard over wide areas (9.6% of Northumberland National Park), thereby complimenting and providing a wider archaeological context to discrete ground surveys. The results of this project will also contribute to upcoming research in the study area that will focus on the study area that will focus on the Anglo-Saxon royal centre at Yeavering (Semple *et al* 2020).

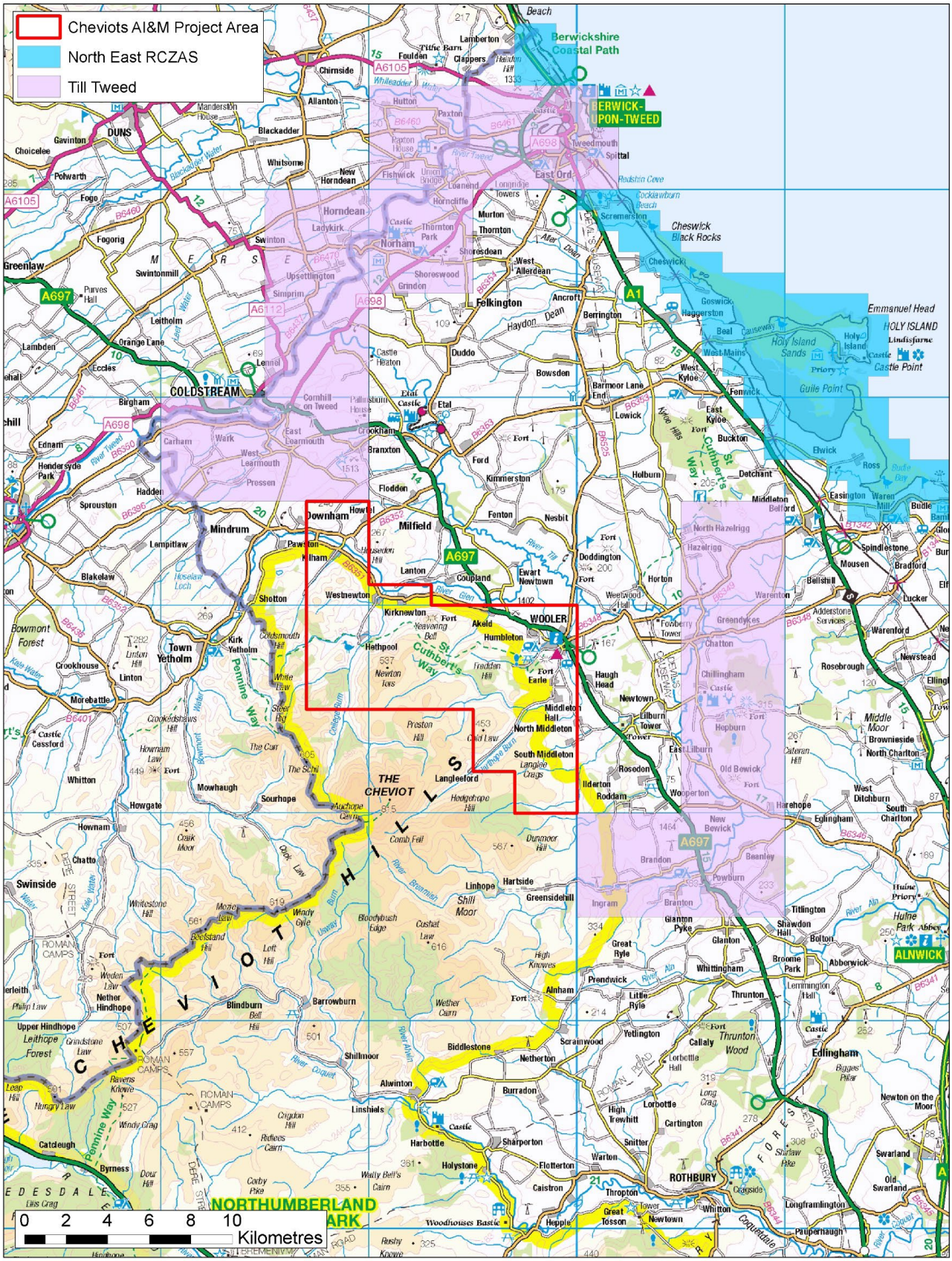

Fig 1: Northern Cheviot Hills Aerial Investigation and Mapping Project area and previous AI&M projects © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Scope of the survey

Geography and Implications for Aerial Survey

The project area covers the northern Cheviot Hills, Northumberland, an area where known and unknown heritage assets were judged to be at risk from changes in land management brought about by climate change, nature recovery and economic drivers requiring farmers and land managers to diversify their income streams as a result of changes to farming subsidies following the UK's departure from the European Union and Common Agricultural Policy. The following overview of the physical geography of the area covered by the project has been written with reference to the Natural England National Character Area (NCA) profiles, together with geology data obtained from the British Geological Survey's online Geology of Britain viewer, examined at a scale of 1:50,000, and soil data from the Cranfield Soil and Agrifood Institute (NRSI) Soilscapes Viewer, accessed online, at a scale of 1:50,000.

The project area falls into two of Natural England's National Character Areas (Fig 2): the majority falls into NCA 4 (Cheviots), with NCA 3 (Cheviot Fringe) skirting along the north-east. The area is dominated by the smooth, rounded hills that characterise the Cheviots along with the river valleys that dissect them. The largest of these is the River Glen that runs through the north of the project area, providing the focus for modern settlement, farming and transport infrastructure (Natural England 2014a). The geology of the area is made up of volcanic rocks of Devonian age, being mostly andesite set around the granite plug of the Cheviot itself, abutting Inverclyde Group Sandstone, Siltstone and Mudstone in the lower reaches of the Glen valley and the Milfield Basin (British Geological Survey 2020a). Much of the upland regions of the survey area are characterised by freely draining sandy and loamy soils concentrated on the upland fringes of the Cheviots and in the valley floors (Cranfield Soil and Agrifood Institute 2018). Such conditions are ideal for cropmark formation and a significant number of sites within the study area were identified by cropmarks. These sites are concentrated in the Glen Valley and the foothills north of

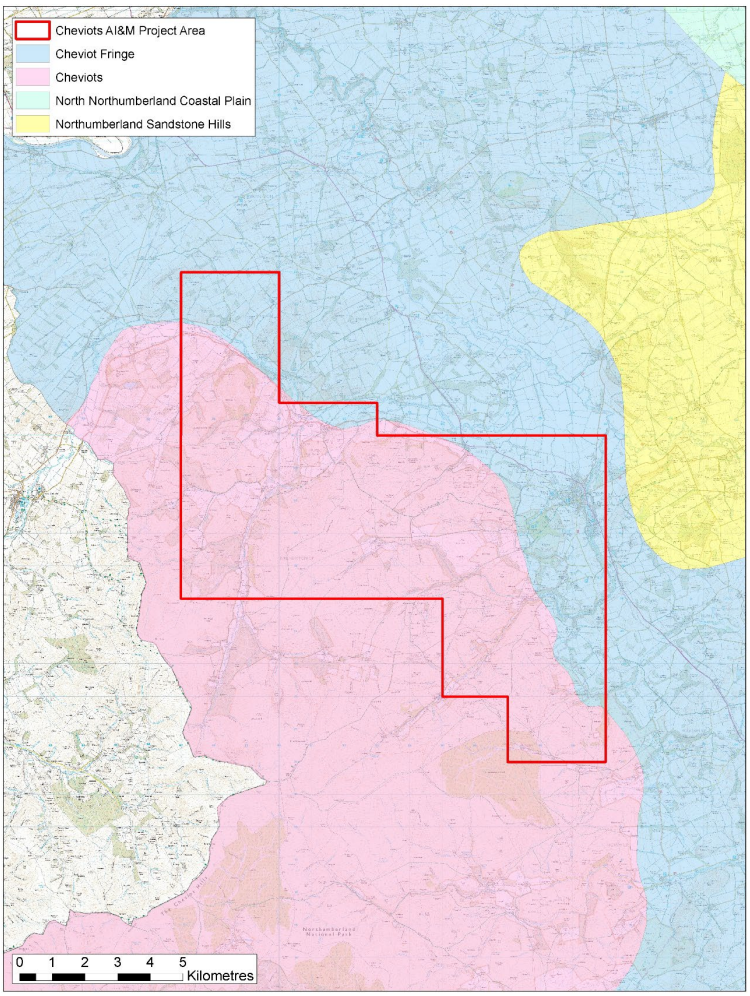

Fig 2: Geographical scope of the Northern Cheviot Hills Aerial Investigation and Mapping Project © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Kilham. In contrast, extensive areas of moisture-retentive peat soils and dominant grasses and heather covering much of the upland interior limit the visibility of extant features through formation of crop marks.

The Cheviot Hills are renowned for the extensive survival of earthworks in the uplands and river valleys. The absence of continuous cultivation has resulted in the preservation of earthworks representing Bronze Age, Iron Age and Roman activity across the uplands on a scale virtually unmatched across much of Britain and Europe. The favourable combination of geological and geographical factors has resulted in archaeology being visible across lowland and upland landscapes, offering a rare opportunity to interrogate the interaction of these contrasting areas since settlement of the Cheviots first began.

Archaeological Scope

The aim of the project is to increase understanding and protection of Northumberland's historic environment by providing a comprehensive dataset of mapped features from aerial sources for the Northumberland HER to help inform the planning process. This was achieved by mapping and recording all archaeological features (earthworks, cropmarks, soilmarks, parchmarks and structures) visible on aerial photographs and lidar imagery where this was available. The sphere of interest for the project follows Historic England Aerial Investigation and Mapping Standards (Winton 2019) and is summarised in Appendix 4.

Summary of Sources

Sources consulted as part of the project include all readily available aerial photographs, together with Environment Agency lidar (where coverage was available). The HE Archive was the primary source of vertical and oblique aerial photography in both digital and print formats. The vertical photographic coverage from the archive was comprehensive across the project area, ranging in date from 1940 to 2000. The loan consisted of 383 vertical photographs and 1558 obliques. Other sources of vertical photography included orthophotography supplied to HE by Next Perspectives™ through Aerial Photography for Great Britain (APGB), Google Earth™ imagery and Bing Map™ imagery. Oblique photography was provided by the HE Archive and oblique photography from the Northumberland HER was also consulted. Unfortunately, the Cambridge University Collection of Aerial Photography (CUCAP) is not currently accessible and could not be consulted. Reference to the CUCAP catalogue shows that obliques within the collection focus on known sites and it is therefore unlikely that sites have been missed by this project as a result of lack of access to the collection.

Lidar data provided by the Environment Agency was consulted and covers *c*. 93% of the project area at 1m resolution. The Historic England Research Records database, HER monument records and Scheduled Monument data were consulted regularly during the interpretation, mapping and recording programme. The nature of underlying bedrock and surface drift geology, as well as soil types, were used to inform interpretation, with online maps available from the British Geological Survey's 'Geology of Britain viewer' and 'The Coal Authority Interactive Map viewer', and the Cranfield Soil and Agrifood Institute (NRSI) 'Soilscapes Viewer'.

Although there is coverage of historic vertical photography for the entire project area, much of it is covered only by a single run of photography, reducing the chance of identifying archaeology as cropmarks or earthworks from this source. While the number of vertical photographs held by the archive was found to be relatively small, oblique photograph coverage is exceptionally good as a result of many years of aerial reconnaissance by Tim Gates. These photographs proved invaluable for the mapping and interpretation of sites, particularly when viewed alongside lidar images. There is excellent coverage of high resolution 1m lidar across the majority of the project area. This proved key to the successful completion of the project, reducing what would have been an almost complete reliance on oblique photography that would have severely limited the project's capacity to identify previously unknown sites. High resolution lidar also allowed for earthwork sites, that make up the majority of those identified by the project, to be mapped quickly and remotely, without the need for access to Historic England's offices which were periodically closed as a result of the Covid-19 pandemic. Although the project has been completed quite successfully with limited physical access to the aerial photograph loan, it should be noted that interpretation of archaeological sites was made more difficult by these circumstances. An over-reliance on a single source of imagery should be avoided whenever possible.

Summary of Methodology

The methodology centred on the systematic study of all available aerial images covering the project area, adhering to Historic England Aerial Investigation & Mapping Standards and Guidelines (Winton 2019). Vertical and oblique aerial images were analysed under magnification and stereoscopically, where possible, to identify archaeological features in the landscape. Frames in which features were identified were scanned at a resolution of 400-600dpi and rectified using the specialist AERIAL 5.36 software. Control was derived from Ordnance Survey MasterMap® 1:2,500 scale digital maps or 25cm resolution APGB orthophotography to produce rectified photographs with error values minimised to sub-meter accuracy.

Lidar data was supplied by the Environment Agency in the form of 1km² ASCII files that were processed in Relief Visualisation Toolbox 2.2.1 to produce 16-direction hill-shade and sky-view factor images (Zakšek, Oštir and Kokalj 2011; Kokalj and Somrak 2019). Rectified images, georeferenced orthophotography, and lidar imagery were inserted into ArcMap 10.4 where they were analysed and mapped. The mapping conventions and layer structure used in the drawing files are summarised in Appendix 2. Details of each feature were recorded as attribute data attached to each shapefile, along with a Historic England Research Records number allowing each feature to be identified in the national and local historic environment records (Appendix 3). Archaeological features were also recorded in WARDEN, the database maintained by Historic England. Records consist of an interpretation, assignation to a period, the location, a description and sources from which a given feature was identified. New records were created for previously unrecorded sites and those with existing records were updated. A list of the monument types used for this project is compiled in Appendix 5. APGB orthophotography was used to record the latest monument condition for earthworks and structural elements, unless more recent lidar imagery or photography was available. In addition, the corresponding HER number for a feature (where existing) was included in the attached mapping data to aid concordance between local and national records (Appendix 3). The monument types

conformed to the Historic England thesaurus and are listed in Appendix 4. Copies of the digital drawing files were deposited in the HE Archive in Swindon and are shared with the Northumberland HER.

The project methodology was significantly impacted by the Covid-19 pandemic. Lockdown requirements forced the closure of Historic England's offices resulting in most of the work has having to be carried out at home. As a result of the relatively small size of the air photo loan and near total lidar coverage of the project area, it was possible to complete the project under these restrictions. It should be noted that, while every effort was made to minimise the impact of not having ready access to the air photo loan, these circumstances will have impacted the quality of the survey to some degree, for instance in making rectification of photographs more difficult or impossible to achieve without access to historic photography for added control. The closure of HE's library service has also impacted the amount of research it has been possible to conduct for this report, though efforts were made to anticipate and mitigate against this to minimise any impact.

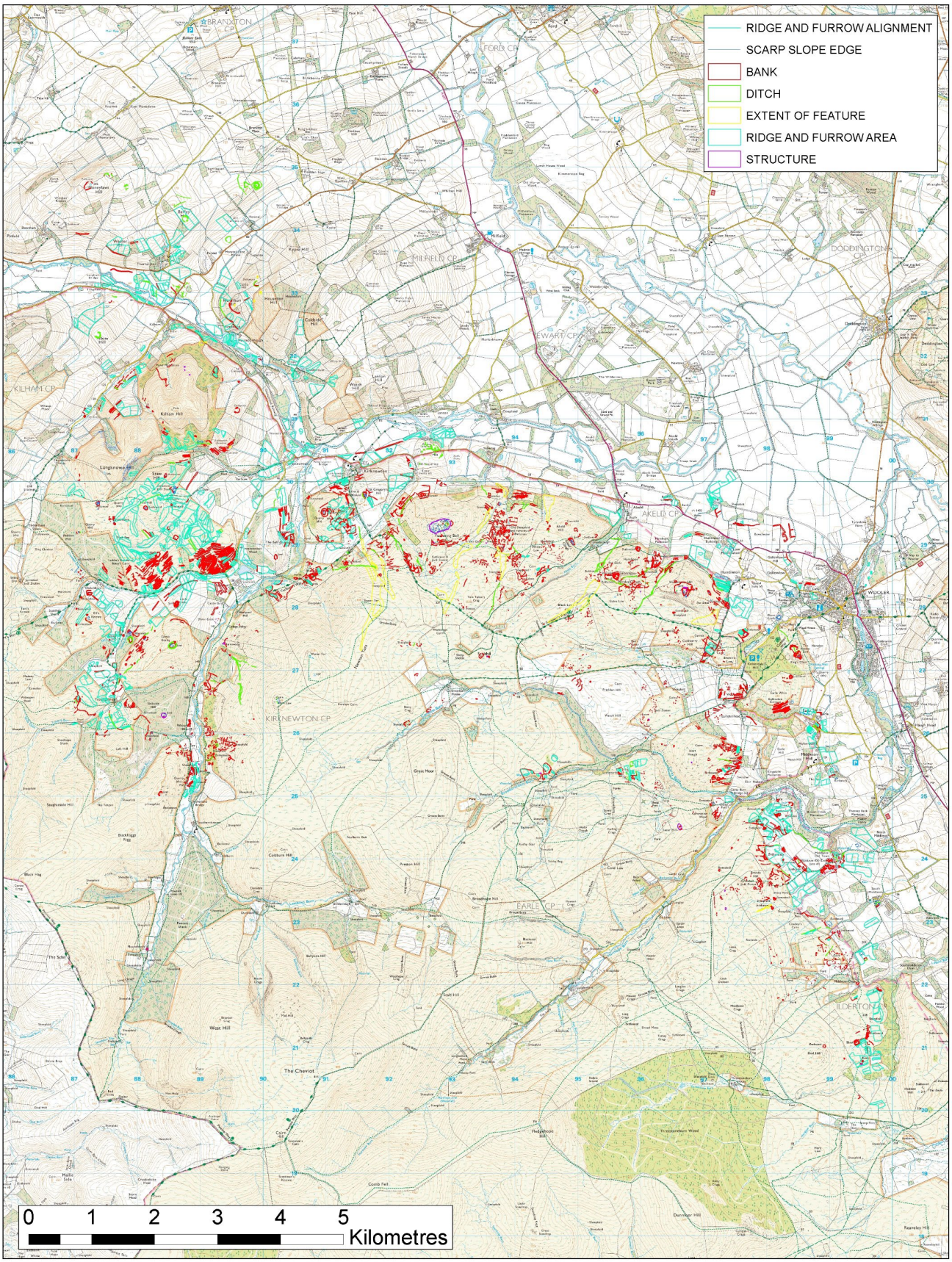

Fig 3: Northern Cheviot Hills Aerial Investigation and Mapping Project mapping © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

HIGHLIGHTS OF THE PROJECT

Summary of Project Results

A summary of the results of aerial investigation and mapping of archaeological features across the project area is presented below on a broad period-by-period basis. This section is intended to highlight the key discoveries of the project, as well as providing the reader with a more general sense of the nature of archaeology in the study area and how this is visible in aerial evidence. As a result of the high number of features mapped by the project, it does not catalogue the results in their entirety, instead presenting those judged to be most representative of the whole and those otherwise considered worthy of note. It establishes the themes to be addressed in subsequent sections as well as highlighting where features were already known to the HER and where they represent new discoveries.

