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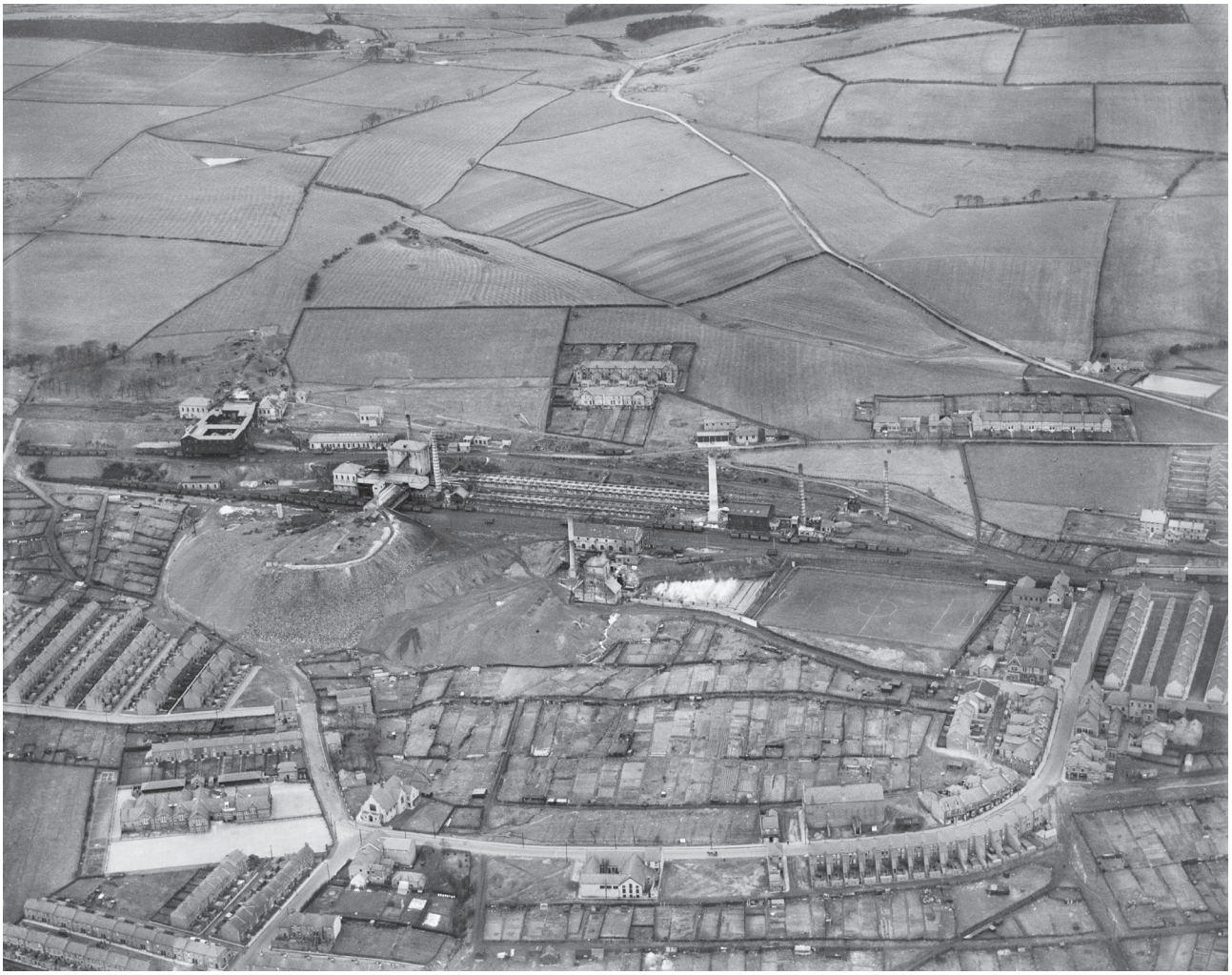
The South East Northumberland Air Photo and Lidar Mapping Project

Alison Deegan

Discovery, Innovation and Science in the Historic Environment



Research Report Series no. 79-2022

Alison Deegan

Research Report Series 79-2022

Northumberland
Newcastle, North Tyneside, Gateshead and Sunderland
Tyne and Wear
and
County Durham

and

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SUMMARY

This project generated a detailed map and records of archaeological and historical features that are visible on aerial photographs and lidar imagery. This report outlines the methods employed and sources used to achieve this outcome. This is followed by discussions of the results in their wider context. It looks at the small but diverse group of Neolithic and Bronze Age monuments and the numerous and homogenous late Iron Age enclosures. This report uses previous documentary and cartographic research to assess the nature and significance of possible medieval and early post medieval earthworks, cropmarks and soilmarks. A significant proportion of the archaeological and historical remains recorded by this project pertain to the extraction, processing and transportation of coal and so this topic is given due consideration. Previously undocumented landscape features in parkland at Ravensworth and Gibside are described and there is a brief overview of the First and Second World War military features. This report ends with recommendations for further work and suggests monuments for Local List status and those for which statutory protection might be considered if a threat were to arise. This report seeks to highlight the contribution of this method of remote prospection to archaeological and historic research and to the management of the historic environment.

CONTRIBUTORS

The mapping project and this report were undertaken by Alison Deegan.

ACKNOWLEDGEMENTS

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Cover image: Chopwell Colliery (Pit No 1) and environs, Chopwell [EPW043822 February 1934 © Historic England Archive. Aerofilms Collection]

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INTRODUCTION

The South East Northumberland (SEN) Air Photo and Lidar mapping project began in March 2017. It was funded by Historic England's National Heritage Protection Commissions Programme (NHPCP). This project was completed to the standards developed by Historic England (and its predecessors) as part of the national programme of mapping and monument recording from aerial photographs and lidar imagery.

The SEN project initially covered an area of 171sq km, contained largely within the administrative boundaries of the county of Northumberland but with a small area overlapping into the Metropolitan District of North Tyneside. In 2018, in response to the Call for Proposals Project no. 7639 Aerial Investigation and Mapping, the project area was extended. This took the project south into North Tyneside and Newcastle, north further into Northumberland and, in a separate transect south of the River Tyne, through the Metropolitan Districts of Gateshead and Sunderland. This transect also covered small areas of County Durham. The extension covered a further 310sq km of land bringing the overall project area to 481sq km (Fig. 1).

The corridor of land between this project's areas to the north and south of the River Tyne was the subject of the earlier Hadrian's Wall NMP project and was not revisited (Oakey 2009). Similarly, this project does not extend up to the North Sea coast as this has been dealt with by the North East Rapid Coastal Zone Assessment Survey (NERCZAS) (Bacillieri et al. 2008).

The project was carried out by Alison Deegan and based with Historic England's Aerial Survey Team in York. It was completed in July 2022. The Project Assurance Officer for Historic England was Matthew Oakey.

Background to the project area

The two parts of the project area: that to the north of the River Tyne, and that to the south, cover diverse and complex landscapes that place considerable limitations on the survival and visibility of the archaeology.

Geology and soils

The project areas both north and south of the River Tyne are dominated by the broad band of Pennine Coal Measures that runs north-east from Bishop Auckland and is exposed along the North Sea coast between the mouths of the Rivers Tyne and Amble. South of the River Tyne the eastern end of the project transect lies on younger, Permian period dolostone formations and, north of the river, the north-west edge of the project lies on older Carboniferous Period sandstone, siltstone and mudstone (Stainmore Formation - Mudstone, Siltstone And Sandstone) (Geology of Britain Viewer).