A total of 79 new records were created in the Historic England Research Records and a further 99 existing records were updated and enhanced. As a result, 44.4% of the records produced comprised new monuments in the Historic England Research Records. In addition, 54 records were new to the HER (30.3% of the total therefore being new to the HER) representing a 5.6% contribution of new records to the HER within the project area.

Archaeological sites within the project area span the Neolithic to the Second World War (Fig 3). Archaeological features relating to medieval/post-medieval agriculture are spread most widely across the area, the most common being ridge and furrow, survival of which was found to be extensive across the project area as evidenced in historic vertical photographs.

Neolithic

Sites relating to the Neolithic are well-represented in the project area, being visible as cropmarks and standing monuments. Interpretation of such sites has been informed by excavation at Yeavering and numerous other sites across the Cheviot Hills. A henge (3855) is visible as a cropmark at Yeavering on the south of side of the B6351 (Fig 4). The henge forms the southern end of the largest henge complex in Britain which extends broadly north-south through the Milfield Plain. Partially excavated by A. F. Harding between 1975 and 1978, it had associated with it an inhumation burial and a pit outside the eastern entrance of the henge that yielded Neolithic pottery (Harding 1981, 122). A circular enclosure (3855) was mapped to the north of the B6351, centred at NT 925 304. The enclosure was the subject of excavation by Brian Hope-Taylor as part of his excavations of the Anglo-Saxon palace complex of Yeavering. Referred to by him as the western ring-ditch, it may have originated as a stone circle around what he interpreted as the bedding-pit for a large central monolith (Hope-Taylor 1977, 115). Two larger stone circles (796, 3481) are visible at Hethpool and another at Threestone Burn (Waddington and Williams 2002). Recent archaeological investigation of Long Meg stone circle, Cumbria (Archaeological Services Durham University 2016), and Duddo stone circle, Northumberland (Edwards *et al*. 2011), have yielded Middle Neolithic (3340-3100 cal

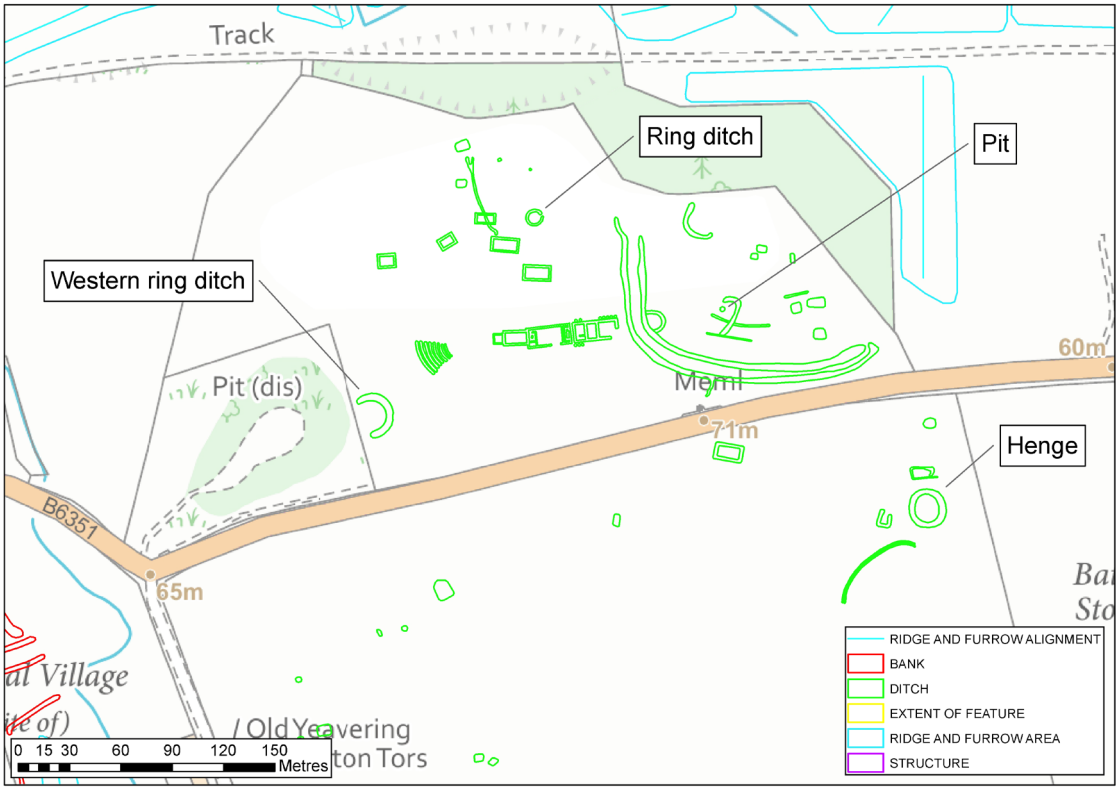

Fig 4: Project mapping of features at Yeavering centred at NT 91611 30460 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

BC) and Early Bronze Age (2200–1900 cal BC) dates respectively that are associated with the construction of the stone circles.

Bronze Age

Sites relating to the Bronze Age are particularly well-represented in the project area mostly visible as earthworks in lidar. A newly identified round burial cairn (3135) is visible on the eastern summit of Yeavering Bell. Trevor Pearson's English Heritage Survey Report on Yeavering Bell (1998) allowed for the possibility of a burial cairn on the eastern summit but found little earthwork evidence of it. Reference to lidar suggests a burial cairn does exist on the eastern summit. This is visible in lidar imagery as a mound with a diameter of 10m.

A number of features at Yeavering (3855) are likely to have their origins in the Bronze Age, two of which have been newly identified by this project. A probable newly identified ring ditch is visible as a cropmark in oblique photography 90m north-west of the eastern ring-ditch excavated by Hope-Taylor, centred at NT 9261 3059. This feature is of comparable size to the eastern ring ditch and may date to the same period. A newly identified cropmark that may represent a large pit is visible 40m east of the eastern ring ditch. Though the date and function of the feature are unclear, it is positioned on an alignment that has been demonstrated to have been significant for early medieval development of the site and it may be representative of remains that are of Neolithic or Bronze Age origin, such as the footing for a standing stone or a ritual deposit. Given the importance of Yeavering these features may be of regional significance, though further

investigation is required to be able to establish their relationship with other elements of the site.

Agricultural terraces are visible on the hillsides of White Hill and Mid Hill. Those at White Hill (789) are recorded in the HER, while those at Mid Hill (1628429) are thought to represent new discoveries. At White Hill these take the form of substantial embanked earthworks measuring 5m across to form a terrace, while at Mid Hill they constitute far more subtle escarpments. It is likely the more substantial embanked terraces at White Hill are the result of their later utilisation for medieval ploughing, resulting in embanked terraces that in places exhibit the curve characteristic of medieval ridge and furrow. Archaeological investigation of agricultural terraces in the Cheviots have demonstrated Bronze Age origins for some of those studied (Frodsham and Waddington 2004; Passmore and Waddington 2012; Brown *et al.* in press), giving them possible national significance as representative of some of the earliest evidence of extensive arable agriculture. A Europe-wide project examining agricultural terraces is currently underway and one of the key case studies being examined is the prehistoric terrace sequence at Plantation Camp in the Ingram valley (Cucchiaro *et al.* 2020, 183-205). The results of this project will have significant implications for our understanding, presentation and care of these previously understudied monument form.

Three clusters of newly identified possible burial cairns and a group of fragmentary field boundaries (2853) are visible 600m east of Hethpool, centred at NT 901 282, closely associated with what are interpreted as post-medieval field systems in the HER. It is likely the cairns are related to a pre-existing field system visible as fragmentary field boundaries and that later field boundaries were constructed using stone from cairns in the area, some of which may have been robbed out completely.

A cairnfield with associated field boundaries and terraces (2853) is visible on the eastern banks of College Burn 450m south-east of Whitehall farm and on the lower slopes of Hare Law (Fig 5). Although the cairnfield and field boundaries immediately opposite Whitehall Farm had previously been identified, those on the lower slopes of Hare Law are not recorded in the HER and likely represent new discoveries. The number of cairns concentrated in this area is unusual and does not appear to be related to clearance for farming, particularly on such steep slopes that do not lend themselves to cultivation. It is therefore possible that some of these features represent burial cairns.

Agricultural terraces (1011989) are visible on the southern hillside of Yeavering Bell. These are visible as embanked earthworks that are far more discrete than those on White Hill. Combined with a lack of cultivation marks, this likely indicates their use did not extend into the medieval period, though their close association with Iron Age enclosures, some of which have been appended to the terraces, and the hillfort on Yeavering Bell, suggests they may have continued in use during the Iron Age. A large cairn (1011989) is visible as an earthwork to the south-east of the terraces that, given its size, may represent a burial monument.

The project has found further evidence of roundhouses surviving as ring-banks or roughly circular cut platforms commonly described as ring-grooves (eg Burgess 1984; Gates 2012, 69). An unenclosed settlement (1370525) at Newton Tors East, centred at NT 923 273, consists of ring-groove hut circles, cairns and field boundaries. A pair of newly identified ring-groove hut circles (1628747) is visible to the west of the summit of

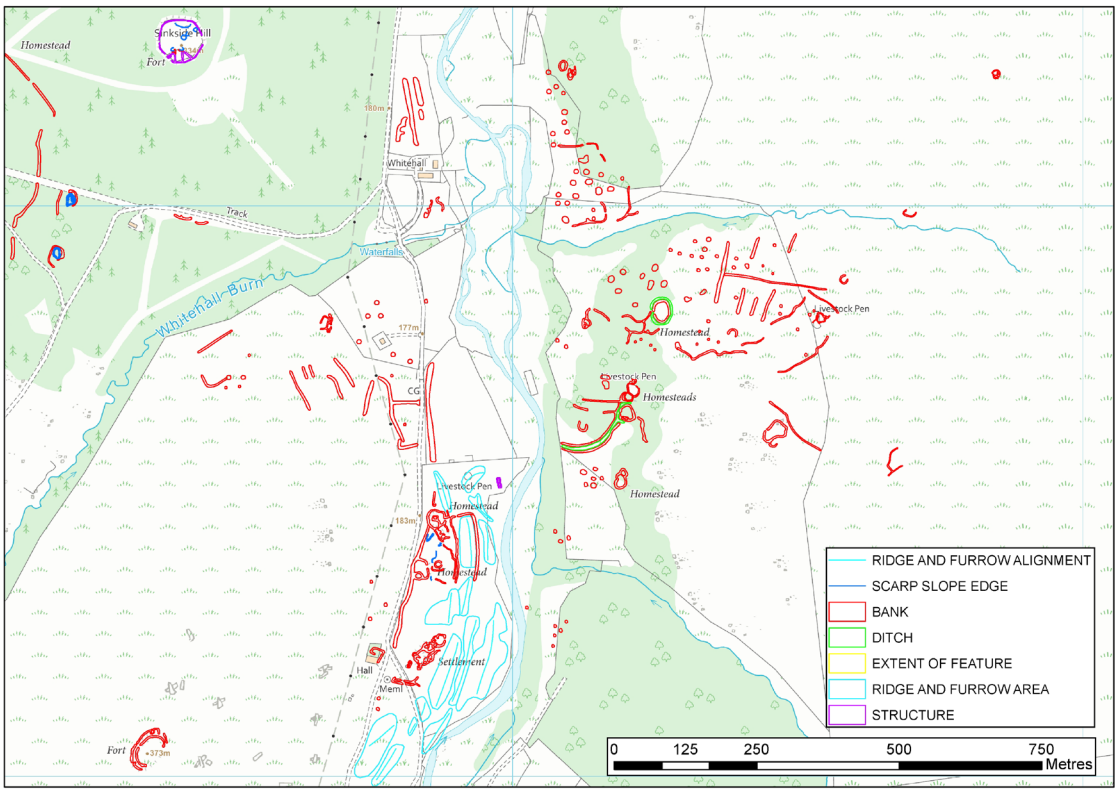

Fig 5: Project mapping of settlement, cairns, terraces and field systems to the south-east of Whitehall Farm, College Burn, centred at NT 89116 25798 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Newton Tors. These are not associated with any visible evidence of field systems or clearance cairns and may represent the remains of a temporary settlement. A group of five newly identified unenclosed ring-groove hut circles (1628733) is visible 480m north of Earlhillhead Farm (NT 977 267) associated with agricultural terraces and clearance cairns. Eight newly identified ring-groove hut circles (1628732) are visible associated with clearance cairns and fragmentary field boundaries on Brown's Law, centred at NT 973 273. A group of scheduled hut circles (2572) is visible as earthworks in lidar imagery 300m west of the hillfort at Monday Cleugh, centred at NT 953 285. Three of these are cut into the ground with no evidence for banked features defining them, while the remaining two are visible as circular banks. These are closely associated with a cairnfield (2572) to the south-west and five cairns to the north- east. Most of this evidence for unenclosed settlement is representative of new additions to the HER which may be of regional and possibly national significance given their potential for contributing to our knowledge of settlement development in the Bronze Age.

A group of six previously unidentified ring-groove hut circles (3225) is visible 650m south-south-west of Yeavering Bell, NT 927 286. These are unenclosed and associated with fragmentary field boundaries that may be contemporary with them. The group shows some variation in morphology, with those to the east visible as circular banks, and those on steeper slopes to the west having scooped interiors. An Iron Age lynchet appears to incorporate another possible roundhouse at the south-western end of the group. Two cairns are visible as earthworks among the group and a further three are visible as earthworks 270m to the north-west.

A newly identified cairnfield with associated field boundaries (1628726) is visible as earthworks in lidar imagery 330m south-east of the hillfort at Monday Cleugh. The cairns and surrounding field systems respect each other, though their precise relationship is unclear. Further survey of the site may be able to tease out the relationship and sequencing of these features.

A newly identified hilltop settlement (1628477) made up of at least eleven newly identified ring-groove hut circles is visible on the summit of Hare Law in lidar imagery, centred at NT 902 265. The site appears to be partially enclosed on its western side by a possible palisade trench visible as a narrow ditch feature. The site may represent an early hilltop settlement that was deserted prior to the development of the earthwork defences seen at other hilltop defended settlements in the project area. If so, it is of regional significance as a result of its potential for preserving in-situ remains from the period in which hilltop locations were first being occupied and carries great research potential for elucidating this important period of transition.

A known field system consisting of an extensive cairnfield and associated field boundaries (1628745) is visible on the western slopes of Fredden Hill. The main body of the cairnfield, centred at NT 949 271, is unenclosed apart from a series of field boundaries that partially enclose a group of cairns to the south-east. Set among these are a rectilinear enclosure and field boundary that may be contemporary with the cairnfield and a large rectilinear enclosure 200m to the east that may also be contemporary. Field boundaries that appear to form a large curvilinear enclosure are located 300m to the south of the main cairnfield along with a large cairn interpreted as a burial cairn as a result of its size compared to others in the cairnfield. A smaller circular enclosure is located 200m to the east of this and is presumed to be contemporary with the rest of the field system.

An extensive cairnfield (2415) is visible as earthworks in lidar imagery skirting the base of the south-eastern slope of Fredden Hill. The spatial distribution of the cairns is interesting as the main body of the cairnfield, centred at NT 960 263, skirts the base of the hill with other newly identified cairns clustered in two distinct groups to the north and north-east. Also significant is a lack of earthwork evidence for associated field boundaries or unenclosed roundhouses associated with the cairnfield.

Agricultural terraces, field boundaries, cairns and enclosures (2462) are visible on the eastern slopes of Hart Heugh (Fig 6). These form part of an extensive previously identified field system with terraces built on the gentler slopes of the hillside, some of which contain evidence for cultivation with cord-rig visible as earthworks in lidar imagery on the terraces. The majority of cairns are newly identified and contained within an area enclosed by field boundaries on the south-east of Hart Heugh, with very few cairns located in the vicinity of the terraces, giving the field system the impression of compartmentalisation and planning. Given that cairns and terraces are thought to be contemporary in date, this separation does seem to be deliberate and the result of some degree of planning. There also appears to be a degree of separation among the group of enclosed cairns. The smallest cairns are grouped together in the east of the enclosure and measure 5m in diameter. To the west of these is a tightly packed group of four cairns, each measuring approximately 8m in diameter. 40m to the south-west of these larger cairns is a single large cairn with a diameter of 12m. The variation in size and distribution of these cairns suggests they are not simply the result of clearance and may represent a cairn cemetery.

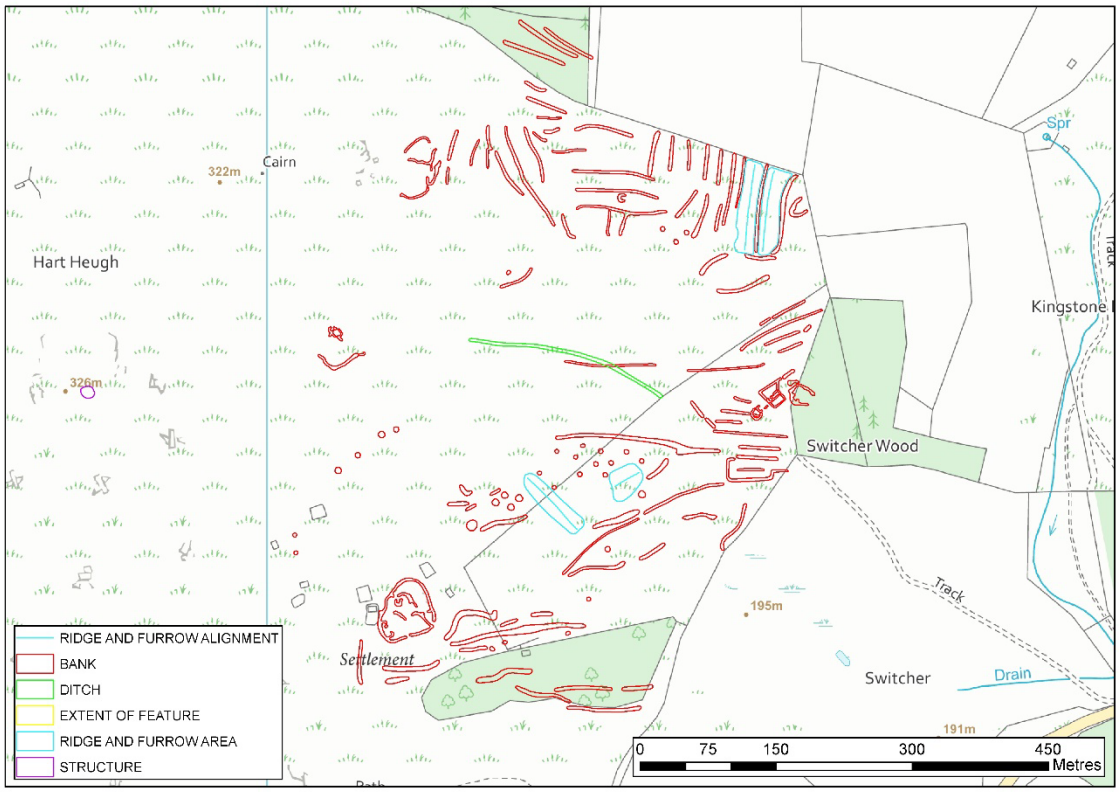

Fig 6: Project mapping of settlement, cairns, terraces and field systems on the slopes of Hart Heugh centred at NT 97351 25538 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Three discrete cairnfields, associated cord-rig cultivation marks and field boundaries (1628752) are visible east of Luckenarks, on the south side of Carey Burn, centred at NT 960 251. These are clustered in three groups, the most easterly is a known site associated with fragmentary field boundaries and contains smaller cairns with a diameter of 4.5m among which are three larger cairns that are 8m in diameter. Cairns within the two newly identified groups to the west are of more uniform size and are associated with cord-rig cultivation marks that appear to respect the cairns. A field system appears to overlie the cord-rig and an enclosed settlement to the west is associated with medieval ridge and furrow, though its form suggests it may have Iron Age origins.

A known extensive cairnfield and associated field clearance boundaries (1628758) are visible as earthworks in lidar imagery on Middleton Dean, centred at NT 990 223. The cairns show variation in size, ranging from 3m to 8m in diameter, and some evidence of spatial grouping. A single large cairn, centred at NT 9909 2241, measures 14.5m in diameter and may represent a burial cairn. Large numbers of stone cairns are known to survive in the upland regions of Northumberland, as has been further demonstrated by this project.

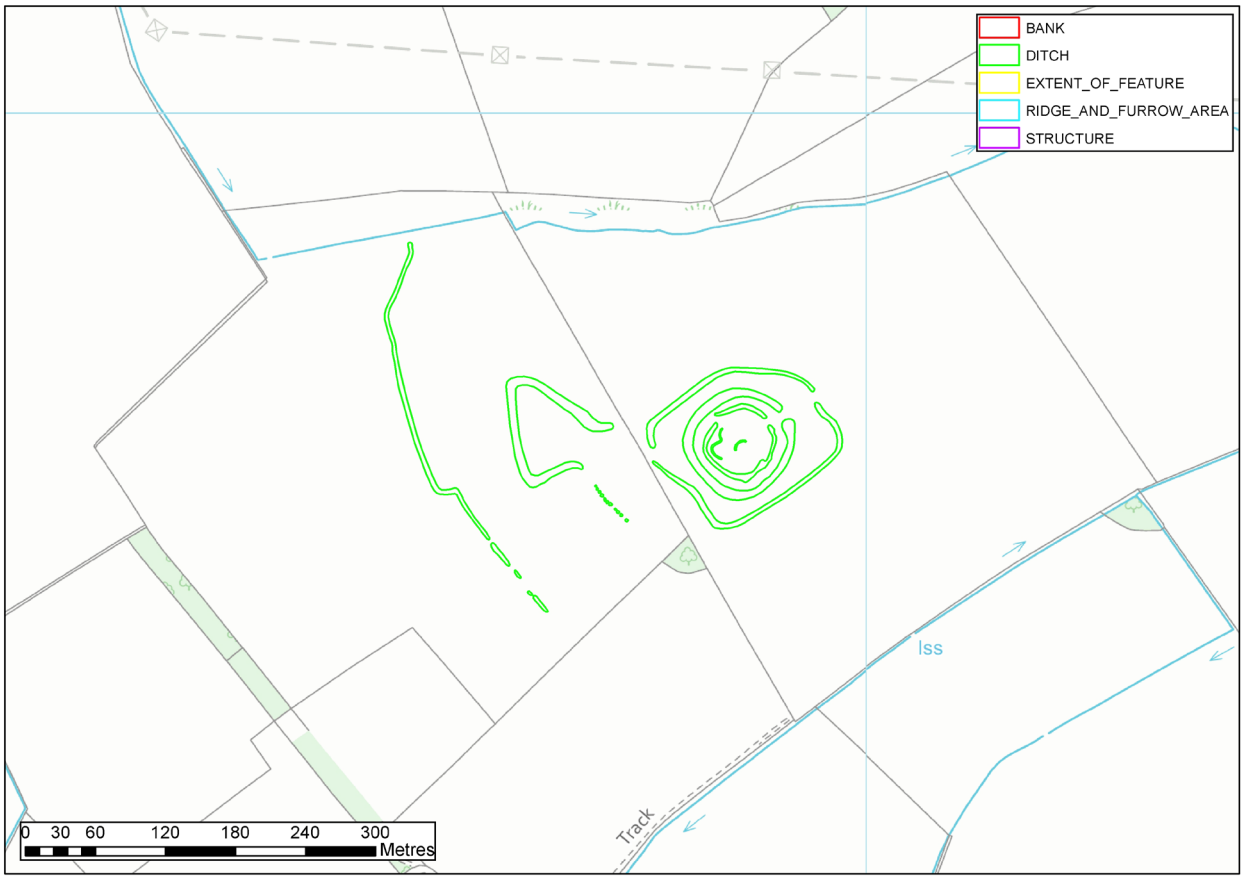

Fig 7: Project mapping of a possible palisaded settlement centred at NT 89800 34711 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Iron Age/Roman

An Iron Age enclosed settlement (895) is visible as cropmarks in oblique aerial photography, 720m north of the hamlet of Howtel, centred at NT 897 347 (Fig 7). The form of the settlement is unique within the project area, consisting of a circular enclosure containing cropmark evidence of roundhouses and a possible palisade construction trench, itself enclosed within a sub-rectangular enclosure. To the west of this is a pit alignment that runs toward the entrance of a trapezoidal ditched enclosure and a further ditched field boundary beyond this. If we assume, as seems likely, that the first phase of settlement is represented by the circular enclosure which was later enclosed by the curvilinear enclosure, it would seem that the trapezoidal enclosure is contemporary with this second phase, its entrance aligning with the south-west entrance of the curvilinear enclosure. Two pit alignments (1266) are visible as cropmarks in oblique aerial photography north of Barley Hill, centred at NT 887 344. Together these form a funnel shape, implying movement of people or livestock was being encouraged between the two. Excavated examples of pit alignments in the Milfield Basin have been shown to range in date from the Neolithic (Miket 1981) to the early post-Roman period (Passmore and Waddington 2012a).

Seven hilltop enclosures and a hillfort (637, 584, 784, 908, 918, 891, 881) are visible as earthworks in lidar imagery on a number of summits to the west of College Burn. At Straw Hill, Mid Hill Laddies Knowe and Ell's Know, these consist of a single or double rampart enclosing a number of hut circles. The enclosure on Little Hetha (891) is surrounded by a double rampart containing a number of curvilinear and rectilinear

banks representing internal divisions and possibly the footings for structures, some of which may be medieval. At least one hut circle is visible within the enclosure. Great Hetha hillfort (784) consists of a double rampart enclosing at least fourteen hut circles. On its north-eastern side, the outer rampart extends to annex and enclose an area where the entrance to the hillfort is located. A hilltop enclosure on Snickside Hill (584) is surrounded by a broad stone rampart and at least five hut circles are visible within the enclosure. The rampart is unusual in that it incorporates two trapezoidal enclosures on its southern side. These likely represent stock enclosures and appear from lidar to form part of the original structure of the rampart. The enclosure on Blackhaggs Rigg (637) consists of a double rampart with a small enclosure incorporated into the outer rampart within the inter-mural area. Although no features could be distinguished within the enclosure from lidar, APGB aerial imagery shows an earthwork bank that appears to sub-divide the enclosure.

Six scooped and enclosed settlements and their associated field systems (1628468, 576, 617, 632) form part of an extensive Iron Age landscape on either side of College Burn to the south of Whitehall Farm. These are integrated with Bronze Age cairnfields described above, and it is likely settlement of the locality began in that period. The morphology of these settlements varies, with those on the valley bottom consisting of roundhouses and enclosures scooped into the underlying alluvial sands and gravels, while those on the valley sides cut into the hillsides and are enclosed with embanked material.

Three known settlements (908, 981, 701) are visible on the south-west slopes of Great Hetha (Fig 8). The earliest of these, an Iron Age defended settlement (908) enclosed by a double rampart, is unusual in that it closely resembles a defended hilltop enclosure but is located on the lower slopes of a steep sided valley. Given that the settlement is over-looked by the steep slopes of Great Hetha, the extent to which the site would be defendable is open to question. Two enclosed settlements (981, 701) of probable early Roman date are located to the north and east of the defended settlement. Both settlements are enclosed by rectangular earthworks, with external scooped elements that may represent an earlier phase of these settlements. The easternmost settlement, known as 'Hetha Burn', was the subject of excavation by Colin Burgess. This found Romano-British material of 1st-2nd century date as well as evidence for a possible timber roundhouse and associated hearth beneath a later stone-built roundhouse (Burgess 1970, 1-26). Given the proximity of Great Hetha hillfort and the defended hilltop enclosure at Ell's Knowe on summits at either side of the valley, these settlements have great potential for elucidating societal changes in the late Iron Age and Roman period and are of regional significance.

Three scheduled enclosed settlements and their associated field system (2886) is visible in the valley bottom below Easter Tor. The settlements mostly consist of embanked earthworks with some elements scooped into these embankments such as three hut circles within the central settlement enclosure. The surrounding rectilinear fields are remarkably well-preserved. They contain clearance cairns and cultivation marks, some of which appear to underlie field boundaries in the north-east of the field system. This site shows excellent evidence of settlement development through earthworks that indicate habitation over a prolonged period of time.

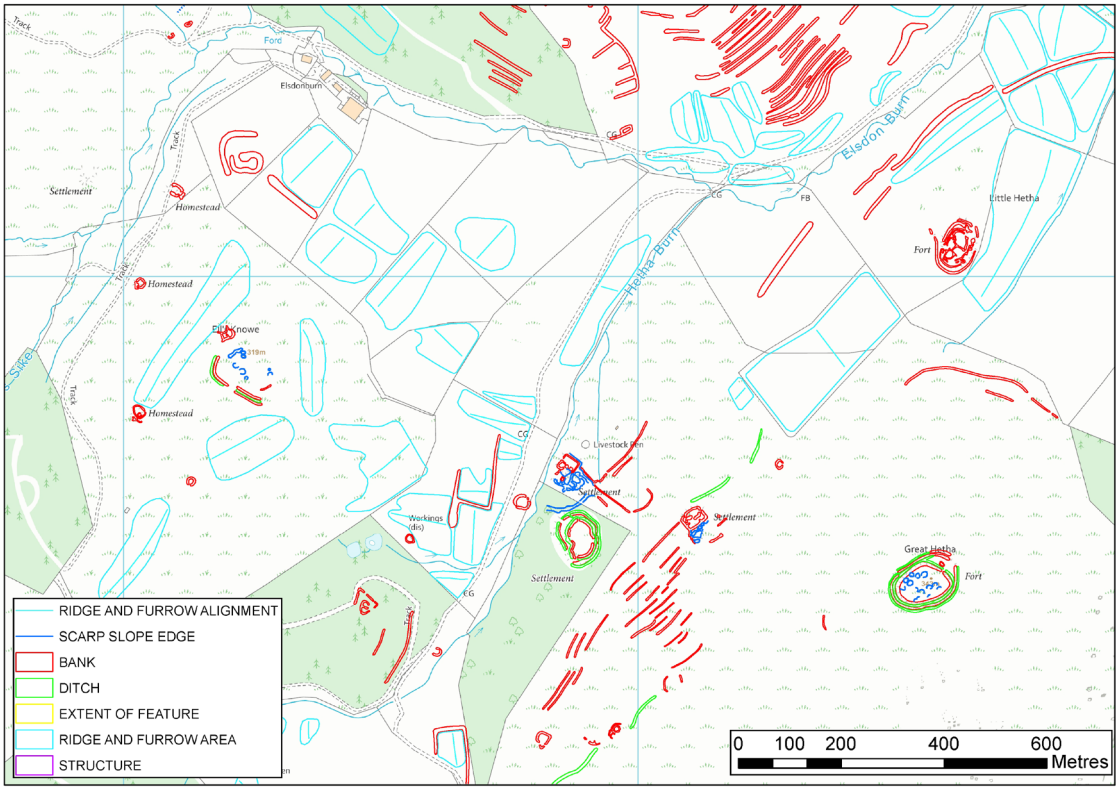

Fig 8: Project mapping of settlement, terraces and field systems in Hetha Burn, centred at NT 87816 627748 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Yeavering Bell hillfort (3135) is visible as earthworks in lidar imagery and historic aerial photographs on the summit of Yeavering Bell. It consists of a single stone rampart that encloses an area of 5.4ha around the two summits of the hill. The enclosed area contains evidence for a large number of hut circles, with 93 mapped from lidar by this project, though 125 were identified and mapped by ground survey (Pearson 1998). A second rampart encloses an ancillary area on the eastern side of the hillfort and there is earthwork evidence of a ditch on the western side of the hillfort that mirrors this. A circular ditch encloses the eastern summit and cuts through some of the hut circles (Pearson 1998).

The project has mapped earthwork evidence of extensive settlements and their associated field systems in the upland valleys surrounding Yeavering Bell (Fig 9). Enclosed settlements and field systems (1628723) are visible as earthworks in lidar imagery in the valley to the east of Yeavering Bell and best illustrate this survival. These consist of a network of terraces, field boundaries and enclosures, with two enclosed settlements central to the field system. There is some evidence of variation in the spatial patterning of the field systems, with those running up the slopes to the south-east possessing a more organic character than the well-organised rectilinear field boundaries to the north-east. The distribution of cairns in the area is also interesting. Although there are a few clearance cairns visible within the field system, the majority are situated within clearly demarcated peripheral areas to the north and south-west. This demarcation does not support their interpretation as clearance cairns and suggests the origins of the field system may lie in the Bronze Age. Three rectangular enclosures (3099, 2873, 1628723) are visible as earthworks in lidar imagery downslope of the field system, centred at NT 936 296. The rectangular bank of one of these (1628723) encloses an earlier scooped

enclosure. It is likely these enclosures can be grouped with other rectilinear enclosures on the lower slopes of the Glen valley (3118, 2962) and are later than the extensive Iron Age settlements described to the south-west of Yeavering Bell.

A scheduled hilltop enclosure and associated field system (2950) are visible on the summit of West Hill. The enclosure consists of a rampart enclosing the summit of the hill and at least ten hut circles. A second rampart encompasses the first, incorporating a D-shaped scooped enclosure (1310904) with a rectilinear entrance. Built into the rear of this enclosure are seven structures that surround an internal yard space. A field system extends across the gentle south-east facing slope of West Hill. This is made up of rectilinear fields, interspersed with trackways and occasional clearance cairns (1311121). On the lower slopes of the hill to the east are two scooped enclosures (1311139) and a series of three isolated scooped hut circles (1628575).

A scheduled multivallate hillfort and associated field system (2588) is visible on Harehope Hill overlooking Monday Cleugh. Unusually, given the number of hut circles visible at the sites described above, only four hut circles evident in lidar imagery within the hillfort itself. The intramural area between the inner two ramparts is segmented by small radial walls, a building characteristic that finds parallels in the forts at Grieves Ash and Brough Law (Topping 2008, 353). The outer rampart appears to be a later addition

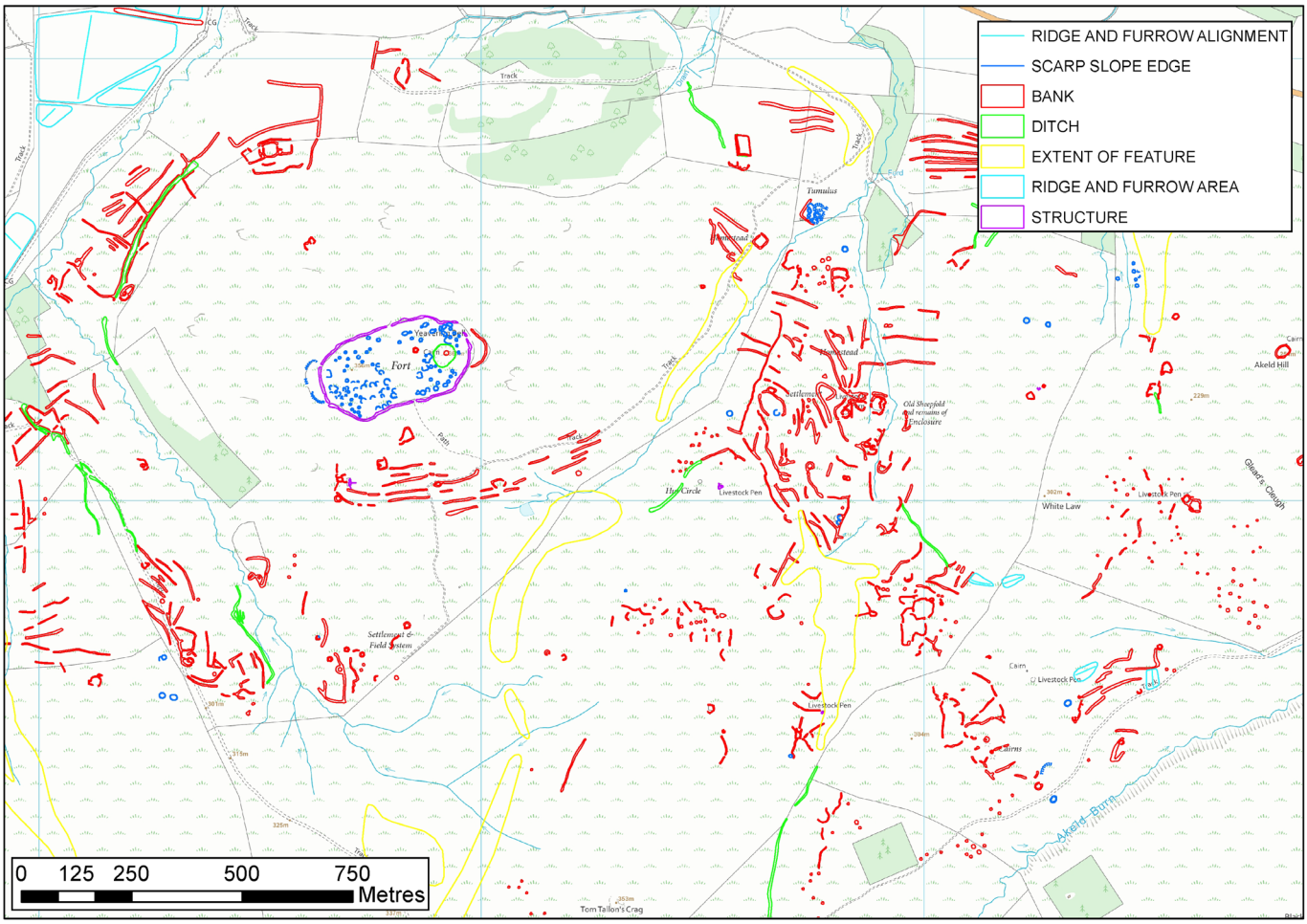

Fig 9: Project mapping of settlement, terraces, cairns and field systems surrounding Yeavering Bell, centred at NT 393491 629006 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

as it cuts through a curvilinear enclosure on the north side of the entrance to the hillfort. Field boundaries define a trackway leading to the entrance of the hillfort from Monday Cleugh. This encloses a large field to the north that contains a hut circle and five clearance cairns. Fragmentary field systems are visible beyond this to the north, while to the west lie the cairnfield and unenclosed roundhouses described above. These unenclosed roundhouses may well have continued in use during the Iron Age, perhaps explaining the limited number of roundhouses within the hillfort itself which may have functioned as a refuge for the wider community in times of conflict.