Superficial deposits are present across most of the project area, mostly glacial tills but with small discrete patches of sand and gravel and ribbons of post glacial alluvial

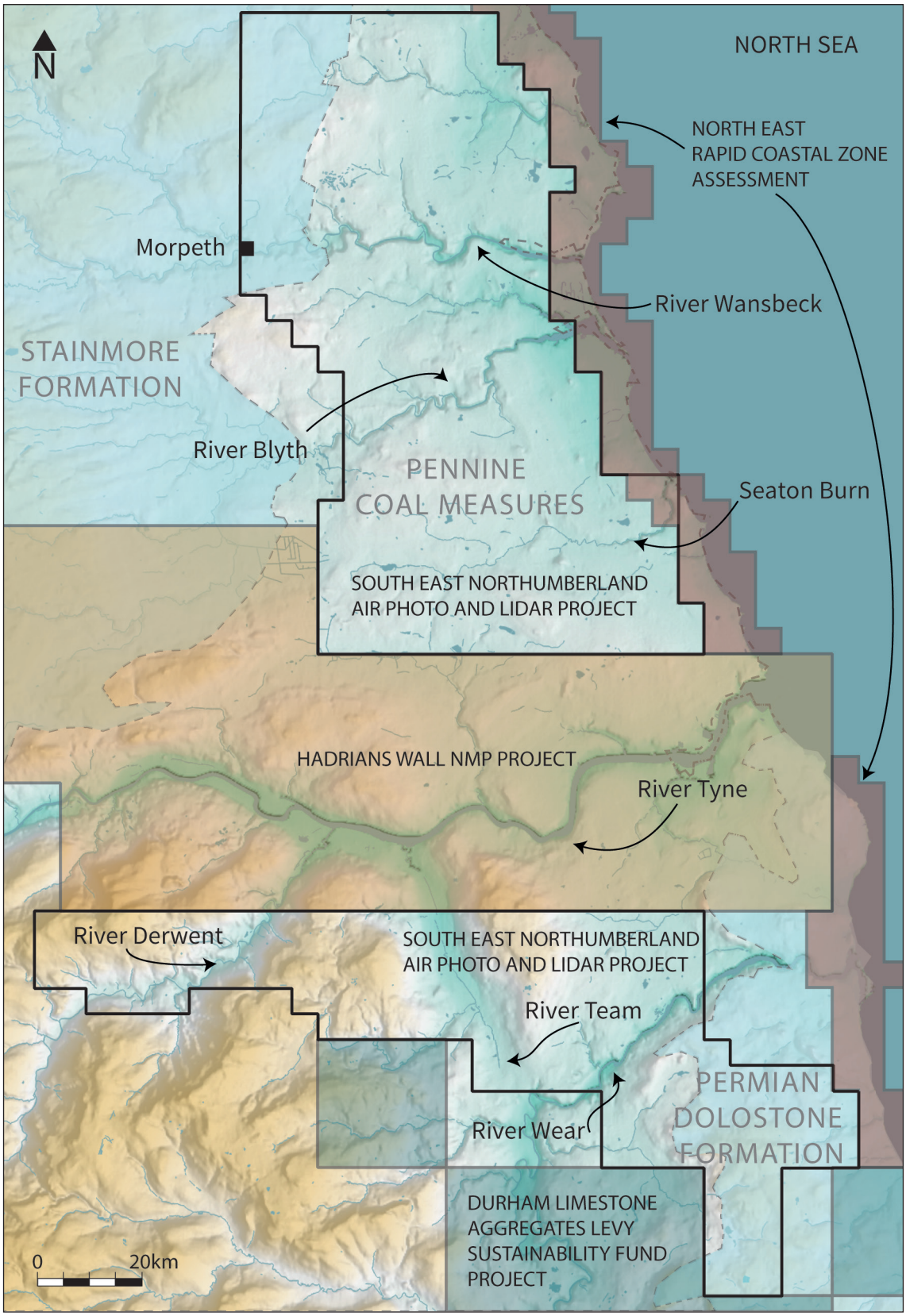


Figure 1: The South East Northumberland Air Photo and Lidar project area and similar projects in the region. [background generated from height data © Bluesky International/Getmapping PLC]

deposits along the river valleys (Geology of Britain Viewer). As a consequence, the soils across most of the project area are loamy and clayey, slow to drain and buried archaeological features do not produce cropmarks as readily and clearly as they might do on better drained soils (Soilscapes).

Rivers and topography

The highest ground in this project lies south of the River Tyne. From the upper ground in the west at over 250m the land dips eastward to the coast. It is incised by the deep cuttings of the Rivers Derwent and Wear and the gentler terraces of the Team valley. Within the project area, burns drain off the higher fells into the Derwent and Team, but the Wear has few tributaries.

North of the Tyne the land is generally low lying and dips quickly from the high points at Heighley (135m OD) and Hebron Hill (129m OD) in the north west to under 10m along the coast. The land is drained west to east by Seaton Burn, the Rivers Blyth, Wansbeck and Lyne and their associated tributaries. Just outside of this area, but also significant, is Prestwick Carr which was a large shallow basin of bogs and pools, some seasonal, some permanent, until it was drained in the 19th century (Harbottle 1995, 3).

Land use

South of the River Tyne there are significant urban areas with strong industrial histories, Washington and the chemical industry, New Silksworth and coal, and Birtley with coal and ironworks. These and the smaller towns are interspersed with fields and small areas of high moor. The impact of the coal industry, whether historical or more recent open cast workings is ever present. West of the River Team the main settlements: Kibblesworth, Sunniside, Rowlands Gill and Chopwell are smaller and separated by steep and wooded slopes.

North of the River Tyne the dense urban fringe of Newcastle upon Tyne ends abruptly along the southern edge of the survey area and is supplanted by a series of well-contained settlements. There are large towns such as Cramlington, Bedlington, Morpeth and Ashington but north of the River Wansbeck a pattern of small villages and hamlets predominates. The land between the settlements is under arable, pasture and woodland but a significant proportion is reclaimed and relandscaped former coal workings.

The combined impacts of the current and historical land use and the soils and geology contrive to place limits on the use of aerial photography and lidar imagery for the detection of upstanding and buried archaeological remains. Yet this area has yielded sufficient results to warrant a long history of specialist aerial reconnaissance in this area, notably by Norman McCord in the 1960s and 1970s and then by Tim Gates through the 1980s and 1990s.

Archaeological background

These project areas are in the shadow of the significant archaeological and historical foci in the North East region: Milfield Basin, Hadrian's Wall and Monkwearmouth which, in the past, have pulled the attention of antiquarians, historians and archaeologists.

Nevertheless, in the 19th and early 20th century the antiquarians Henry MacLauchlan and the Rev. John Hodgson were observing and documenting prehistoric earthwork enclosures north of the Tyne and the Rev. Greenwell was excavating Bronze Age barrows south of the river (1835; 1832, 306; Trechmann 1915).

Working with aerial photographer Norman McCord in late 1960s and 1970s enabled George Jobey to his extend his interest in the earthwork prehistoric settlements on the higher ground to the west to extend eastward onto the cropmarked sites on the coastal plain. They began to collate lists and distributions of enclosures in the south-east of Northumberland and excavations by Jobey at Burradon and Hartburn were pivotal to their dating (McCord and Jobey 1968; Jobey 1970 and 1973).