A scheduled multivallate hillfort (2671) is visible as earthworks in lidar imagery and historic aerial photographs on the east slopes of Kenterdale Hill (Fig 10). Architecturally, the fort is the most complex in the project area, consisting of two main enclosures separated into two parts by triple ramparts that run perpendicular to its long north-west to south-east axis. single rampart on the western and eastern sides of the enclosure. An entrance is visible through these ramparts to the north-west. Segments of a hollow way run through the enclosure from the north-western entrance and continue through the entrance to the south eastern enclosure. This enclosure is particularly complex, defined on its north-western side by a triple set of ramparts; the enclosure is separated into three areas by an inner circular enclosure taking up the majority of the space while defining two enclosed areas on either side of the entrance. The inner enclosure contains a further trapezoidal shaped enclosure which is defined by slight earthen banks and encloses four

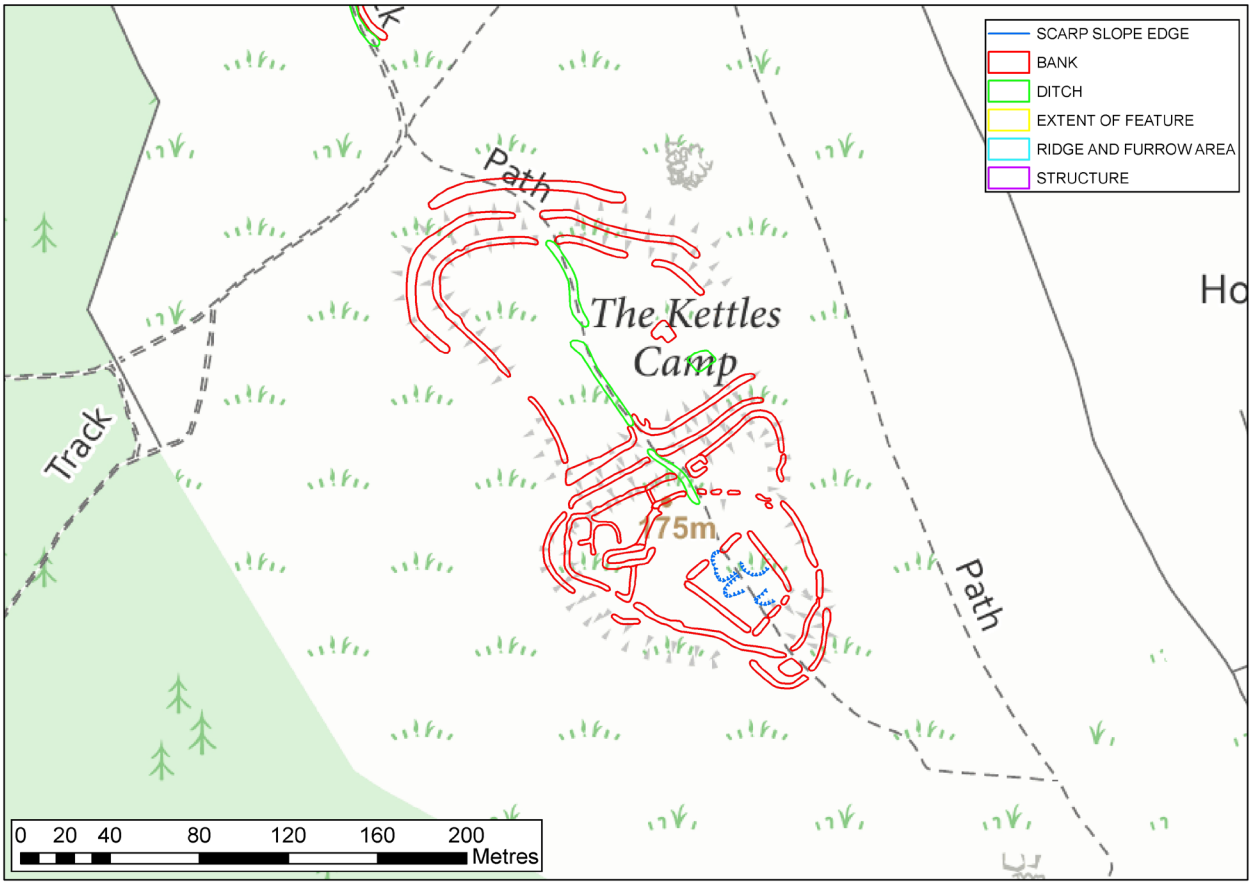

Fig 10: Project mapping of The Kettles multivallate hillfort, centred at NT 398464 627296 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

building platforms, visible as distinct levelled areas cut into the ground. The enclosure on the eastern side of the entrance contains a small rectangular enclosure, measuring 3.2m by 5.5m, built into the ramparts by the entrance that may represent the footings of a guardhouse. The enclosure on the western side of the entrance contains a number of slight earthen banks that may define stock enclosures, a long enclosure measuring 18m by 4.5m that resembles a longhouse and is built into the inner circular enclosure, and a rectangular enclosure with a sunken floor on the western side of the entrance opposite the posited guardhouse. The south-eastern entrance to the hillfort is defended by a second rampart that encloses an intramural area. Within this is an embanked earthwork that appears to be a building platform.

At least fourteen enclosed settlements and their associated field systems (1628754) are visible on the north-eastern slopes of Brands Hill. These consist of curvilinear and rectilinear enclosed settlements, four of which are newly identified. Field systems in the north of the area are more rectilinear and associated with medieval ridge and furrow that likely represents medieval reuse of Iron Age field systems, though cairnfields may indicate settlement in the area beginning in the Bronze Age. Field systems in the south of the area are curvilinear and much smaller, perhaps dating to the Bronze Age, though they are ascribed to the Iron Age in the HER. A good example of these is associated with a large stone-walled enclosure that has been likened to a Scottish dun as a result of the size of its walls (centred at NT 9786 2360).

Three scheduled scooped settlements and a rectilinear enclosed settlement and associated field system (3476) are visible south-east of Middleton Dean. The scooped settlements are positioned adjacent to a trackway that appears to curve toward the enclosure before being overlain by medieval ridge and furrow. The enclosure consists of a double rampart with an entrance on its eastern side. This encloses the rectilinear footings of at least one medieval long house, though the enclosure itself is likely to be Iron Age.

Early Medieval

Evidence for early medieval settlement in the project area is far more limited than that identified for previous periods. This is not to say that there were not people living and working in the area during this time, but that settlement patterns established in this period largely continue to the present day. It is likely that some upland sites continued in use, as is evidenced by the presence of medieval ridge and furrow in close proximity to some sites, while settlement in the valleys has either developed into modern settlement or been levelled by agricultural activity. The altitudinal reach of medieval ridge and furrow agriculture never extends to the limits of prehistoric settlement and is one of the main reasons for its excellent survival in the Cheviot Hills.

The Anglo-Saxon royal centre at Yeavering (3855) is visible as cropmarks in historic aerial photographs 1.2km east of Kirknewton (Fig 11). As previously discussed, features visible in aerial photographs of the site have been shown to date from the Neolithic-Bronze Age, with the site providing a focus for ritual activity and monumentalisation in this period, perhaps related to this locale lying at the foot of the most prominent of the northern Cheviot hills, Yeavering Bell, whilst also overlooking the mouth of Glendale and controlling access north-south and east-west through the Milfield Plain (Waddington 1999). What is perhaps most interesting about Yeavering is the way in which archaeological investigation of the site has demonstrated the significance of

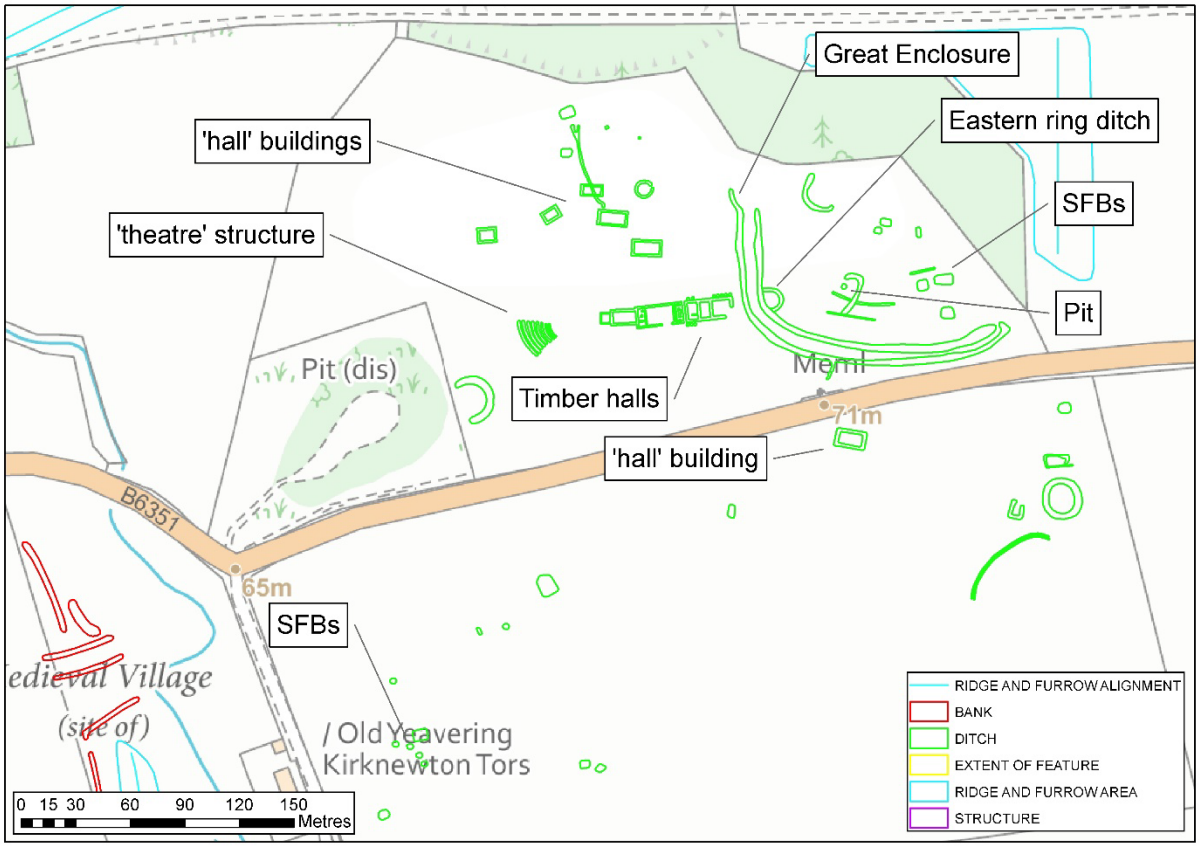

Fig 11: Project mapping of Yeavering with early medieval features labelled, centred at NT 91611 30460 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

these early features in the subsequent development of the site as a ritual and political centre in the early medieval period (Hope-Taylor, 1977). A double ditched enclosure, described as the Great Enclosure by Hope-Taylor, encloses the eastern end of the site. The outer ditch of the enclosure is curved at its northern end and coincides with the circular terminals excavated by Hope-Taylor. Within the enclosure is the eastern portion of a circular enclosure known as the eastern ring ditch. This was excavated by Hope-Taylor and interpreted as having once surrounded a barrow that pre-dated the Great Enclosure, into the top of which was driven a large wooden post that mirrored the remains of a post excavated in the western ring ditch (*ibid* 84-85, 112-113). Directly east of this is a possible double palisaded enclosure, visible as cropmarks as well as in the results of a resistivity survey conducted at the site (Semple *et al* 2017, 93-95). Appearing to cut through this enclosure is a newly identified curvilinear ditch, partially enclosing a possible pit, both of which are visible as cropmarks. A partial curvilinear enclosure and three newly identified aligned pits are visible as cropmarks to the east of the northern terminal of the Great Enclosure. The curvilinear enclosure likely represents the eastern side of the entrance to the Great Enclosure that consisted of a second circular terminal enclosure, excavated by Hope-Taylor. In the eastern portion of the Great Enclosure are six newly identified, roughly rectangular cropmarks that may represent Sunken Featured Buildings (SFBs).

To the immediate west of the Great Enclosure are a range of early medieval rectangular structures (1369693) visible as cropmarks. These were excavated by Hope-Taylor and represent timber hall structures, with a linear group of three halls aligned to the west of the eastern ring ditch and shown to belong to different phases of construction at the site. To the immediate west of these halls is a theatre-like structure which is also aligned with

the eastern ring ditch. Excavated by Hope-Taylor, it represents a form of structure that is without parallel in the early medieval period within the British Isles and most closely resembles the form of a classical theatre, from which it likely draws its architectural inspiration (Hope-Taylor, 241-244). A north-westerly alignment of three halls culminating in a fourth structure that is interpreted as a Sunken Featured Building (SFB) from excavation. A further two halls are visible to the immediate west of these, the most easterly of which is newly identified.

Other cropmarks likely representing early medieval features are visible to the south of the B6351. These consist of two previously identified halls and a rectilinear enclosure, located to the west of Old Yeavering Henge, which may represent a hall. In the north-east corner of the field is a circular feature (3855) that may represent a SFB or a large pit. Concentrated in the west of the field are thirteen newly identified rectangular cropmarks that may also represent SFBs. If this is the case this may be an outlying settlement associated with Yeavering.

Medieval

A medieval longhouse (1311162), first identified by earthwork survey conducted by Oswald *et al* (2000), is visible on the eastern slopes of West Hill. This appears to have refashioned an earlier scooped settlement and is itself overlain by a post-medieval byre-house. The longhouse is likely associated with the evidence for medieval ridge and furrow ploughing in the surrounding fields, some of which respects the pre-existing Iron Age field-system and some of which overlies it.

A medieval settlement (3339) known as Middleton Old Town consists of at least six longhouses and associated garden plots visible as earthworks. The level of earthwork preservation of the site is exceptional and its proximity to Iron Age/Roman period enclosed settlements 300m to the west (1628754) represents an excellent opportunity for research into settlement development in the locale. Earthworks relating to a newly identified medieval settlement (1628757) are visible in lidar imagery adjacent to a hamlet at South Middleton (Fig 12). This consists of holloways, field boundaries and building platforms adjacent to a burn that runs through the hamlet. That these do not relate to more recent settlement, is evidenced by the lack of any depiction of buildings or earthwork remains on historic maps of the settlement. The site is certainly locally significant as a previously unrecognised medieval settlement. Despite modern settlement overlying much of the medieval settlement of Hethpool, earthworks relating to the medieval watermill leat (1628463) are visible running south-east from Elson Burn to the earthwork remains of the mill pond visible in the west of the village. A steep scarp (1628464) is also visible enclosing a roughly rectangular levelled area to the immediate south-east of Hethpool tower house that likely represents a courtyard or garden associated with it. Both the Kettles hillfort (2671) and a rectilinear enclosed settlement east of Dod Hill (3488) represent Iron Age sites that contain clear evidence of medieval re-occupation, with earthworks relating to medieval longhouses visible at both sites.

Post Medieval

The majority of post-medieval sites in the project area relate to upland sheep farming whether in the form of settlement or stock enclosures. Five millponds (1628729, 1628731, 2762) are visible in the project area, taking advantage of the lower slopes of the

Fig 12: Project mapping of medieval settlement at South Middleton, centred at NT 99798 23308

hills surrounding Wooler; most of these are associated with mills for textile production and cloth processing.

Second World War/Cold War

A total of five pillboxes (1421704, 1421707, 1421709, 1421710, 1428712) and a prisoner of war camp (1474050) have been mapped by the project surrounding Wooler. The town served as the western terminal of a defensive line that stretches from the town of Wooler in the west past Belford to the east coast. As the most northerly defensive line in England, it served to control movement south by road and rail (Pillbox Study Group).

GLENDALE: EARLY SETTLEMENT AND MONUMENTALISATION

The northern Cheviot Hills and Milfield Basin have been the subject of aerial reconnaissance aimed at photographing archaeological remains since the Second World War. This work has recently been supplemented by the Environment Agency's lidar programme which has allowed subtle earthworks not visible in aerial photographs to be identified for the first time. As a result of the presence of geologies conducive to cropmark formation in the Milfield Plain and the extraordinary survival of earthworks in the Cheviot uplands, aerial reconnaissance has proved a highly effective means of identifying new sites in the area. This is evidenced by the number of sites that were discovered when regular flying was commissioned, with year-on-year increases regularly exceeding 33% (Gates 2012, 62). Given the proven visibility of archaeological remains across the upland and lowland landscape, this area presents the rare opportunity to evaluate settlement patterns across these areas through time. Tim Gates (2012, 91) has observed how, despite extensive evidence for Neolithic/Bronze Age monuments in the Milfield Plain, there is a dearth of sites representing Iron Age/Roman settlement in the lowlands. This project has comprehensively mapped the archaeology of the northern Cheviot uplands and Glendale, providing a dataset that will allow the interaction between upland and lowland landscapes to be further explored and better understood.

The Neolithic represents the earliest period to which features mapped from aerial imagery can be attributed, and in many instances, this has only been possible as a result of their excavation. Although the number of Neolithic features identified within the project area is limited in comparison to later periods, they are highly significant, providing the first manifestations of what would become an increasingly complex ritualised landscape by the subsequent Beaker period. It is worth noting the presence of Neolithic 'axe factory' sites on and around the rock outcrops on the watershed between the Harthope Burn and the Linhope Burn. Such sites cannot be identified from aerial photographs but geological sourcing of ground and polished axe heads indicates one or more of these outcrops were likely used for this purpose (Waddington and Schofield 1999).

Situated atop a prominent glacio-fluvial river terrace overlooking the river Glen, Yeavering is an important and complex multi-period site and one of the best examples of a truly 'persistent place' in the archaeological record (Waddington 1999; 2005; Waddington and Passmore 2012). The site of Yeavering was discovered through aerial reconnaissance by J.K.S. St Joseph in the 1940s and soon recognised as belonging to Ad Gefrin (the Britonic name used by the Anglians meaning 'hill of the goats') the Anglo-Saxon royal centre described by Bede. The site was excavated by Hope-Taylor between 1953 and 1962, revealing a multi-phase site of great complexity (Hope-Taylor 1977). This project represents the first time the site has been comprehensively mapped from aerial photographs, revealing features that have not previously been recognised (Fig 13). The following discussion will not describe the site in its entirety but will focus on newly identified elements and how they contribute to Hope-Taylor's interpretation of the site.

The henge, located south of the B6351 and visible as a cropmark, was securely dated to the Neolithic through radiocarbon dating of material from a closely associated pit and the presence of Neolithic pottery (Harding 1981). Harding observed that the entrances to the henge and their associated pits are aligned with a megalith known as the Battle Stone located 160m to the east-south-east (Harding 1981, 120), providing the first evidence for

the significance of alignments between monuments at the site that would prove fundamental to its later development. Further evidence of Neolithic activity was unearthed with the discovery and excavation of a 'ritual' pit by Hope-Taylor (1977, 348-51). The feature is visible as a cropmark at the northern extent of the site and was found to contain sherds of Neolithic Grooved Ware pottery, cremated human bone, flints and hazelnut shells. Excavation of the western ring ditch revealed the ditch in fact consisted of a series of pits, interpreted as the sockets of standing stones that had been deliberately removed (Hope-Taylor 1977, 109-112). The remains of a large wooden post set into a cremation deposit at the centre of the monument was also found and interpreted as having been erected in the setting of an earlier monolith (*ibid*, 112). The cropmarks that relate to the western ring ditch represent the remains of a stone circle that may have originated in the Neolithic, given the evidence for cremations inserted into the enclosed area and within the central post hole. The eastern ring ditch, also excavated by Hope-Taylor and visible as a cropmark was found to relate to features consistent with the ploughed-out remains of a round barrow, into which a standing wooden post was later inserted, mirroring that erected in the western ring ditch (Hope-Taylor 1977, 85). These features can be viewed alongside a circular enclosure visible in multispectral imagery on the north-eastern side of the western ring ditch (Semple *et al*. 2020, 14) and a newly identified circular enclosure, visible as cropmarks in the north of the site. Features uncovered during Hope-Taylor's excavation of the western ring ditch bear some resemblance to those revealed by Roger Miket's (1985) excavation of a penannular ditch

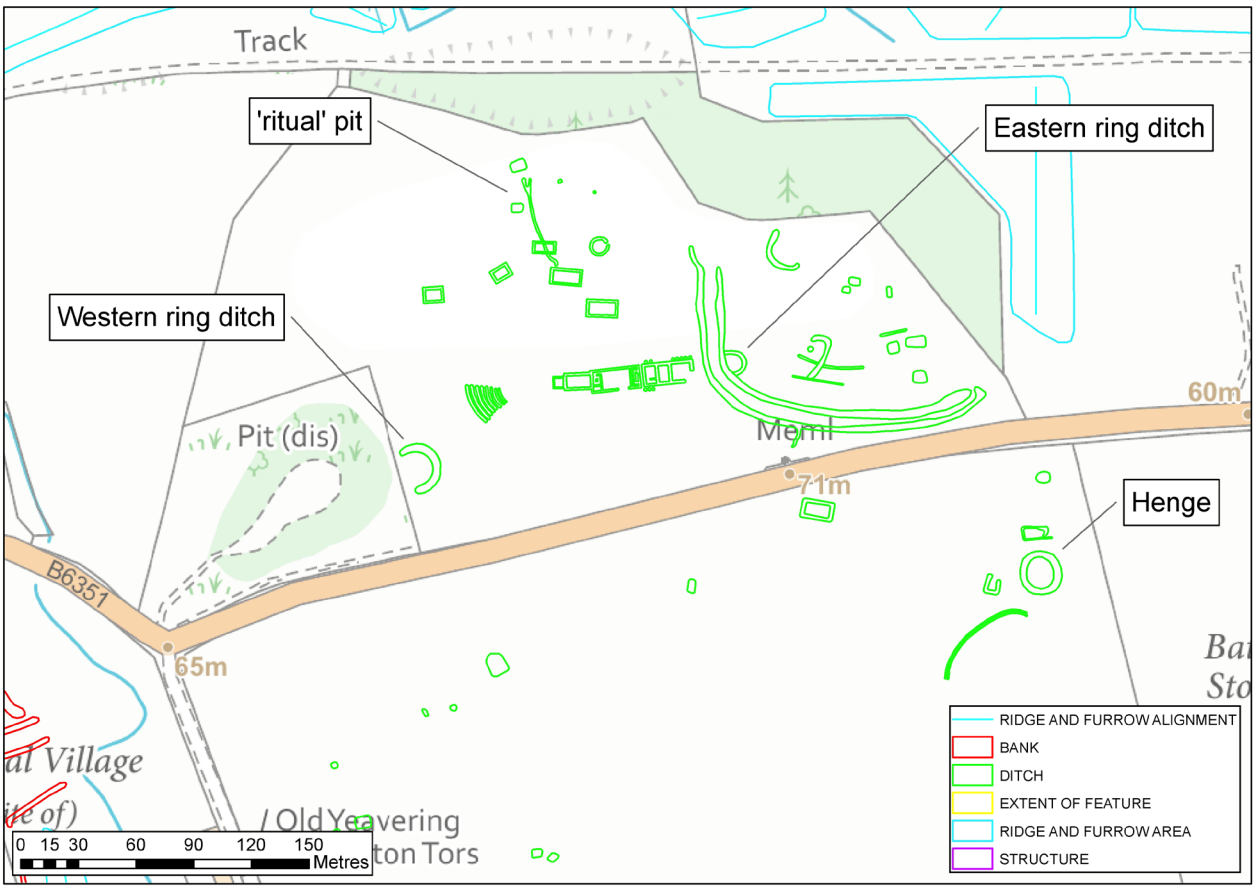

Fig 13: Project mapping of Yeavering with Neolithic/Bronze Age features labelled, centred at NT 91611 30460 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

at Whitton Hill (Site 2), north of Milfield. Here a shallow ditch encloses a circle of pits, interpreted as the settings of monoliths that in turn surround a central pit filled with the cremated remains of at least 23 individuals.

Excavation of these sites illustrates how a process of monumentalisation that likely began in the Neolithic continued into the Beaker period. The importance of these features lies not in them slotting neatly into a defined period, but in their reflecting the transition from the Neolithic to the Beaker period that is associated with an intense phase of monumentalisation. Research has shown how Neolithic/Beaker open area ritual enclosures, such as stone circles and ring ditches, were often the subject of elaboration over time that saw their function shift from communal to funerary spaces (Garwood 2007, 36). Such sites often provided a focus for human activity and burial over an extended period of time before being 'closed' through construction of a barrow mound (Last 2007, 173). Hope-Taylor's excavations at Yeavering appear to illustrate this architectural and funerary elaboration. Waddington's study of the henges of the Milfield Plain and consideration of their architectural form, landscape positioning and alignment concluded that they appeared to form part of a ceremonial processional route focused on Yeavering and aligned with the double top summit of Yeavering Bell. Yeavering is described by Waddington as a persistent place, with Yeavering Bell possibly considered a sacred mountain and the river Glen (the Brittonic translation of which means 'pure') a holy river (Waddington 1999). What is fascinating about Yeavering is how Neolithic features at the site continue to provide a focus for development into the Iron Age, with the largest hillfort in the region situated on top of Yeavering Bell, but also into the early medieval period as a royal centre and the place chosen for the mass conversion of Bernician Northumbrians to Christianity.

A probable cairn on Yeavering Bell (3135) is interpreted as overlooking the site of Yeavering. Large burial cairns dating to the Bronze Age are known from within the project area. In 1858 an exceptionally large cairn known as Tom Tallon's Grave was dismantled revealing a stone-lined cist containing human bones (Gates 2012, Northumberland HER, ref: N1456). Lewis' (2007, 82) discussion of the setting of round barrows on the Mendip Hills highlights the importance that may have been attached to barrows located in prominent places and the potential significance attached to what could be seen looking from these places as much as looking to them. Paul Frodsham (2004, 9-10) evocatively highlights the significance that may have been attached to landforms with dramatic profiles such as Yeavering Bell, with its twin summits (Fig 14). While the Neolithic monuments at Yeavering mirror the monumental landscape in which they are set, Bronze Age activity, whether in the form of cremations inserted into a pre-existing stone circle or the construction of a large burial mound on a prominent summit, can be seen as co-opting these places for remembrance of individuals in their own right or as representative of the group. Evidence from excavation of the monuments at Yeavering support this and may be representative of a process by which individuals were being selected as representative of group identities.

Fig 14: Yeavering Bell (viewed from the north-east).

BURNS AND HIGH GLADES: BRONZE AGE SETTLEMENT OF THE UPLANDS

The picture of the Cheviot uplands in the Neolithic/Early Bronze Age presented by palaeoenvironmental evidence is one of variable woodland cover, predominantly made up of Birch and Alder, and evidence for small-scale forest clearance by burning dating from *c.*4600 cal BC (Topping 2008, 330). It is only in the Bronze Age that the first evidence of permanent settlement becomes visible (Burgess, 1984; Passmore and Waddington 2012), these settlements occupying areas of cleared woodland and wood pasture. The project has mapped Bronze Age sites consisting of unenclosed roundhouses, round cairns and fragmentary field boundaries dispersed across the northern Cheviot uplands. These include the unenclosed Early Bronze Age settlements excavated by Colin Burgess at Houseledge East and West (2585, 2609). At Houseledge West (2585), five hut circles are visible as earthworks alongside an associated field system and cairnfield. Burgess (1984) provides a detailed interpretation of the site and its associated fields and cairns which will not be repeated here, apart from to highlight two important insights that resulted from excavation. First, that one of the hut circles excavated by Burgess showed three phases of construction and use, the first two being successive timber roundhouses superseded by a stone hut circle, the latter being contemporary with the surrounding field systems. This suggests the rectilinear field system associated with the settlement may only be associated with the final phase and that, as Burgess (1984, 145-6) also points out, the roundhouse is only visible as a result of it being incorporated into a later stone hut circle. It is therefore important to bear in mind that timber roundhouses are not likely to be visible as earthworks and that we may only be seeing and mapping a final stone-built settlement phase (Waddington and Passmore 2016).

The Houseledge settlements also raise the interesting question of the visibility of archaeological remains using different sources. 1m resolution lidar, even with reference to Burgess' map of the site, proved to be of insufficient resolution for the recognition of discrete earthwork features such as the field boundaries, with only some huts visible. Mapping of features was totally reliant on aerial photographs captured by Tim Gates in March 1985, where banks are made visible by heightened vegetation protruding through a fortuitous quantity of snow (Fig 15). This is likely the result of the 1m resolution of lidar data available simply not being of high enough resolution to capture discrete earthworks that are little more than 1m wide. Given the range of sources of imagery available for the site, this would make the site an ideal candidate for photogrammetric drone survey providing a model with centimetre level resolution to assess the visibility of features using this method.

The project has found evidence of roundhouses surviving as ring-banks, as is visible in the final phase of roundhouses at Houseledge West, or roughly circular cut platforms described as ring-grooves by Gates (2012, 69). Unenclosed hut circles visible as ring-grooves have been mapped at a number of sites across the upland interior of the northern Cheviots. These sites occur in a range of topographical locations, often without association with developed field systems and they display none of the architectural elaboration represented by ring-bank hut circles. An unenclosed settlement (1370525) visible as earthworks in lidar imagery at Newton

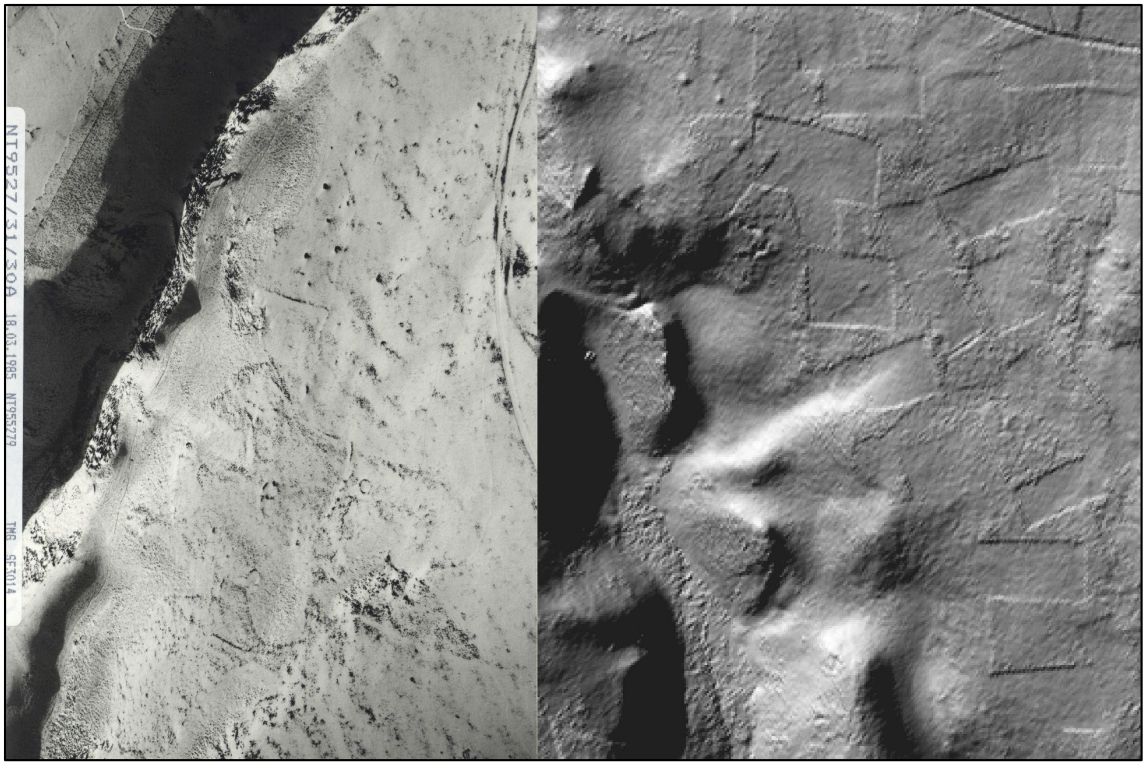

Fig 15: Comparison of features visible at Houseledge East in an oblique aerial photograph and lidar © Tim Gates, 18th March 1985; Environment Agency copyright 2019. All rights reserved.

Tors East, centred at NT 923 273, consists of ring-groove hut circles, cairns and boundaries. What is unusual about the site are the pairs of curvilinear boundaries associated with the settlement, particularly the eastern pair of boundaries that forms a funnel shape, with no evidence of them being enclosed at their wider northern or narrower southern apertures. Even accounting for further survival of features not visible in lidar at this resolution, the unusual shape of these boundaries more closely resembles features associated with controlling the movement of livestock than enclosed fields. A pair of newly identified ring-groove hut circles (1628747) is visible on the western slopes of Newton Tors. These are not associated with any visible evidence or suggestion of field systems or clearance cairns and may represent the remains of a temporary settlement.

A group of five unenclosed ring-groove hut circles (1628733) are visible 480m north of Earlhillhead farm (NT 977 267). The settlement is sheltered in a cleugh to the south of Humbleton Burn alongside the St. Cuthbert's Way footpath and is associated with agricultural terraces and clearance cairns. It is likely that some of the agricultural terraces closely associated with the settlement are contemporary with it and may provide evidence of Bronze Age cultivation. Evidence of settlement shift can be seen on the opposite side of Humbleton Burn on the south-east slopes of Coldberry Hill (Fig 16). Here eight ring-groove hut circles (1628732) are visible associated with clearance cairns and fragmentary field boundaries downslope of an Iron Age enclosed settlement and rectilinear field system.