In 1975 Wrathmell's extensive documentary research and field survey brought a focus to medieval settlement in southern Northumberland.

Jobey's rescue excavations at Cramlington and Marden in the late 1960s and 1970s presaged the developer-funded excavations of the late 1990s and 2000s. In 2016 Northumberland County Council highlighted this contribution in Celebrating 25 years of development-led archaeology – 1990-2015 and publications by Proctor (2009) and Hodgson (2012) provide a welcome synthesis drawn from many excavations for the later Bronze Age to the early Roman period.

The North East Regional Research Framework for the Historic Environment, first published in 2006, collated existing information and established research aims and objectives. This was recently updated as web version NERFF 2.0 to include progress and developments from the intervening years.

PROJECT SCOPE AND METHODOLOGY

Archaeological Scope of the Survey

This survey followed the archaeological scope outlined in Historic England's *Standards for Aerial Investigation and Mapping* (Winton 2019). However, for this project a more inclusive approach to historical buildings and structures was taken to accommodate the extensive and significant industrial heritage of this area. This included the mapping of pre-20th century colliery housing, some colliery structures up to the mid-20th century, and former wagonways and railway lines. The purpose of broadening the remit was to document the features that had not been depicted on the historical Ordnance Survey maps, and/or to record the elements of industrial heritage that may still survive, either extant, in ruins or as archaeological features.

Sources

The two main resources used by this project were aerial photographs and lidar imagery. The interpretation of this visual data was supported by existing monument records and historical cartography. The strength in this project, as with others in Historic England's long-standing programme, is to consider simultaneously the wide range of aerial imagery available for a given area. This allows potential features identified on one source to be cross-checked on all the other sources. This produces results with greater integrity than single source surveys that, for example, rely on Google Earth imagery or the lidar data alone.

Aerial Photographs

The main sources of aerial photographs were the collections held by the Historic England Archive (HEA). During the course of this work approximately 12,947 vertical air photos, 1,990 specialist oblique air photos and 301 low level military obliques were examined. The HEA kindly permitted and arranged for the temporary transfer of this material to the Historic England York office where it could be examined, considered and re-examined as necessary.

The HEA vertical photographs range in date from the 1940s to the early 2000s. The earliest photographs were taken by the RAF to inform post-war reconstruction of the country. The late-1950s to 1970s Meridian Airmaps Ltd images were taken to facilitate planning for urban and industrial growth and infrastructure. From the 1960s the Ordnance Survey flew regular sorties for cartographic purposes. Together these vertical aerial photographs provide complete coverage of the whole of the project area for most decades. They were not taken for archaeological purposes but often record archaeological cropmarks, soilmarks, earthworks and structures of historical significance. All of the HEA vertical aerial photographs were supplied as prints.

The Specialist Collection comprises aerial photographs, mainly obliques, from the historical Aerofilms Collections, aerial reconnaissance conducted by Historic England (and its predecessors) and Tim Gates and a small number of duplicate

prints from other collections. The reconnaissance conducted by Historic England (and its predecessors) is not limited to archaeological targets and has included two thematic surveys of historic and contemporary subjects that are pertinent to this area, namely hospitals and collieries. Photographs of these subjects make up a considerable proportion of the Specialist Collection coverage in this area. Some of the Specialist Collection was available as prints and but newer photography and the Aerofilms Collection were only available in digital format.

The Military Oblique Collection comprised RAF aerial photographs taken in the 1940s and 1950s. These were supplied as print or, occasionally, photocopies from prints.

Previous projects of this type have also enjoyed access to aerial photographs held in the Cambridge University Collection of Aerial Photography (CUCAP). Unfortunately, the library was closed for the duration of this project and so the bulk of its contents that are pertinent to this area have not been examined. A small number of photographs were available as low resolution images through the CUCAP online catalogue and these were examined on screen. A few CUCAP aerial photographs were duplicated in the other collections consulted.

The conventional aerial photographs were complimented by more recent orthophotography supplied via the Aerial Photography for Great Britain (APGB) agreement by Next Perspectives™ and Google Earth™. Most areas had APGB coverage taken in at least two different years. The earliest Google Earth™ coverage for this area was taken in 2001 and there was a varying frequency and date of repeat coverage. Imagery continues to be added to Google Earth but once this resource had been consulted for a mapping area it was not feasible to monitor for and examine subsequent coverage.

The Great North Museum, Newcastle upon Tyne holds a collection of aerial photographs taken from the late 1960s until the early 2000s. This collection was maintained by the Museum of Antiquities until 2008 and is often referred to by this name in monument records that pre-date the transfer. This is a collection of aerial photographs taken by Norman McCord, Tim Gates and Raymond Selkirk and a small number of duplicates of CUCAP and Royal Commission on the Historic Monuments of England aerial photographs. A total of 673 oblique aerial photographs from this collection were examined over four visits. The collection is housed in the stores of the Discovery Museum, Newcastle upon Tyne.

At the outset of this project Northumberland County Council held a small collection of oblique aerial photographs taken by Tim Gates and vertical sorties taken in several different years. For the original project area this totalled 24 oblique aerial photographs, 360 black and white verticals and 123 colour vertical photographs, which were all examined at County Hall, Morpeth. By the time this collection was required again for the extended project area it was no longer easily accessible. The vertical aerial photographs had been transferred to Northumberland Archives and ongoing covid-19 restrictions at County Hall prevented the quantification and

examination of any relevant oblique aerial photographs. As a consequence, this collection was not consulted for the extension area.

Environment Agency lidar imagery

Environment Agency lidar data was consulted alongside the aerial imagery described above. From the outset of this project this data was freely available in ASCII, and later in GeoTIFF format (some earlier projects elsewhere in the country had only had access to low resolution 'quick view' jpeg images). However, at the time of mapping substantial areas had only 2m resolution data, which is generally too low a standard for archaeological detection and some areas had no cover at all. Only the area north of northing 589000 had complete cover at 1m resolution at the time it was mapped. Now Environment Agency lidar data at 1m resolution is available for the whole of the project area. Whilst it was beyond the remit of this project to review all of this data for the areas where it was previously absent, it has been examined on an *ad hoc* basis in the course of writing this report.

Existing monument records

Monument records for this project area are maintained by Historic England, Northumberland Historic Environment Record and the Tyne and Wear Historic Environment Record (for the Metropolitan Districts of North Tyneside, Newcastle upon Tyne, Sunderland and Gateshead). These records were used routinely to inform mapping and interpretation. The HER records are comprehensive, particularly in respect of the 19th century and early 20th century industrial heritage derived from historic Ordnance Survey maps, contemporary records and more recent surveys and investigations. The Historic England record of monuments in the project area was fairly sparse.

Historical Cartography

Ordnance Survey six inch and 25inch scale maps dating from the 1860s, 1890s and early 20th century were referred to throughout the course of this project. They provided a timeframe for the development of industrial sites, associated housing and infrastructure. These maps were accessed via the National Library of Scotland website.

Methodology

Image capture, processing and examination

Due to the large volume of aerial photographs and complex and changing land use the overall project was divided into small more manageable mapping areas 10-20sq km in size. These mapping areas were tackled and completed in turn. The resources were collated at the start of the mapping process for each area. All of the digital resources were assembled within the GIS, photographic prints were arranged in sorties or kilometre squares so that all material was readily on hand throughout the mapping process. The collections held by the Great North Museum

and Northumberland County Council were consulted at intervals during the lifespan of this project.