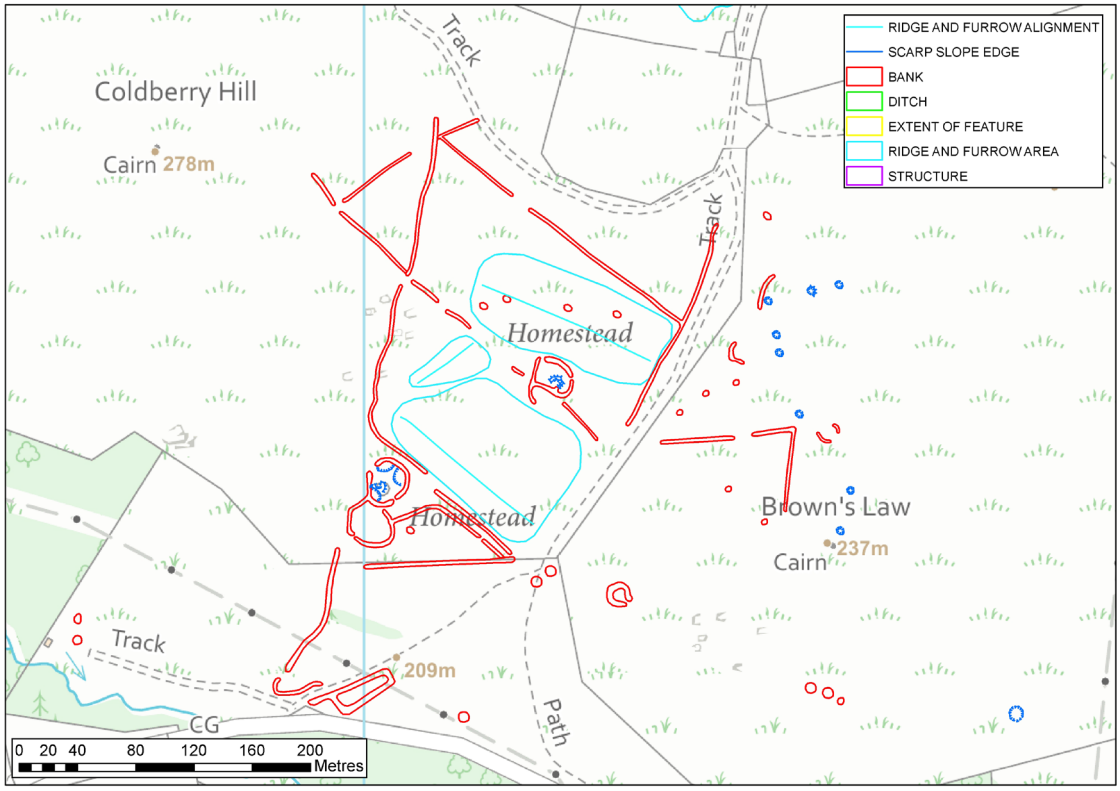

Fig 16: Project mapping of unenclosed roundhouses and Iron Age scooped settlement on the south-east slopes of Dod Hill, centred at NT 97139 27327 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Comparison of these settlements serves to highlight the range of contexts in which ring-groove hut circles are found. Earthwork survival of settlements mapped in the highest reaches of the Cheviot uplands are more discrete and fragmentary than those on the upland periphery, requiring further survey using methods producing higher resolution imagery than those available to this project. Reference to such imagery would provide more certainty as the extent of their survival and character, allowing for more certain conclusions to be drawn with settlement visible at lower altitudes. One observation that can be made from visible earthworks mapped by this project is that despite obvious differences in the topography and field systems associated with unenclosed ring-groove settlements, there is little evidence of the development of enclosed field systems around any of them. Where ring-groove hut circles do occur, they are likely representative of outlying survival of earlier, timber-built settlement that was not subject to the rebuilding in stone evident at Houseledge West.

This shift in building techniques may be a reaction to a gradual change in environmental conditions evidenced by palaeoenvironmental data. Investigation of sites across the county show increased spread of heathland during the Bronze Age, some associated with significant charcoal deposits indicative of forest clearance by burning (Young 2004, 165; Topping 2008, 333). More recent data shows that land use on the eastern flanks of the Cheviots is indicative of continued woodland clearance within the context of a still widely wooded landscape, with increasing heather moorland (heath), pastoralism and some evidence of cereal cultivation (Waddington and Passmore 2016, 183). Given the exposed locations of many of the settlements described above, it may be that the rebuilding in stone of the roundhouse at Houseledge West is representative of adaptation to an increasingly open landscape, due in part to clearance for agriculture, where local supplies of timber were being conserved and shelter was no longer afforded by surrounding woodland.

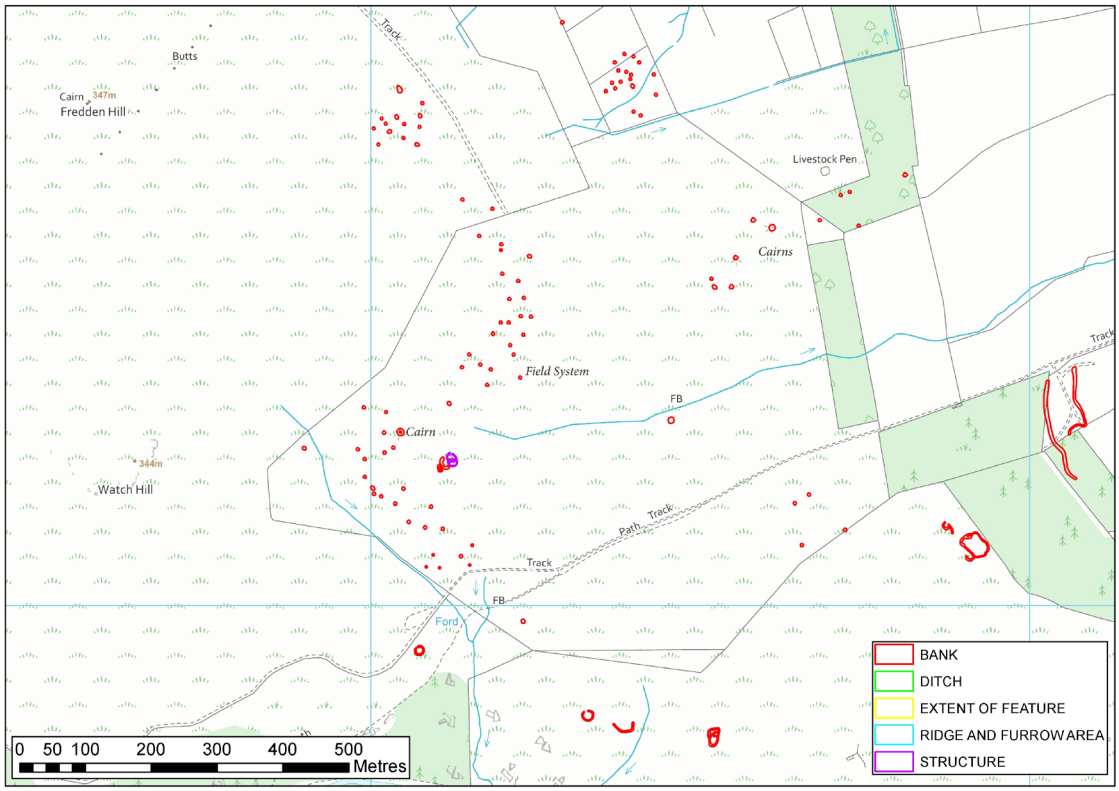

Fig 17: Project mapping of cairnfields on the south-east slopes of Fredden Hill, centred at NT 96099 26433 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Extensive cairnfields have been mapped by the project. Whereas previously each cairnfield had been provided with a single point ID in the HER, providing little interpretive value, mapping by the project means the distribution of cairnfields and their spatial relationship with settlement can now be interrogated in a way that was not previously possible. A scheduled cairnfield and associated field system (1628745) is visible beneath the western slopes of Fredden Hill, centred at NT 949 270. This cairnfield displays the close association with field boundaries and enclosures that would be expected from an area in which great amounts of energy had been invested in making the land viable and productive. Here the cairns are concentrated in the north of the site, some distributed alongside small enclosures, others seemingly enclosed within fragmentary field boundaries. This can be conveniently compared with an extensive cairnfield (2415) skirting the eastern slopes of Fredden Hill and Watch Hill further south (Fig 17). The largest of these cairnfields skirts the lower slopes of Fredden Hill and two separate groups of cairns are visible to the east. This area shows no evidence of associated settlement or field systems, apart from a small Iron Age enclosed settlement at the southern end of the cairnfield. The absence does not appear to be the result of lack of visibility as is the case at Houseledge West, where slight earthworks were visible in lidar. The lack of associated agricultural features opens the possibility of the cairnfield representing Bronze Age mortuary practice. George Jobey's excavations of groups of small cairns at High Knowe (1966), Chatton Sandyford (1968) and Millstone Hill (1981) provide ample evidence of small cairns overlaying cremations and burials. Groups of cairns have been identified across the project area in settings that appear ill-suited to agriculture, while others may have been deliberately sited to be inter-visible with significant sites on the Milfield Plain and peaks such as Hedgehope Hill. Comprehensive mapping of these features provided by the project will allow these factors to be assessed more readily and targeted for further investigation.

CONTROLLING THE LANDSCAPE: HILLTOP SETTLEMENTS AND HILLFORTS

The Iron Age marks a distinct shift in the settlement pattern visible in the northern Cheviots toward defendable hilltop locations. Radiocarbon dates collected from hilltop settlements in the area suggest they were established no earlier than 800 cal BC (Gates 2012, 76) but this may reflect a dearth of radiocarbon dated sites given that nearby hilltop enclosures such as Traprain Law and sites in North Yorkshire, Cumbria, the Pennines and the Welsh Marches date to the Late Bronze Age have long been known throughout much of upland Britain (Waddington and Passmore 2012, 190-222).

Palaeoenvironmental evidence indicates a reduction in cereal cultivation between approximately 1300 and 1150 cal BC in the Bowmont Valley (Tipping 2010) while pollen records from the eastern Cheviots indicate continuation of cereal production; this does not however preclude localised abandonment and shifting cultivation (Waddington pers. comm.). The fact that so many Bronze Age settlements have been left fossilised across the Cheviot Hills is testament to the fact that they were abandoned in this period. Climatic deterioration is evidenced in the Late Bronze Age beginning around 1170 cal BC, with a marked downturn from 850 cal BC that resulted in major flooding events across Britain (Waddington and Passmore 2012b, 230-1). That so many defended hilltop settlements appear to have been established during this period of climate instability could suggest the two are linked and that hilltop locations may have been increasingly valued for the security they offered. The motivation for the occupation of hilltop locations may be illustrated by Tim Gates' excavation of an unenclosed settlement at Halls Hill, Redesdale in 1981 and 1986 (Gates 2009). This showed evidence for cereal cultivation at the site in the Late Bronze Age and that the settlement was abandoned following its destruction by fire between 810 and 520 cal BC (*ibid*, 51). It is worth considering whether this represents evidence of increased conflict arising from pressure on resources during a period of climatic deterioration. Recent excavations at the Cheviot palisaded enclosure on Bleakmoor Hill have dated the construction of this defended settlement to the late 6th – 5th century cal BC (Hunter and Waddington in press) – dates which appear to immediately supercede the destruction and abandonment of unenclosed sites such as Hallshill.

A newly identified settlement made up of at least eleven ring-groove hut circles (1628477) is visible on the summit of Hare Law (Fig 18). The remains of a possible palisade trench are visible partially enclosing the western side of the settlement. It is likely that the palisade post-dates at least some of the hut circles given that one of the hut circles is isolated outside it to the west. This site is significant as the only hilltop settlement in the project area not subject to defensive elaboration through the subsequent addition of earthwork ramparts. It is possible that this represents an early example of a hilltop settlement that was abandoned at an early stage in its development, similar to that recently excavated on Bleakmoor Hill (Hunter and Waddington in press).

Great Hetha bivallate hillfort (784) is visible as earthworks 1.9km west-north-west of Hare Law on the opposite side of College Burn. The earthwork remains of at least fourteen hut circles are visible within the main enclosure and a separate area has been annexed to the north-east of this with the addition of the outer rampart. The hillfort was the subject of an analytical field survey conducted by English Heritage in 2000 which found that development of the hillfort was likely in three distinct phases (Pearson and Lax 2001). The inner rampart is thought to have replaced an earlier enclosure in the

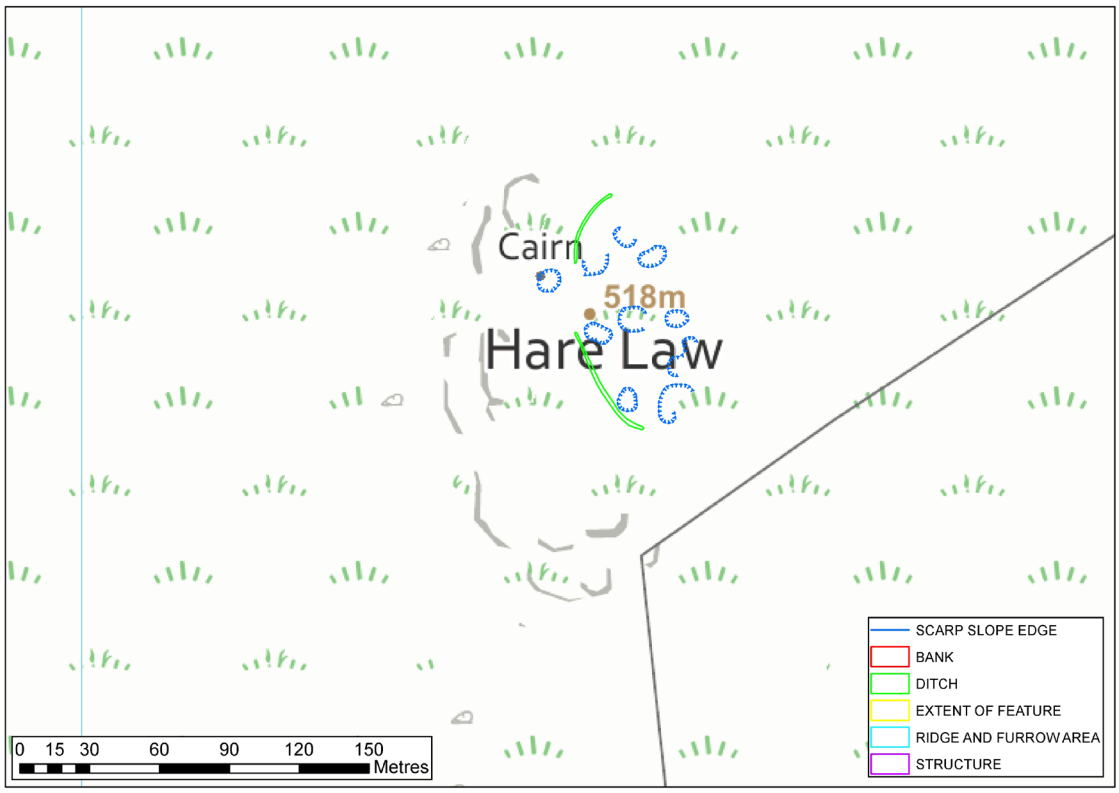

Fig 18: Project mapping of a partially enclosed roundhouse settlement on the summit of Hare Law, centred at NT 9022 0 26516 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

second phase prior to the addition of the outer rampart in the third. That defence was an important aspect of the site is demonstrated by the scale of the ramparts and the north-east entrance that faces onto a steep slope rather than the gentle south-western approach (*ibid*, 23). The defences are further augmented by a cross-ridge dyke (1339436) that cuts across the south-western approach to the hillfort. Pearson describes how the hillfort ramparts are more substantially constructed on its western side, increasing their visibility and further enhanced by natural terraces that resemble ramparts from below (*ibid*, 26). That the builders of the hillfort should want to project power in this direction is perhaps unsurprising given the presence of Ell's Knowe defended hilltop settlement on the opposite side of the valley and Hetha Burn defended settlement in the valley bottom.

Hetha Burn defended settlement (908) is visible as earthworks in the valley bottom below Great Hetha hillfort. The site is significant as the only bivallate defended settlement situated on a valley bottom in the project area and raises interesting questions about why an Iron Age defended enclosure would be located in such close proximity to the hilltop settlements at Great Hetha and Ell's Knowe. No earthwork evidence of internal structures has been mapped within the settlement and the extent to which the settlement would be practically defendable is called into question by the steepness of the slope of Great Hetha that directly overlooks the site. That great effort has been made to make the site defendable, or at least appear so, is illustrated by the 4m wide double rampart that surrounds the site. Whatever the function of the site it undoubtedly asserts control over the valley floor and would have provided a refuge for those engaged in activities in the valley should they be attacked. The steepness of the hills surrounding Great Hetha presents ample opportunity for a concealed approach to its environs and its

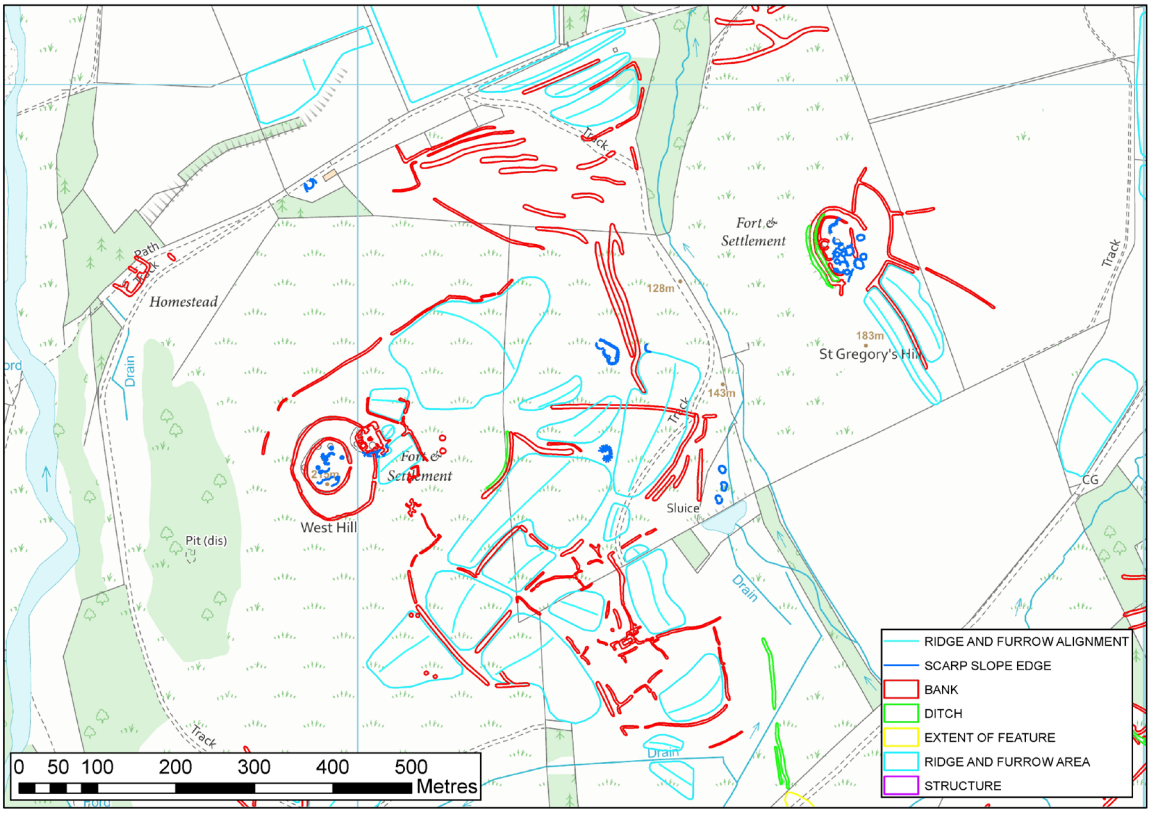

Fig 19: Project mapping of hilltop enclosed settlements at West Hill and St. Gregory's Hill and surrounding field systems, centred at NT 91280 29578 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

possible this site functioned as a refuge for those alerted to the presence of a hostile group at short notice.

The hillfort and field system at West Hill (Fig 19; 2950, 1310904, 1311121) have been the subject of field survey dating back to that of Henry MacLauchlan in June 1860. More recently it has been the subject of analytical field survey and interpretation that has allowed for discrete phases in the development of the site to be distinguished (Oswald 2004). These suggest that while the central enclosure of the hillfort originated in the Iron Age, the outer enclosure, settlement and field systems are likely Romano-British in date. Oswald suggests the field system likely represents a developed agrarian landscape with trackways allowing for the droving of cattle between relatively large fields. Mapping undertaken by this project complements the work of Oswald and his predecessors, further defining the field system and trackways while adding to the number of scooped settlements visible among them. Palaeoenvironmental records show a marked increase in pollen associated with agricultural activity during the Middle-Late Iron Age, with the Roman period characterised by continuity in this activity rather than an intensification of it (Passmore and Waddington 2012b, 268). The mapped features that constitute this field system have been given an Iron Age/Roman date to reflect the possibility that visible earthworks may be pre-Roman, given the lack of any precise dating evidence from the site.

An enclosed settlement (1310904) is visible as earthworks incorporated into the outer rampart of the hillfort. Built into the rear of this enclosure are seven roundhouses surrounding what appears to be an internal yard space. Oswald (2004, 206) compares the layout of this enclosure to that of a Roman villa, suggesting it may be an elite residence influenced by Roman architectural style. The monumental size of the front wall of the enclosure is certainly notable, measuring almost 5m in width as it currently stands, it dwarfs the 2m wide wall surrounding the rear of the enclosure and attests to a degree of ostentation on the part of those residing here. There is also some evidence of scooping on the southern exterior of the enclosure, along with a possible enclosing wall, that may be indicative of an earlier enclosed settlement that was remodelled in the Romano-British period.

Romano-British remodelling of pre-existing enclosed settlement is also visible at two enclosed settlements in Hetha Burn (901, 781). This is most obvious at the easternmost of these settlements (781), centred at NT 881 275, which was the subject of excavation by Colin Burgess (1970). Excavation of two houses within the enclosure yielded Romano-British material and resulted in the discovery of a possible underlying timber roundhouse and hearth. As at West Hill, mapping of the enclosure shows scooped features extending to the south-east, suggesting a pre-existing settlement that may be associated with Burgess' timber roundhouse was the subject of remodelling in the Romano-British period. A similar relationship between scooped features and a Romano-British enclosed settlement is visible at the settlement (901) to the north-west of this. This settlement consists of a similar arrangement of a rectangular embanked enclosure alongside scooped features, as well as being associated with holloways and field boundaries. Although the scooped elements at each of these sites appear to represent earlier settlement onto which Romano-British settlement is superimposed, this does not mean to say that these features did not continue to be used during the later period as outbuildings or stock pens. This may be the case at the western settlement where these features compliment the layout of the settlement and may have been themselves re-modelled in later periods.

CATTLE AND CULTIVATION: ECONOMIC DEVELOPMENT IN THE NORTHERN CHEVIOT HILLS

Cultivation terraces have long been recognised as an important feature of the northern Cheviots landscape and have traditionally been assumed to be medieval (Topping 1981). Terraces shape many of the hillsides mapped by the project and occur in such large numbers that subtle differences in their morphology and landscape context have been easily missed. The supposed medieval origins of cultivation terraces in the region were first called into question by Peter Topping's (1981) investigations of prehistoric field systems in the College Valley and by Burgess' recognition of terraces underlying the Bronze Age settlement at Houseledge (Burgess 1984, 126-175; 1985, 195-229). More recent investigation of the cultivation terraces at Plantation Camp has provided a secure chronology for their development through radiocarbon dating of associated soil horizons (Frodsham 2004, 179-182; Brown *et al*. in prep.). Further, more detailed excavation and analysis of the Plantation Camp terraces by Clive Waddington, Tony Brown and colleagues has produced further evidence that the terraces post-date the Neolithic and were in use during the Bronze Age, with a Roman Iron Age pit cut into the terrace surface (Brown *et al*. in prep.). That some terraces may have Neolithic origins is tentatively suggested by Peter Topping (1989, 173) and further advanced by Frodsham and Waddington (2004, 181) with reference to the cultivation terraces identified by Burgess underlying the settlement at Houseledge. Although the possibility of Neolithic origins for some cultivation terraces in the project area cannot be discounted, evidence from Houseledge West should be treated with caution. Burgess (1985) presents no evidence that the field system is associated with the earliest phases of settlement identified at the site, so that the cultivation terraces it overlies could still relate to Early Bronze Age settlement of the site associated with the Phase 1 and 2 timber roundhouses rather than to the Neolithic.

Slight terraces (1628453) are visible on the eastern slopes of Ring Chesters Hill above Elsdon Burn. These form part of an extensive system of terracing etched around the entire hillside that is likely associated with the hillfort present on the hilltop. A pair of cairns are situated close to these terraces and hint at a possible Bronze Age origin for the features. Morphologically similar terraces are visible on the eastern slopes of Longknowe Hill (1628351) that are associated with two enclosed hut circles and may also be of Bronze Age origin. These can be compared with the terraced field system (2462) visible on the eastern slopes of Hart Heugh. The close association of the field system with unenclosed hut circles and cairns suggests the field system may have Bronze Age origins, though it appears to have been the subject of Iron Age re-use and re-modelling. These sites can be contrasted with an extensive system of cultivation terraces visible on the south-east facing slopes of White Hill and Ladies Knowe (789). Here the terraces are represented by substantial bank features measuring up to 7m wide. Medieval ridge and furrow is visible within some of the larger terraces and it is considered likely medieval ploughing has produced the substantial banks that characterise these terraces. The excavation of an agricultural terrace at Linhope Burn by Clive Waddington produced an early medieval radiocarbon date, which although notwithstanding the notorious difficulty of dating agricultural terraces, suggests some of the terrace systems on the lower slopes at least do indeed date to the medieval period (Frodsham and Waddington 2004).

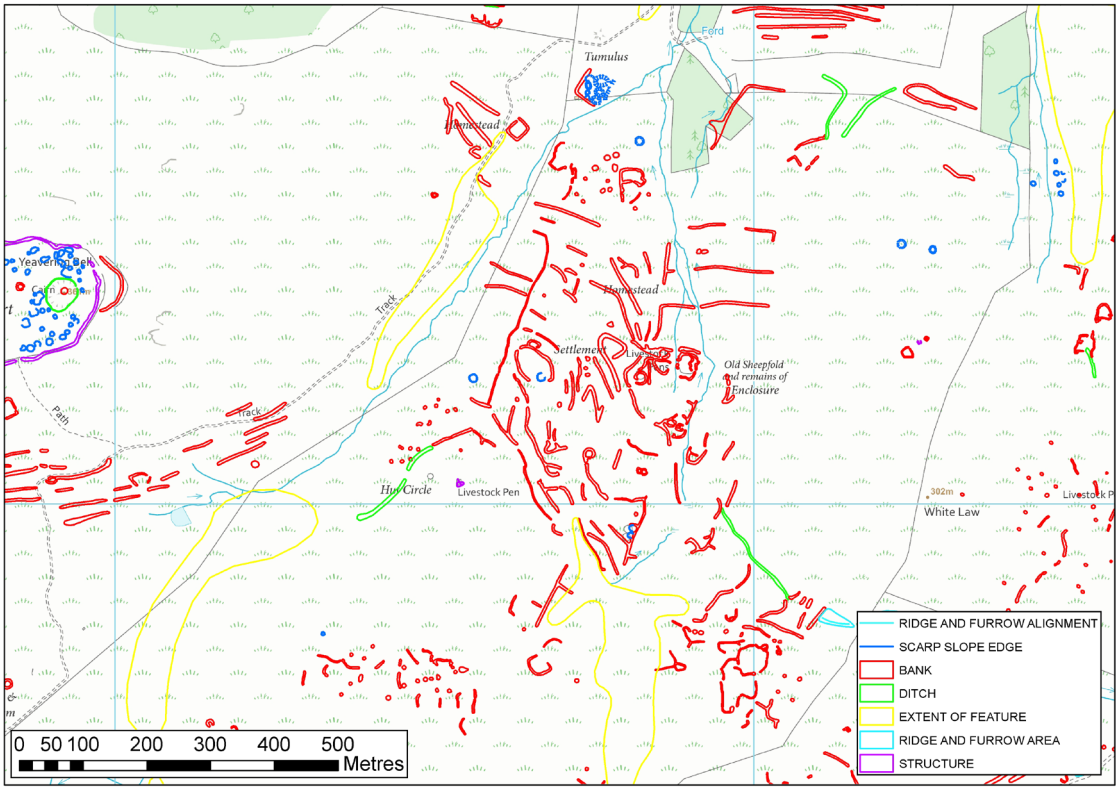

Fig 20: Project mapping of Iron Age settlement east of Yeavering Bell, centred at NT 93740 29265 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

Perhaps the greatest and most significant contribution of the project has been in the mapping of extensive earthwork evidence of newly identified Iron Age settlement and their associated field systems in the vicinity of Yeavering Bell (Fig 20). This represents the largest concentration of settlement in the project area, far exceeding that associated with any other hillfort mapped by the project, though it will be a matter of debate whether settlement developed in this location because of its close association with the hillfort or the hill on which it is situated. Most of the settlement is concentrated around the burns to the east of Yeavering Bell and is made up of a complex network of field boundaries, terraces, trackways and enclosures. Among these it is possible to differentiate rectilinear lynchets of probable Iron Age origin that appear to post-date more organic looking, curvilinear field systems further up the hill slope. Although some cairns are distributed within these field systems, most are grouped together on the periphery of it, in some instances within enclosed areas. The extent to which these cairns represent pre-existing Bronze Age monuments incorporated into a subsequent Iron Age field system or are contemporary with the field system is unknown and merits further research. What can be said is that the site bears strong morphological similarities to the curvilinear enclosure complexes identified and mapped in the Yorkshire Wolds, particularly the settlements at Rudstone and Butterwick (Stoertz 1997, 58-9). These sites share contextual similarities as well as morphological ones, situated in areas where there is strong evidence for continuity of settlement from the Bronze Age to the Iron Age.

The earthworks mapped around Yeavering Bell show clear evidence of cultivation terraces and the enclosure of fields that may be associated with agriculture. The

palaeoenvironmental record for the Iron Age in the northern Cheviots is characterised by pollen associated with pastoral farming, with some areas seeing a dramatic increase in these pollens during the period (Young 2004, 166). It may be that the assortment of earthworks visible in the valley east of Yeavering Bell are associated with pastoral farming, representing a network of paddocks and field boundaries for the corralling of cattle as they seasonally migrate from lowland to upland pastures. The extent to which these field systems are contemporary with and associated with the hillfort itself is a question that will only be answered through further research. Given that 125 hut circles have been identified within the hillfort, the economic structure supporting this population must have been well-established and of some sophistication.

Earthwork evidence of at least fourteen enclosed settlements of Iron Age and Roman date are visible on the eastern slopes of Brands Hill (Fig 21). The field systems in this area can be categorised into two types based on their morphology. Field systems associated with enclosed settlements in the north of the area are associated with large, rectilinear fields and trackways (NT 979 2244). These bear a close resemblance to those visible on the eastern slopes of West Hill that have been attributed to the Romano-British period (Oswald 2004) and it is likely these field systems belong to the same period. More fragmentary field systems consisting of curvilinear fields boundaries are visible in the south of the area (NT 978 236). These are more closely associated with scattered groups of round cairns and are similar in appearance to field systems visible at Akeld (NT 940 286). Given the denuded and fragmentary nature of the southern field systems in comparison to their northern counterparts, along with their close association with round cairns, it is likely they are earlier. If this is the case the field systems that survive on Brands Hill capture the transition from small enclosed fields and paddocks, likely representing pastoral farming and small-scale cultivation, to a more organised agrarian landscape as is visible on West Hill.

The project has mapped extensive evidence for settlement in the northern Cheviot uplands ranging in date from the Bronze Age to the Roman period. The end of this timeframe marks a period in which the focus of settlement shifts away from the uplands, but this seems to have been a gradual process. The project has identified little evidence for Iron Age settlement in the interior of the Cheviot uplands, with most settlement from this period situated within the valleys on the upland periphery. Study of pollen assemblages indicate widespread woodland clearance during the Middle-Late Iron Age and there is evidence for expansion of peat between cal AD 300 and 650, inferring wetter conditions in this period (Passmore and Waddington 2012b, 230-231). It is possible that the effects of climatic deterioration, exacerbated by widespread forest clearance, had a negative impact on the productivity of land in the uplands and contributed to the withdrawal of settlement visible in the archaeological record.

Longhouses interpreted as being early medieval in date have been identified at four sites within the project area, often taking advantage of pre-existing field systems or enclosures. A good example of this is at West Hill, where a longhouse (1311162) is built into the field boundaries that form the pre-existing Iron Age/Roman field system. This can be usefully compared to a square Iron Age/Roman enclosure (3488) at the foot of Dod Hill that contains the earthwork remains of two longhouses. The enclosure is located adjacent to three Iron Age/Roman enclosed settlements and an associated field system that are also likely to have been occupied and utilised in the medieval period. Perhaps the

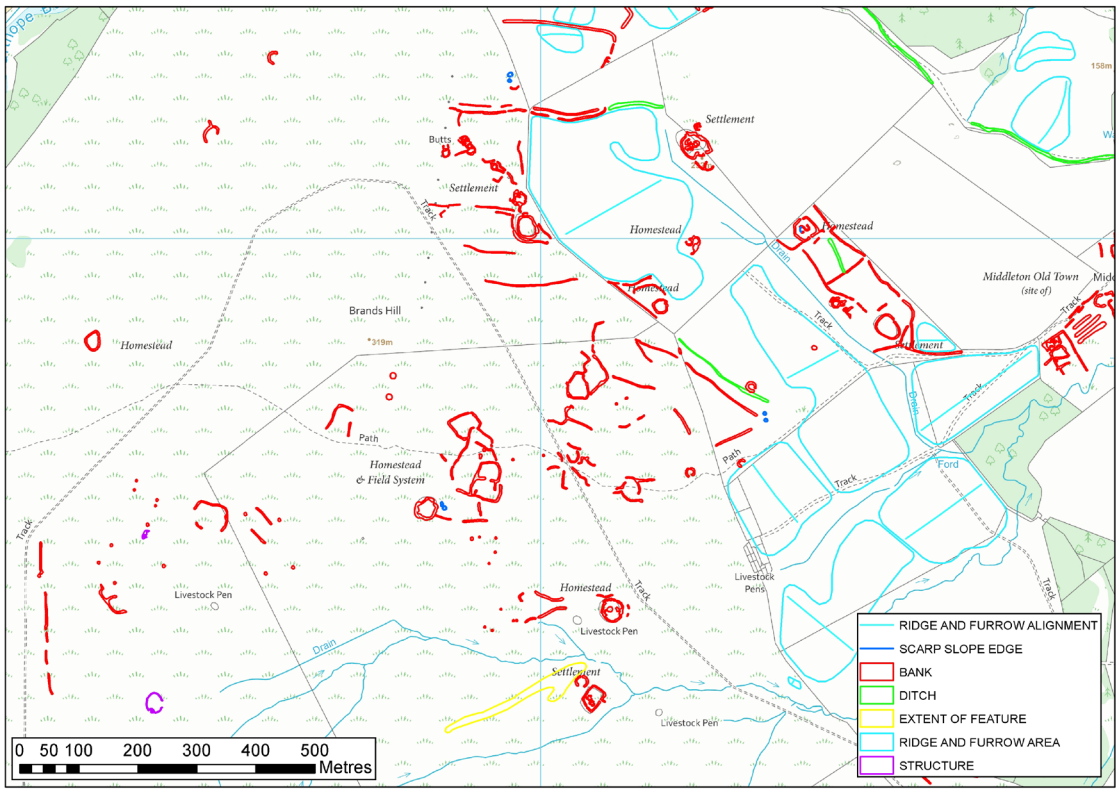

Fig 21: Project mapping of enclosed settlements and field systems on the eastern slopes of Brands Hill, centred at NT 9791 6 23741 © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100019088.

most striking evidence of early medieval reoccupation of a pre-existing site has been identified at The Kettles hillfort. Earthworks relating to an early medieval longhouse and rectangular enclosure are visible within the south-eastern enclosure of the hillfort. Like at Dod Hill, these provide evidence of medieval re-occupation of high-status Iron Age sites. Whether these represent high-status early medieval settlements remains to be explored.

Earthwork remains relating to three medieval settlements at Hethpool, North Middleton and South Middleton have been mapped within the project area. These sites are surrounded by ridge and furrow which serves to highlight the continued importance of the agrarian economy in the region throughout the medieval period. The landscape surrounding Hethpool exemplifies this, with agricultural terraces showing evidence of medieval ploughing on nearby White Hill (789) and earthworks relating to a leat (1628463) and reservoir associated with a medieval mill located adjacent to the village. The medieval lynchets on White Hill serve to illustrate the challenge the local topography has presented to arable farmers over the millennia.

YEAVERING: ROYALTY AND RITUAL

Early medieval activity at Yeavering appears to be emblematic of a shift in the focus of elite settlement away from the hilltops and toward lowland locations following the Iron Age, though one of the palisades on the summit of Yeavering Bell could well be of early medieval date (Waddington per comm). Through extensive aerial survey across the Cheviot uplands and the Milfield Basin, Gates (2012, 91-92) has noted how, despite there being extensive evidence for ceremonial and funerary monuments of Neolithic and Bronze Age date on the Milfield Basin, there is very little evidence of settlement in the lowlands until the Anglo-Saxon period. This apparent imbalance has been partly addressed by the recognition, excavation and dating of several unenclosed post-built Bronze Age roundhouse settlements across the Milfield Plain (see Waddington 2016, 179-190 for a full summary and discussion). There still appears to be limited evidence for Iron Age settlement in this particular lowland setting, although Iron Age settlement is widespread across its lowland periphery.