The process usually started with the generation the lidar visualisations. As a matter of course 16-direction hill-shade models were created for the Digital Surface Model (DSM, data including trees and structures) and the Digital Terrain Model (DTM, data excluding the trees and structures). In addition a Simple Local Relief visualisation was created from the DTM. Other visualisations were generated on an *ad hoc* basis if it was considered to be useful for the interpretations of a particular earthwork. The three lidar visualisations were examined in turn in 1km swathes from north to south, south to north across a mapping area. These visualisations were retained in the GIS and referred to during examination of the other sources. The DTM hill-shade model was examined again towards the end of the mapping process to assess the latest known condition of a monument.

After the initial analysis of the lidar visualisations the Historic England Archive specialist and vertical aerial photographs were examined. Prints had to remain in the HE York Office and so the workflow had to be flexible particularly during 2020 and 2021 when Covid-19 restrictions were in place. All prints were examined under magnification and stereoscopically where possible. Where digital images were supplied in lieu of prints, these were examined on-screen on a high-resolution 20-inch monitor.

The locations of potential cropmark, soilmark and earthwork features were checked on the orthophotography, Google Earth™ imagery and lidar visualisations to see if these sources offered better or additional information. Selected prints were scanned at 400dpi. These scans or digital images were rectified using Aerial 5.36 and control points were derived from OS MASTER MAP. Aerial 5.36 can use height data to improve its rectification calculations, but this often produced incorrect transformations. This appears to be due to the very considerable changes in terrain between the historical topography and latest height data. Height models were not routinely employed except where a standard rectification was clearly deficient and the height data improved the result. In practise this was very rare.

Rectified images were imported into the GIS for digitisation of features.

Once all the prints had been examined and processed including mapping (see below) the APGB and Google Earth imagery were closely and systematically examined on screen in 1km swathes. Features observed on the former were digitised directly into the GIS, the later were captured as jpeg images and rectified using AERIAL5.36 as described above.

Mapping

Digitisation of features from the various sources was usually undertaken at the point of discovery following image capture and rectification. Banked and ditched features were depicted as seen and with closed polygons or regions. Particular attention was given to the relative widths of features, the relationships between abutting and

intersecting features and corners, in so far as the visible cropmarks and earthworks are representative of these. For standing buildings and structures the outline footprint was digitised. For earthwork slopes a simplified T-hachure line convention was used to indicate the top of slope, and the direction and length of slope. Ridge and furrow was recorded by a simple closed polygon outline around adjacent plough ridges of common alignment with a simple polyline to show the direction of ploughing.

Data, including monument record numbers, period, type and sources was attached to each mapped object to enable interrogation and traceability. A full list of the data is provided in Appendix 1.

Monument recording

Monument records were generated to compliment the spatial objects and summary information in the GIS data. They were an opportunity to provide a brief description of archaeological features and their relationship to one another and the landscape, the rationale of the interpretation and the contribution of other sources beyond the aerial imagery, such as finds, geophysical surveys, excavations. The monument records are linked to the GIS data by a unique identifier.

As noted above, four individual historic environment records operated across this project's area: Historic England, Northumberland HER (NHER), Tyne and Wear HER (TWHER) and Durham HER (DHER). The destination of the records generated by this project depended on the circumstances at the time of recording.

In this report where reference is made to individual HER monuments then their unique identifying numbers are presented in parenthesis prefixed with the appropriate abbreviation. Historic England monument are referenced without a prefix. The prefix NHLE indicates a National Heritage List for England entry number.

The original SEN project

The original SEN project was largely within Northumberland and with a small area under the authority of the Tyne and Wear HER. In the Northumberland area, if there was no existing HER monument record for a feature then a new HER record was created. The new monument records were drafted by Alison Deegan and then appended in bulk at the end of the project by the HER officer. For existing HER records additional information was added to each record manually by Alison Deegan.

For the small area under the Tyne and Wear HER Alison Deegan drafted monument record text and detail for new and existing monument records. This information was passed to Tyne and Wear HER officer and added to the HER at their discretion.

No monument records were added or enhanced to Historic England monument recording system for this part of the project.

The SEN extension project

Monument records were drafted as mapping progressed through the extension area. For several reasons it proved to be impracticable to generate new monument records and add information to existing records directly into the Tyne and Wear and Durham HERs. Due to an upgrade Historic England's monument recording system was not possible from May 2019 and until the launch of Warden in 2020. Fortuitously the availability of remote access from October 2020 allowed the process of monument recording to continue and progress despite the Covid19 restrictions. This data will be transferred to the HERs as part of the Heritage Information Access Simplified programme in due course.

For the Northumberland section of the extension area some adjustment of the strategy devised for the original project area was required. As before, new monument records were created by Alison Deegan and appended to the HER database in bulk by the HER officer on completion of the project. However, it was not possible to access the database directly to manually enhance the existing monument records. Instead monuments with existing HER records were recorded in the Historic England system and the data provided to the HER as an export file for the HER office to deal with in their own time.

The Historic England monument records and the small number of Tyne and Wear HER monument records generated or enhanced by this project are currently available through Heritage Gateway and Sitelines respectively. The records generated for the Northumberland HER are available through the normal enquiry routes but the online portal Keys to the Past will not be updated for this county until the current enhancement project is complete.

Quality Assurance

Quality assurance checks were undertaken across a minimum of 5% of the project area by the Historic England Aerial Survey Team. These were undertaken at intervals during the lifespan of the project so that any issues could be readily addressed retrospectively and in subsequent work.