One of the most consequential discoveries of Hope-Taylor's excavations at Yeavering was in the alignment of buildings along significant axes, in particular between the wooden post erected within the eastern ring ditch and the centre of building D2 which he interpreted as a roofed temple. Along this axis are aligned the monumental timber halls and theatre-like structure (Fig 11). The gable ends of building D2 also mark significant alignments with one side of the segmented theatre-like structure, the walls of the aisled halls, a ritual building to the south-east of the eastern ring-ditch and a newly identified cropmark that may represent a large pit 40m east of the eastern ring ditch. Given the significance of the other features on this alignment, it is likely this pit feature is also of some significance. Within the double ditched enclosure Hope-Taylor named the Great Enclosure are six possible newly identified SFBs visible as cropmarks. These are similar in form to the cropmark that relates to the SFB excavated by Hope-Taylor and referred to as building C1 (*ibid*, 88-91). The presence of structures within the Great Enclosure is significant as it was the absence of evidence for structures that formed the basis of Hope-Taylor's interpretation of it as a communal cattle-corral. That the Great Enclosure was in existence for a long period of time is evident from excavation showing it was re-built in the third phase of the site. The presence of buildings within the enclosure may reflect changes in function over time. Two ditches have also been identified within the Great Enclosure that coincide with ditch features visible in a resistivity survey of the site conducted by Durham and Newcastle universities between 2007 and 2009 (Semple 2020, 13). The resistivity data shows these features continuing further east than the cropmarks and they were interpreted as representing a palisaded enclosure that likely pre-dates the Great Enclosure.

A newly identified hall is visible as a rectangular cropmark 20m west of Hope-Taylor's building C3. The cropmark is similar to those relating to buildings C2 to C4 that were excavated by Hope-Taylor and found to represent trench-built halls relating to the fourth phase of occupation of the site. This phase is significant as it follows the complete destruction of the site by burning that marked the end of its third phase (Hope-Taylor 1977, 164-166). Cropmarks relating to a newly identified rectangular building are also visible to the immediate west of the henge south of the B6351. This feature is similar in form to two other rectangular cropmarks visible in the field and may represent further trench-built halls. Scattered across the field to the west are a further seven newly identified cropmark features that are similar in appearance that of the excavated SFB,

along with a number of pits. Taken as a whole, the features visible in this field demonstrate the continuation of the site on the south side of the road with possible evidence of settlement in the form of an SFB in the west of the field.

This report provides a worthwhile opportunity to briefly compare aerial transcription of Yeavering with that undertaken at its successor site, Maelmin, by Air Photo Services for the Till Tweed project (Gates 2012). Aerial photography visible in Google Earth dating to the dry summer of July 2018 reveals exceptional cropmark features relating to Maelmin, a number of which were not identified as part of the Milfield aerial survey (Fig 22). Aerial transcription of the archaeological landscape at Maelmin is illustrative of a much more expansive site than Yeavering. When viewed alongside each other the two sites bear similarities that are worthy of comment. Neolithic monuments at both sites have been shown to have provided a focus for Anglo-Saxon activity, with evidence of metalworking at Yeavering and burial at Maelmin (Tinniswood and Harding 1991; Scull and Harding 1990). Both sites are situated next to fording points and positioned at strategic locations that control movement north-south and east-west across the Milfield Plain. At Maelmin a double ditch is visible that forms a circuit encompassing an area of nine hectares to the south of the main hall building. There is an obvious parallel between this enclosure and the Great Enclosure at Yeavering: both sites exhibit monumental timber halls juxtaposed with large enclosures, providing twin focal points at each of the sites. This project has also mapped a number of cropmark features at Yeavering that are interpreted as SFBs. Similar cropmark features are visible scattered across the landscape at Maelmin and it is interesting to note the dispersed nature of the settlement pattern at both sites.

Fig 22: Mapping of features at Milfield representing the site of Maelmin, centred at NT 94035 33909 © Google 2021.

Targeted excavation at Yeavering has allowed for many of the questions that naturally stem from the scrutiny of cropmarks to be answered in terms of the kind of features they relate to. The value of archaeological investigation at Yeavering lies not only in what it tells us about the site itself, but also in allowing us to frame research questions and approaches that can be applied to the archaeology visible at other sites, in particular Maelmin. The significance of the alignment of structures with reference to pre-existing monuments at Yeavering can be viewed in terms of an Anglo-Saxon elite seeking to legitimise themselves by establishing links with a mythical past (Scull and Harding 1990; Blair 2005, 54). Such a concern may have been particularly pressing in the case of Ida's accession, as the first known Anglo-Saxon king of early Bernicia. The same concern for the use of earlier monuments is evident in and around the henge at Milfield South whereby dozens of Anglo-Saxon, presumably pagan, burials were found on the immediate periphery of the Maelmin site (Scull and Harding 1990).

Conclusion

Significance of Results

The most significant contribution of the project has been to comprehensively map the extent of earthwork survival related to upland settlement in the northern Cheviots. Although the area has long been recognised as being extraordinarily rich in prehistoric earthworks, the point-based nature of data within the HER is not well-suited to reflecting important information such as the shape and extent of field systems and how relate to each another. Comprehensive aerial mapping allows these sites to be viewed alongside one another in a single dataset, as opposed to a profusion of discrete surveys. The mapping produced can be further augmented by targeted analytical ground survey and interpretation of the stratigraphic relationship between individual features in the field. The combined use of these techniques holds the key to unlocking the full potential of site survey and prospection in this rich archaeological landscape. The project successfully identified features that were missed or dismissed during field survey as a result of having access to high-resolution lidar data, making it possible to more easily differentiate between natural and built features. Lidar has proved invaluable for the successful completion of this project, allowing for earthwork features to be mapped quickly and accurately. The project has also highlighted the limitations of lidar in certain contexts. The extent of Bronze Age earthwork survival in the interior of the Cheviot uplands remains something of an unknown quantity because the resolution of 1m lidar has proven insufficient for capturing the most subtle earthworks. In these instances, Unmanned aerial vehicle (UAV) based photogrammetry and lidar survey would allow these features to be mapped to centimetre-level resolutions.

The project has identified and mapped Bronze Age unenclosed hut circles in a range of contexts. These are thought to represent the earliest form of settlement in the Cheviot uplands and are visible in isolation or associated with cairnfields, cultivation terraces and field systems. Detailed mapping of these features in their landscape context will allow for sites to be targeted for further research in order to elucidate how settlement development varied between these locations. These include the newly identified hilltop settlement at Hare Law (1628477) which is important as the only hilltop settlement in the project area not enclosed by earthwork ramparts. The remains of a possible palisade trench are visible in lidar partially enclosing the settlement, indicating the site may be a rare survival of an antecedent to the enclosed hilltop settlements that command much of the northern Cheviot landscape. If this is the case, given the strong possibility of the survival of intact archaeological remains associated with these early stages of occupation, further research at the site may help elucidate the reasons for the settlement shift to hilltop locations in the Iron Age and provide good comparative data for the pallisaded site at Bleakmoor Hill on the south-eastern rim of the Cheviots (Hunter *et al* 2021).

The availability of high-resolution lidar has proven to be invaluable for identifying and mapping the exceptional level of earthwork preservation relating to Iron Age settlement and field systems in the project area. This is particularly true around Yeavering Bell, where settlement displays a remarkable level of development and complexity. Mapping of these settlements over a wide area has elucidated common characteristics in their spatial organisation. The relationship between these settlements and the enclosed cairnfields situated on their peripheries is intriguing and worthy of further study. There are also striking morphological similarities between Iron Age settlements mapped in the project area and those visible in the Yorkshire Wolds. The project has also highlighted

the distribution of unenclosed cairnfields to be a subject of interest. These are often located in prominent locations with little evidence of the field boundaries or cultivation marks that would be expected alongside clearance cairns.

The project has made a significant contribution to the number and range of features visible at Yeavering. The identification of a possible ring ditch (3855) contributes to the number of Neolithic/Bronze Age monuments at the site and further emphasises the early significance of the site. Identification of a significant number of cropmarks that may relate to SFBs provide important evidence for further structures associated with the site. The location of some of these features within the Great Enclosure emphasise the need to develop a greater understanding of the sequencing of these structures in relation to the chronology established for the rest of the site. The identification of a cropmark relating to a possible pit (3855) within the Great Enclosure may also be of importance as it coincides with one of the significant alignments of structures at the site.

Project Objectives and Contribution

Recommendations for Further Work

The project highlights a number of avenues for future research in the northern Cheviots. Five newly identified sites representing probable Bronze Age settlement and cairnfields (1628746) have been identified in the upland interior of the project area. The majority of these are focussed on land surrounding Commonburn Farm where earthwork features are not masked by heather and the fields are grazed pasture. These features are slight, and it is possible that their true extent is not captured by 1m resolution lidar. UAV-derived Structure from Motion (SfM) photogrammetry survey has proved an effective method for capturing subtle earthwork features in the Cheviot Hills with resolutions up to 10cm (Cucchiaro *et al* 2020). SfM photogrammetry and UAV-based lidar survey could be used to target areas where it is suspected that the true extent of earthwork features is not reflected in lidar. The production of high-resolution terrain models through SfM photogrammetry and lidar would provide a means of rapidly identifying such features. The identification of Bronze Age features around Commonburn Farm and the absence of heather in the area make it particularly amenable to this kind of survey.

Cultivation terraces with a range of distinct morphologies have been identified and mapped by the project. Agricultural terracing is the subject of on-going study as part of the TerrACE Archaeology and Culture in Europe project. Given that some terraces in the project area are likely to have originated in the Bronze Age and display evidence of having been utilised through to the post-medieval period, further research of these features represents a significant opportunity to further our understanding of their development and use.

Despite excellent survival of hilltop settlement in the northern Cheviots, very little is known about it. It has been suggested that Yeavering Bell may have exerted some degree of political control over the other hillforts in the area as a result of its relative size (Frodsham 2004, 38). Further research is needed to establish the contemporaneity of sites through a systematic programme of targeted excavation and radiocarbon dating. This could follow the framework of The Habitats and Hillforts Landscape Partnership Scheme which successfully established secure radiocarbon chronologies for the hillforts of the Mid-Cheshire Ridge (Garner 2017). Such a study could also incorporate

geochemical sampling using portable X-ray fluorescence (pXRF), a technique that is seeing increasing use within archaeology (English Heritage 2013, *Save et al* 2020). The technique determines the chemical composition of soils within and around archaeological features, allowing for activities that leave distinct chemical markers, such as metal working or livestock penning, to be recognised. Application of pXRF geochemistry to sites in the northern Cheviots may elucidate variation in how hilltop settlements functioned. This could prove particularly informative at Yeavering Bell, providing a multi-scalar means of identifying variation in activity between sites and even households, with the targeting of individual hut circles. Given the number of newly-identified unenclosed roundhouse settlements in the project area, there is also the scope to apply this non-invasive technique to these settlements in order to establish the kinds of activities that were taking place at such sites and whether there is evidence for variation in function between them.

The landscape of the northern Cheviots and Milfield Plain is perhaps unique for the visibility of sites spanning a wide range of periods as well as the interface between upland and lowland landscapes. The excellent survival of upland Iron Age centres of power such as Yeavering Bell, in close proximity to the early medieval power centres of Yeavering (Ad Gefrin) and Maelmin provide an unparalleled opportunity to further our understanding of the relationship between upland and lowland landscapes through time and the transition to the early medieval period. The project has highlighted the visibility of archaeological features in aerial images of Yeavering and Maelmin. Unfortunately, the aerial photographs of J.K.S. St Joseph are archived in the CUCAP collection and could not be consulted as a result of the collection being closed to consultation. The photographs taken by St Joseph show cropmarks of the timber halls at Yeavering in detail unrivalled by those available to this project. There is great potential for mapping of the site to be improved with reference to these photographs, as well as for further features at the site to be revealed. In the case of Maelmin the number of features visible at the site has been greatly increased by aerial photographs taken in the dry summer of 2018. Updated aerial transcription of Maelmin to bring it into line with AI&M standards would ease comparison between the sites and provide the opportunity to incorporate them into a single dataset. Given the state of preservation of these sites and their primary primacy within the kingdom of Bernicia, further research presents a unique opportunity to develop our understanding, not only of the processes by which the Anglo-Saxon kingdom of Northumbria was formed, but of the means by which kingship was established and maintained in Anglo-Saxon England more widely.

Designation

The project area contains 147 scheduled monuments that include many of the sites identified by the project. Up until now archaeology within the project area has not been threatened by upland land-use traditionally dominated by grouse moor. The government's Committee on Climate Change Reducing UK Emissions Progress Report to Parliament recommends implementation of "a strategic mechanism to fund tree planting and natural carbon storage at a much larger scale while improving the productivity and resilience of our food supply, strengthening flood protection and protecting biodiversity." (Committee on Climate Change 2020). In line with this, it is likely that new woodland planting will take place away from productive arable farmland, on poorer upland soils (Newman, 2018). Archaeology identified with the project area faces an increasing threat from afforestation, as is evidenced by the increasing number of

small-scale tree planting schemes for which permission has been sought in recent months and large schemes such as the afforestation of Doddington North Moor in Northumberland which will see the planting of 600,000 new trees (Department for Environment, Food & Rural Affairs 2017).

For the majority of sites identified in the project area, the incorporation of mapping data produced by this project into the Northumberland HER may be judged to be sufficient provision for their protection. There are also sites that may be of sufficient importance to warrant designation assessment in due course. Details of these will be forwarded to the North Listing Team.

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APPENDIX I ARCGIS MAP LAYERS AND DRAWING CONVENTIONS

Layer Name	Layer content	Feature Type	Layer colour
BANK	For embanked features such as banks, platforms, mounds and spoil heaps	Polygon	Red
DITCH	For cut features such as ditches, ponds, pits or holloways	Polygon	Green
EXTENT_OF_FEATURE	Polygons outlining complex or extensive remains such as mining or military installations	Polygon	Orange
MONUMENT_ POLYGON	Polygon encompassing features within a single Historic England Research Records	Polygon	Black
RIDGE_AND_FURROW_ALIGNMENT	Polyline showing the direction of ploughing of ridge and furrow	Polygon	Cyan
RIDGE_AND_FURROW_AREA	Polygon outlining a single plot of ridge and furrow	Polyline	Cyan
STRUCTURE	Structural features including stone, concrete, metal and wood	Polygon	Purple
THACHURE	Schematic t-hachure depicting break and direction of slope	Polyline	Blue

APPENDIX II ARCGIS MAP DATA TABLES

Monument Data Table

The Monument Data table consists of nine fields that were input directly through ArcMap 10.4. The content of these fields follows those that are entered in the Historic England Research Records.

FIELD NAME	FIELD CONTENT	Sample data
MONARCH	Historic England Research Records Unique Identifier ()	68887
PERIOD	Date of features (HE Thesaurus)	MEDIEVAL
NARROW_TYPE	Monument type (HE Thesaurus)	MOTTE
BROAD_TYPE	Monument type (HE Thesaurus)	CASTLE
EVIDENCE_1	Form of remains (HE Thesaurus) as mapped	EARTHWORK
PHOTO_1	Reference for the photograph/image from which the feature was mapped and the date of the source	LIDAR SJ4350 Environment Agency LAST RETURN 16-FEB-2001
EVIDENCE_2	Form of latest evidence (HE Thesaurus) as mapped	LEVELLED EARTHWORK
PHOTO_2	Reference for the photograph/image from which the latest evidence was taken	Next Perspectives APGB Images SJ4350 09-JUN-2013
HER_NO	Northumberland HER record number where applicable.	1397

APPENDIX III PROJECT MANAGEMENT

The project was funded by Historic England (HE) and undertaken by Archaeological Research Services Ltd (ARS Ltd).

The project team comprised the Project Executive made up of Jonathan Last (HE NHPCP Project Assurance Officer), Matthew Oakey (HE AI&M Quality Assurance Officer), Lee McFarlane (Inspector of Ancient Monuments) and Tom Gledhill (Heritage at Risk Officer). Project Stakeholders were Chris Jones (Northumberland National Park Historic Environment Officer) and Liz Williams (Northumberland Heritage and Historic Environment Record Officer). The Project Manager was Robin Holgate (ARS Ltd).

Joel Goodchild (ARS Ltd) was the Project Officer who carried out the survey, recording and report production.

The HE AI&M Quality Assurance Officer for the air photo mapping was Matthew Oakey, and quality assurance was carried out on *c*. 5% of the total mapped area. The HE team also provided advice and support where necessary and helped ensure the interpretation, mapping and recording were conducted according to AI&M standards.

The project ran for 14 months beginning in January 2020, with mapping and recording completed in January 2021 and the report finalisation in May 2021.

APPENDIX IV PROJECT SCOPE

The scope of the project, derived from the aerial investigation and mapping standards (Winton 2019), is as follows:

Earthwork archaeology

All earthworks identified as archaeological in origin were mapped, including those since levelled or buried. Where the quality of the photography was insufficient to trace individual earthwork features with certainty, or post-medieval sites were deemed too complex to be fully mapped within the time constraints of the project, these were mapped as an extent of feature.

Levelled archaeology

All cropmarks, soilmarks and parchmarks identified as archaeological in origin were mapped and recorded.

Post-medieval and modern field boundaries

Post-medieval and modern field boundaries (upstanding or levelled) that are depicted on first edition Ordnance Survey or later edition maps were generally not mapped, except to provide a wider context for field systems not mapped, or where they were found to truncate archaeological features.

Medieval and post-medieval ridge and furrow

All ridge and furrow was mapped and depicted with an outline indicating the extent of area, with the direction of ploughing represented by a single line. Where the date of the earthworks was uncertain, these were dual indexed as medieval/post-medieval date.

Industrial features and extraction

Small-scale extractive pits of less than 0.5ha were not mapped unless the extraction impinged on existing archaeological features, or was visibly associated with other elements, such as limekilns. Larger extraction sites such as quarries and collieries greater than 0.5ha were mapped and recorded as an extent of feature, irrespective of whether they were depicted on any Ordnance Survey map. Earthwork and structural features within these complexes were only mapped if considered to be of archaeological significance. Urban industrial sites and mills depicted on Ordnance Survey were not mapped.

Buildings

The foundations of buildings visible as cropmarks, soilmarks, parchmarks, earthworks or ruined stonework were mapped and recorded, except when they were depicted on first edition Ordnance Survey or later edition maps. Roofed or unroofed standing buildings or

structures were generally not recorded unless they fell within the sphere of AI&M interest, usually associated with parkland or military remains.

Parkland, landscaped parks, gardens and country houses

Post-medieval landscape and garden features visible as earthworks, cropmarks, parchmarks and structures were only mapped if previously unrecorded by first edition Ordnance Survey or later edition maps.

Geological features

In line with AI&M practice, geological features were not mapped. These may be described within monument records, for example where close proximity potentially affects the accuracy of the interpretation.

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Where no final project report is available, you should consult the author before citing these reports in any publication. Opinions expressed in these reports are those of the author(s) and are not necessarily those of Historic England.

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