NEOLITHIC AND BRONZE AGE MONUMENTS

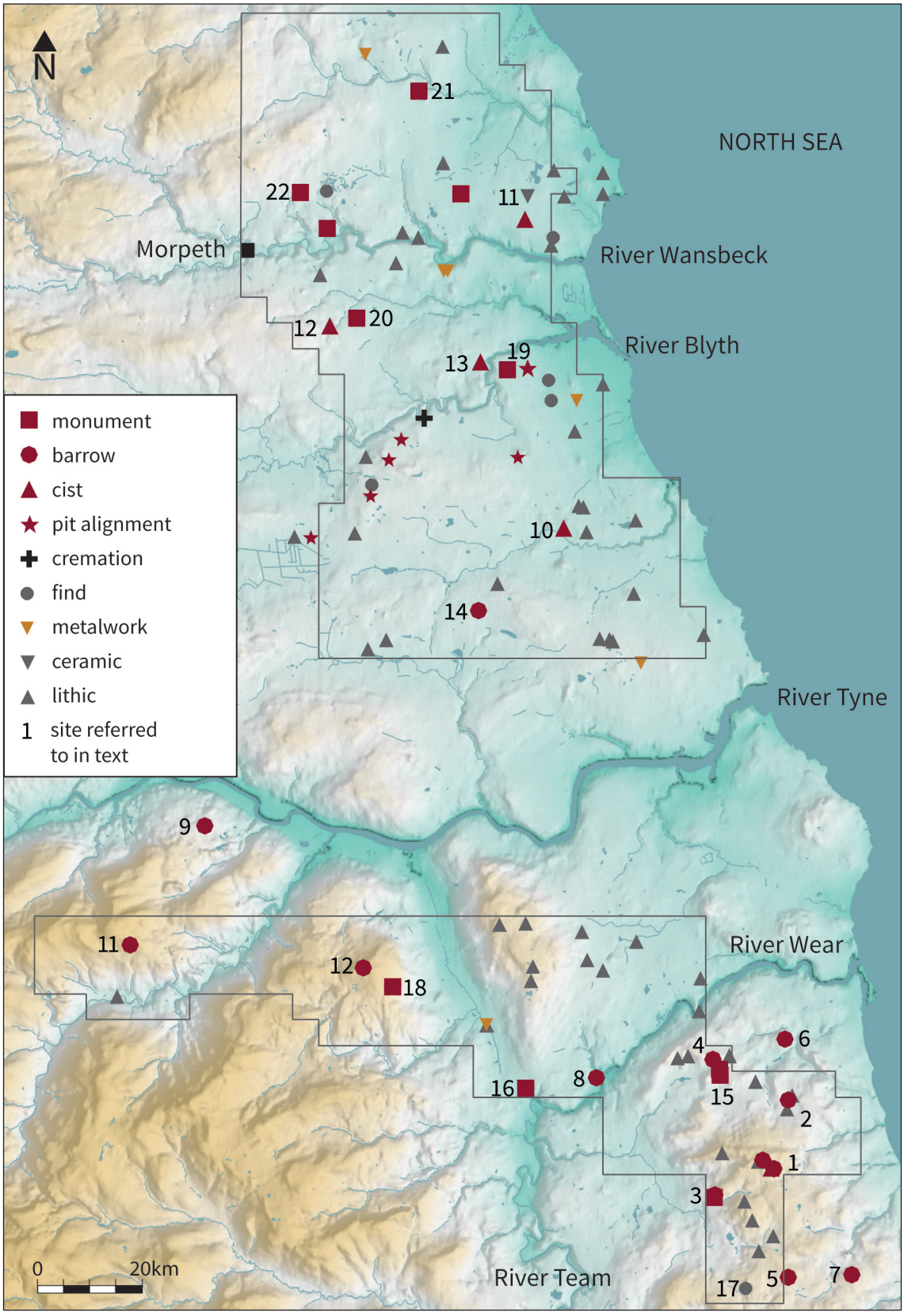


Figure 2: Distribution of Neolithic and Bronze Age monuments and findspots. [includes data from Northumberland and Tyne and Wear HERs]

Introduction

The Neolithic and Bronze Age monuments represented in this project's data, although few in number, are not insignificant and they merit some discussion. Their sparsity mirrors the fairly low level of known Neolithic and Bronze Age activity discovered by other investigations and sources.

Several barrows and cists are known from antiquarian excavations (Fig. 2, nos 1-7). Greenwell excavated two barrows with cists and a possible third at Warden Law, another at Steeple Hill, Silkstone and the Seven Sisters barrow at Copt Hill, near Houghton le Spring in the late 19th century (Trechmann 1914). Following Greenwell's work Trechmann investigated other examples at Hasting Hill, and just outside the project area, at Murton Moor, Humbledon Hill and Batter Law in the early 20th century. A barrow with cist at Fatfield was uncovered during road building in 1907 (TWHER318) (Fig. 2, no. 8).

More recently, work at Cushy Cow Lane, Ryton (just beyond the area of this project) discovered a small ring ditch with burial pit that was probably the remains of a barrow (TWHER17539) (Fig. 2, no. 9).

Each of these burials was associated with a surviving or inferred barrow mound, and each is located on the south side of the River Tyne. North of the Tyne there have been incidental finds of cist burials: in a churchyard at Seghill (N11471) and during construction works at Hirst in the late 19th century (NHER11668) and, in the first half of the 20th century, at Clifton from ploughing (NHER11701) and at Bedlington during housing construction (NHER11747) (Fig. 2, nos 10-13).

More recently excavations at Salters Lane produced rare evidence of a barrow north of the Tyne (ASDU 2021)(Fig. 2, no. 14).

In recent decades the large-scale open area excavations undertaken in South East Northumberland have presented generous opportunities to recover evidence of Neolithic and Bronze Age activity. Small quantities of flint were recovered at East and West Brunton, Bagdon Park 1 and 3 and Shotton North-East but 'These assemblages do not suggest any high level of earlier activity at the excavated sites' according to Hodgson et al. (2012, 162). Similarly at Pegswood Moor the pre-Iron Age is represented by struck flint and a single pit (Procter 2009, 13). The St George's Hospital site at Morpeth again revealed a scatter of Neolithic and Bronze Age pits, but also a late Bronze Age stock enclosure that was small and oval in plan (ARS 2016, 16-23). Neolithic features have been reported from excavations at West Blyth, but details are not available at the time of writing (NHER22890). Four pit alignments excavated at Blagdon Park 1, Shotton North-East, Shotton Anglo-Saxon Site and at Fox Covert, Horton Grange (just west of this project area) have been dated to the late Bronze Age or early Iron Age using optically stimulated luminescence (Hodgson et al. 2012, 107).

Beyond the excavations there is a low-level distribution of incidental finds of lithics, pottery and Bronze Age metal work. These are particularly scarce in those areas of this project that lies west of the River Team and in the Lyne Valley.

This detailed and comprehensive survey of the existing aerial photographs and lidar imagery has updated and consolidated current understanding of a number of known monuments but new discoveries have been few.

Monuments south of the River Tyne

Hasting Hill, Tyne and Wear (Fig. 2 no. 15 and Fig. 3)

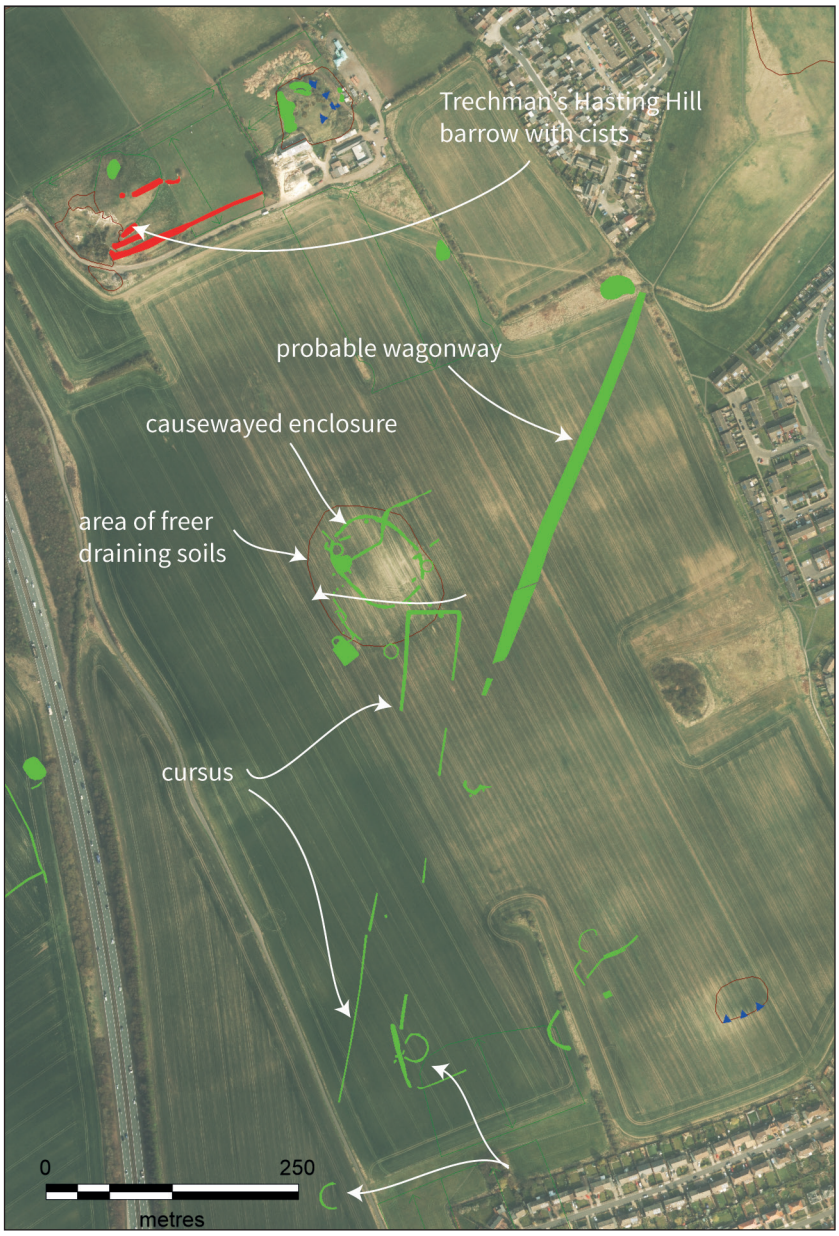


Figure 3: Mapping of the cursus, causewayed enclosure and other monuments on Hasting Hill. [background image 3 October 2015 © Bluesky International/ Getmapping PLC.]

In early 1970s aerial photographs taken by Norman McCord began to reveal a group of monuments of likely Neolithic and Bronze Age date. These stood less than half a kilometre to the south of the barrow Trechmann had excavated on Hasting Hill in 1911. They include a large oval enclosure, a cursus and numerous ring ditches and pits.

The large oval enclosure measures 90m by 70m and its long axis runs north-west to south-east (26356). Referring to McCord's original aerial photographs Newman suggested that this was a causewayed enclosure and it is included as a possible candidate in Oswald et al.'s catalogue of this monument type (1976, 2001; Oswald, 2001). Subsequent aerial photographs have filled in some of the gaps in the circuit but there are still three or four causeways to merit this interpretation. Early Neolithic pottery has been recovered during recent work on this monument by Jan Harding (Frodsham 2019).

The cursus is aligned near north to south, it can be traced over a distance of 500m, though the location of its southern terminus is not yet known, and it is approximately 50m wide (1256992). The northern terminus is squared-off with a broad ditch and angular corners and there is less than 10m between this and the edge of the oval enclosure. The rest of the cursus is visible only as short, fragmented sections of ditch. There are at least four ring ditches around the northern end of the cursus (1628138, 1258230 & 26356). Some within or abutting the oval enclosure.

Today these monuments sit in large open fields with the A19 to the west and residential estates to north, east and south. As well as the Trechmann's barrow to the north, with its ten individual interments, flints dating from the Mesolithic through the Bronze age have been recovered at Grindon, 650m to the north-east and a polished axe from Farringdon, 1.3km to the east (Trechmann 1914; TWHER232, TWHER233 and TWHER236).

Topographically the cursus and surrounding monuments are located approximately 2km south of the River Wear and on the western edge of the limestone ridge that runs from the River Tyne to the River Trent. Siting at about 95m above sea level, the views towards the river to the north and north-west of the cursus are impeded by small knolls, including the rise on which Trechmann's barrow stood. To the north-east the land falls away gently towards the sea, interrupted only by Humbledon Hill, the site of another barrow (Trechmann 1914). The nearest known cursus to the Hasting Hill example are at Scorton Cursus (55km) and Thornborough (75km), both to the south-east in North Yorkshire.

The Hasting Hill cursus and causewayed enclosure have been scheduled (NHLE1016977).

Picktree, Tyne and Wear (Fig. 2 no. 16 and Fig. 4)

Approximately 7.5km west of Hasting Hill there is a small window onto an earlier landscape between the A183 to the west and Lambton Park to the east. Two circular enclosures sit above a pronounced loop in the River Wear, on sands and gravels

overlying the coal measures. The larger of the two enclosures has slightly flattened sides, opposing entrances that are aligned north-north-west to south-south-east and is 65m in diameter. The smaller lies to the immediate west, may have had opposing entrances and appears to have at least three inner circuits of pits. This enclosure measures 28m in diameter (internal to the ditch). The cursus suggested by some observers to intersect the larger of the enclosures (see NHRE876885) is the remains of Mr Joliffe's New Way, a post-medieval wagonway and can be seen to cutting across medieval ridge and furrow in the field to the east (1629155).

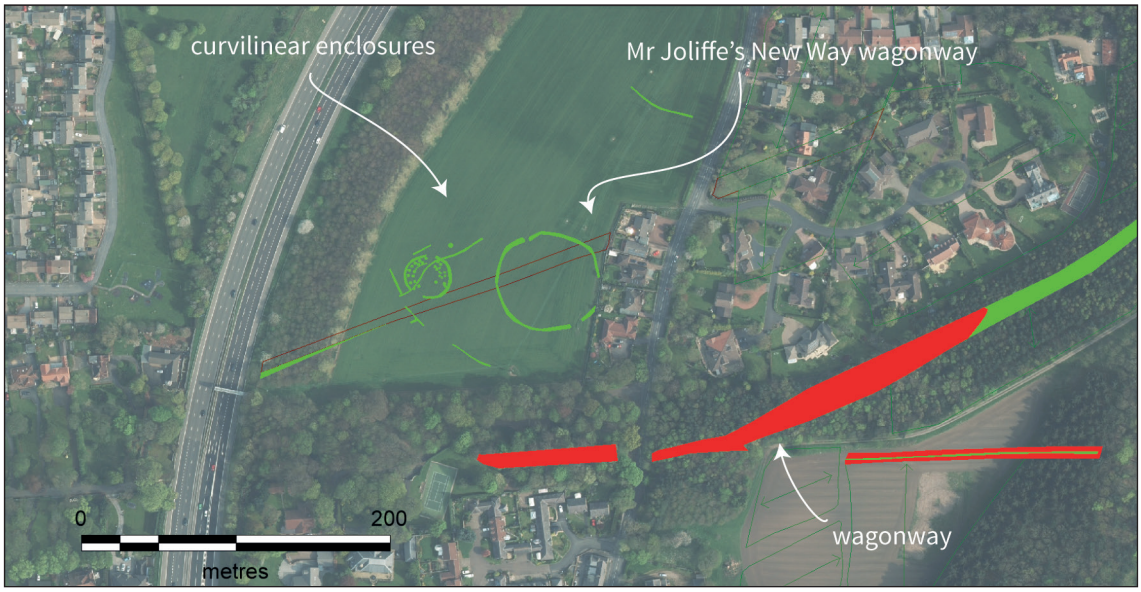


Figure 4: Mapping of curvilinear enclosures at Picktree. [background image 6 May 2016 © Bluesky International/Getmapping PLC.]

The form and arrangement of the two circular enclosures has similarities to features recorded on the opposite side of the country near Bootle, Cumbria. Close to the River Annas, two circular enclosures, 50m and 60m in diameter are closely spaced and with internal pit circuits. Fragmentary cropmarks suggest a third example to the immediate north. The pit circuits, like those observed inside the small henge known as Akeld Steads in the Milfield Basin, may have held timber posts. The flattened sides of the larger examples recall the inner ditches of some of the Yorkshire henges: Ferrybridge, Cana Barn and Newton Kyme in particular.

A possible Bronze Age barbed and tang arrowhead and other undated lithics were recovered from the area around the Picktree enclosures (D6720). Beyond this field the nearest known Neolithic or Bronze Age sites are the Fatfield barrow to 2.7km to the west (TWHER318) and finds recovered at the Birtley brickworks (TWHER654).

Enclosure at Easington Lane, Tyne and Wear (Fig. 2 no. 17)

RAF photos taken in 1947 show faint traces of a curving ditch partly concealed by housing on Tay Street at Easington Lane (1627037). It suggests a sub-circular enclosure approximately 77m in diameter. In isolation this feature warrants no

more than a passing comment but recent investigations in the area provide some potentially significant context. Geophysical survey of the land to the south-west has revealed part of a large rectilinear enclosure and within that part of a sub-circular enclosure approximately 60m in diameter (ASDU 2008, fig. 6).There are reports that the enclosure has produced a mid-fourth millennium cal BC date (Frodsham 2019). In the latter half of the 20th century the site of the cropmarked enclosure was converted from a field to a school playing field and more recently it has been built over. Construction was preceded by archaeological trial trenching but unfortunately the trenching plan did not intersect this feature (Wardell Armstrong 2019, fig. 2). Two undated gullies were recorded in the playing field area. This group of features overlooks the cut of a small burn running south into Coldwell Burn.

A sub-circular enclosure at Old Ravensworth Tyne and Wear (Fig. 2 no. 18)

RAF aerial photographs show the pale and faint cropmarks of a sub-circular enclosure to the north of Ravensworth Grange (1627892). It is also partly visible as cropmarks and soilmarks on more recent imagery. This enclosure measures 64m by 58m, appears to have a broad ditch and has a wide opening (or is incomplete) to the east. It lies on the eastern slope of Blackburn Fell and looks down Mitcheson's Gill towards the River Wear, 2.3 km to the east. Antiquarian sources claim 'cairns built from small stone' lie near Tinkler's Row on the top of Blackburn Fell, but there is no tangible evidence of these (TWHER11237). It is possible that this enclosure is of Neolithic or Bronze Age date but it requires further investigation.

The barrows and cists

The barrows investigated in the late 19th and early 20th century at Warden Law, Copt Hill and Hasting Hill and another, undisturbed, at Chopwell are visible only as low indistinct mounds even on the earliest aerial photographs. Had they not been excavated it is doubtful if, from the air, these could have been distinguished from the natural mounds and hummocks that dot the landscape and more so the very common spoil heaps from small-scale coal workings. The Steeple Hill barrow at Silkstone, excavated in 1876 was already obscured by allotment gardens created for the New Silkstone mining village on the earliest available aerial photographs available and, as mentioned above, the Fatfield example was removed during road building in the early 19th century.

By contrast the barrow recently investigated north of the River Tyne at Salter's Lane, Long Benton presented a relatively clear cropmark and soilmark feature on aerial photographs taken in the 1960s and 1970s, and can even be detected as a vestigial earthwork on lidar imagery (Fig. 2 no. 14). It was used by the Ordnance Survey as a trigonometrical marker point in the 19th century and so distinct was this feature that it was presumed to be of more recent origin. However excavation in 2019 revealed a Neolithic feature cut into a slight mound of likely natural origin, and then encircled by a ring ditch in the Bronze Age. A small undated rectangular enclosure abutting the eastern side of the ring ditch may be a mortuary enclosure (ASDU 2021, 22).

Monuments in South East Northumberland

Being more rural in character and with larger expanses of arable cultivation, cropmarked features of likely pre-medieval date are considerably more widespread north of the Newcastle upon Tyne conurbation than they are anywhere south of the River Tyne (within the boundaries of this project). However, very few of these cropmarks have been confidently identified as having Neolithic or Bronze Age origins, and none has yet been confirmed by excavation. Small rectilinear enclosures are numerous, fairly homogenous in appearance and, where they have been excavated, are usually of late Iron Age date. Some of the small number of sites that do not fall readily into this morphological category and seem unlikely to be of more recent origin, may date to the Neolithic or Bronze Age origin. They include a possible penannular enclosure at Bebside, a double-ditched circular enclosure at Hepscott Manor Farm, part of a large oval enclosure at Ulgham and features at Fulbeck (Fig. 2 nos 19-22).

Harding with Lee mentions the Bebside penannular enclosure [N11763] as a possible henge-related monument (1987, 202-3). The cropmarks show a C-shaped ditch with a large pit between the ditch terminals to form a small enclosure with two west-facing causeways. Its internal diameter is just 14m. This enclosure sits at about 30m above sea level with the River Blyth about 800m to its north and west and the land to the east gently falling towards the North Sea. There is other evidence of Neolithic activity in the wider area: a possible ring ditch 1.2km to the south-east at West Blyth [N22890] and a group of five cist burials on the north bank of the River Blyth at Bedlington, approximately 1.5km to the north [N11747]. It is tempting to compare this feature with some of the small henges in the Milfield Basin: Milfield South, Milfield North, Yeavering and Whitton Hill (Harding 1981, table 3; Miket 1985, fig. 1). They share similar characteristics: an internal diameter less than 25m, a broad ditch and at least one causeway entrance. However, it would be rash to make a morphological comparison on the strength of the few aerial photographs of the Bebside example, which were taken on a single occasion in 1972. Unfortunately this site has been under increasingly dense scrub vegetation since 2010 so at present there is no opportunity to obtain a better image by targeted aerial reconnaissance.

The double-ditched circular enclosure north-west of Hepscott Manor Farm [N11704] is unusually symmetrical and concentric. Perhaps for this reason, it has been dismissed as being the result of irrigation [N11704 comment 2]. However, this feature has now produced cropmarks and soilmarks in many years, which lends weight to it being of archaeological origin. The inner enclosure, defined by a broad ditch, is 68m in diameter, the outer, which is less complete and narrower, measures 122m across. This feature is located between the A1 and the A192 and approximately 400m south of Catch Burn. Cist burials were recovered 1km upstream at Clifton (NHER11701, Fig. 2 no. 12). There is, as yet, no evidence to exclude it from consideration as an example of a Neolithic or Bronze Age monument.

The third example is a simple single-ditched oval enclosure, lying to the south-west of the small village of Ulgham (NHER31842) (Fig. 5). Only the north and north-eastern sides are visible. There is a slightly out-turned entrance along the north-east

side. The modern trackway that runs around the south-west corner of the field may coincide with unseen sections of the enclosure circuit. It is the potential overall size of this enclosure that sets it apart out from other cropmarked enclosures. This enclosure measures at least 85m wide and at least 150m long: its long axis runs north-west to south-east. It sits on the edge of the short but deep natural gulley that runs into the River Lyne, which lies 300m to the north-east.

Figure 5: Large oval enclosure at Ulgham. [background image 14 July 2006 ©Bluesky International/ Getmapping PLC.]

As noted above, cropmarked features recorded in South East Northumberland are often notable for their apparent simplicity: rectilinear enclosures, single or double ditched, with occasional internal or external features. Excavation has repeatedly shown that this simplicity is misleading both in terms of features actually present on the site and the time depth that they cover. This makes the small patch of complex cropmarks that are visible in a field to the north of Fulbeck rather intriguing (1629483; Fig.1 no. 12). The cropmarks are particularly fine and detailed and suggest the presence of a palisaded enclosure, oval features one of which is defined by pits, a small rectilinear enclosure within a sub-circular enclosure and other enclosures, pits and linear features. This site lies to the 1km west of the later Iron Age and Roman settlement that was excavated on Pegswood Moor in 2000 (Proctor 2009). Some elements of the complex cropmarks may be of Neolithic or Bronze Age date. The superimposed curvilinear and rectilinear enclosures with touching circuits have parallels with examples elsewhere in the country (e.g. Deegan 2007, fig 1.3 nos 6-8, 9 and 11). Where similar arrangements have been excavated they have been

found to result from a sequence of monument construction that includes a Neolithic mortuary enclosure and a later Neolithic or Bronze Age barrow and ring ditch.

Discussion

A confident and detailed consideration of the potential Neolithic or Bronze Age monuments discussed above is hampered by faint and indistinct cropmarks or soilmarks and poor-quality photography. Most, with the possible exception of Hasting Hill, also lack repeated specialist photography. This, at least, would go some way to mitigating for some of the unfavourable fixed parameters such as the poorly drained soils and geology. A better photographic record could avoid undue credence being given to poorly recorded monuments such as the Bebside penannular enclosure and conversely greater confidence to features such as the double-ditched enclosure at Hepscott, which lacks any specialist photography.

Once a feature enters the monument records as specific monument type, no matter how carefully caveated, it can then permeate through subsequent literature, especially in areas where other examples are few or absent. Once embedded it becomes difficult to refute and retract unfounded interpretations. The putative henge recorded at Tynemouth (just outside this project area) is a case in point (1214377). This cropmark is referenced in several discussions of the Neolithic monuments in the north east (e.g. Frodsham 2019; Edwards 2009, 52). These 'double parallel dark marks' were identified on aerial photographs taken in the 1950s and the site was subsequently built over (TWHER1918). However, a photograph taken in 1949 suggests contemporary activity on the site is the cause of the marks, not buried archaeology.

Overall the distribution of barrows and cists within the project area is sparse, and other monument types are even more thinly spread. These other monument types, and it is worth reiterating that many have not been scientifically dated, do echo some of the trends and preferences observed amongst prehistoric monuments further south in Yorkshire.

Most of the known Yorkshire henges, for example, are located on the limestone ridge and often, as in the case of Ferrybridge, Newton Kyme, Nunwick and Catterick close to its interface with the adjacent bedrock. Two cursus monuments: one at Thornborough and another at Scorton show a similar disposition. Similarly the Hasting Hill cursus is located where the limestone ridge gives way to the earlier coal measures. The limestone ridge continues northward for just another 13km before terminating at the South Shields. Unfortunately these northern reaches, and thus any monuments that may have stood there are now obscured by modern development.

Although the Hasting Hill cursus enjoys a more elevated position and is slightly more distant to the River Wear than either the Thornborough example is to the River Ure or Scorton is to the River Swale, it has in common with them a proximity to pronounced river meanders. The Picktree enclosures are also located above a significant loop in the River Wear. Given that these are dynamic river systems

further research is required to see if these spatial relationships held at the time that these monuments were constructed.

South of the Tyne (in this project area), there is a marked bias towards the limestone ridge in the distribution of known and potential monuments and finds. With the exception of the Fatfield Barrow and Picktree enclosures in the Wear valley, monuments are absent between the latter and the River Team; finds are widely, though thinly spread. West of the Team Valley there are no dated monuments, but a putative barrow at Chopwell, the unverified Tinkler Row cairn, and the possible Neolithic enclosure at Old Ravensworth. Finds in this area appear to be absent with the exception of a perforated axe-hammer close to the River Derwent at Blackhall Mill. Although this project area presents only a narrow east west transect it is consistent with the trends observed in the results from adjacent projects (Hadrians Wall to the north, Durham NMP to the south and NE RCZAS to the east).

As noted above in the area north of the Tyne, with the exception of the Salter's Lane example, round barrows are seemingly absent (in this project area). Several cist burials are known from antiquarian investigations but these appear to have been without the covering mounds that are often present in examples known to the south of the Tyne. Aside from the Salter's Row and Fulbeck examples the aerial photographs and lidar evidence has produced no further evidence for round barrows, either as cropmarked ring ditches or as earthwork mounds. It is however possible that some of the ring ditches presumed to indicate hut circles may instead be the remains of small round barrows.

Vyner posits the Hasting Hill, Picktree (Chester-le-Street) and Copt Hill monument groups as part of his Great Route North and a continuation of the more legible alignment of monuments stretching from Ferrybridge to Scorton (2007). It is tempting to see the thin spread of potential monuments north of the Tyne as occupying some of the gap between the River Wear and the Milfield basin. However, it would be remiss to do so without full consideration of the distribution of known monuments further to the west, which is outside the scope of this study.

LATE IRON AGE AND EARLY ROMAN SETTLEMENT

Introduction

In 1968 Norman McCord and George Jobey published a list of 42 'early settlement sites' between the Rivers Tyne and Wansbeck (1968, 51). Their aim was to correct the perceived bias that prehistoric occupation favoured the high ground in the west. Most of these settlement sites were in the form of rectilinear enclosures discovered by aerial reconnaissance conducted by McCord and Prof. St Joseph (CUCAP). Twenty-three of those enclosures lay within the area of this project (Fig. 6). The others lay to the west as far as Corbridge. This project, together with parts of the Hadrian's Wall NMP and the NE RCZAS projects have now recorded 203 enclosures between the Rivers Tyne and Wansbeck, a further 32 north of the River Wansbeck and 24 south of the River Tyne. The following analysis will concentrate on the examples recorded by this project but will reference the Hadrian's Wall and NE RCZAS data where it is fruitful to do so.

Background

Specialist aerial reconnaissance, by Tim Gates in particular, was the primary source for approximately one-third of the enclosures recorded by this project, but nearly one-half of all examples were identified and recorded from historical vertical aerial photographs. Recent orthophotography contributed approximately 17% and just 5% of enclosures were mapped primarily from the lidar imagery. It should be noted that at the time of mapping, not all areas of the project had 1m resolution lidar cover; some areas had only 2m resolution data (which is insufficient for earthwork interpretation) and some areas had no cover at all. One metre resolution data is now available for the whole of the project area so a rapid review of this data was undertaken to inform this analysis. Of the 229 enclosures recorded by this project, fewer than one-quarter could be detected on the lidar imagery. Of that fraction many survive only as the very slightest earthworks; it is unlikely they would have been confidently recognised as enclosures without the complementary conventional aerial photographs. However, the identification of some examples: enclosures at Mount Pleasant farm (NHER27766), north-east of Plessey Hall farm (NHER27767), the large enclosure east of Mitford Castle (NHER11119), the Morley Hill Farm enclosures (1627349) and a substantial enclosure in Blackdean Wood, Cockle Park (1629503) relied heavily on the lidar imagery. Surprisingly, of these examples only the Blackdean Wood enclosure is concealed by trees making it difficult to detect on conventional aerial photographs. Although the project area now has substantial tree cover, a considerable proportion of this is on land reclaimed after surface mining for coal and is devoid of surviving archaeological features. Of the 184 enclosures not detectable on the lidar imagery most have been levelled by ploughing but a substantial minority had been impacted by mining, infrastructure and development and if not destroyed they are no longer accessible for observation or intrusive investigation.

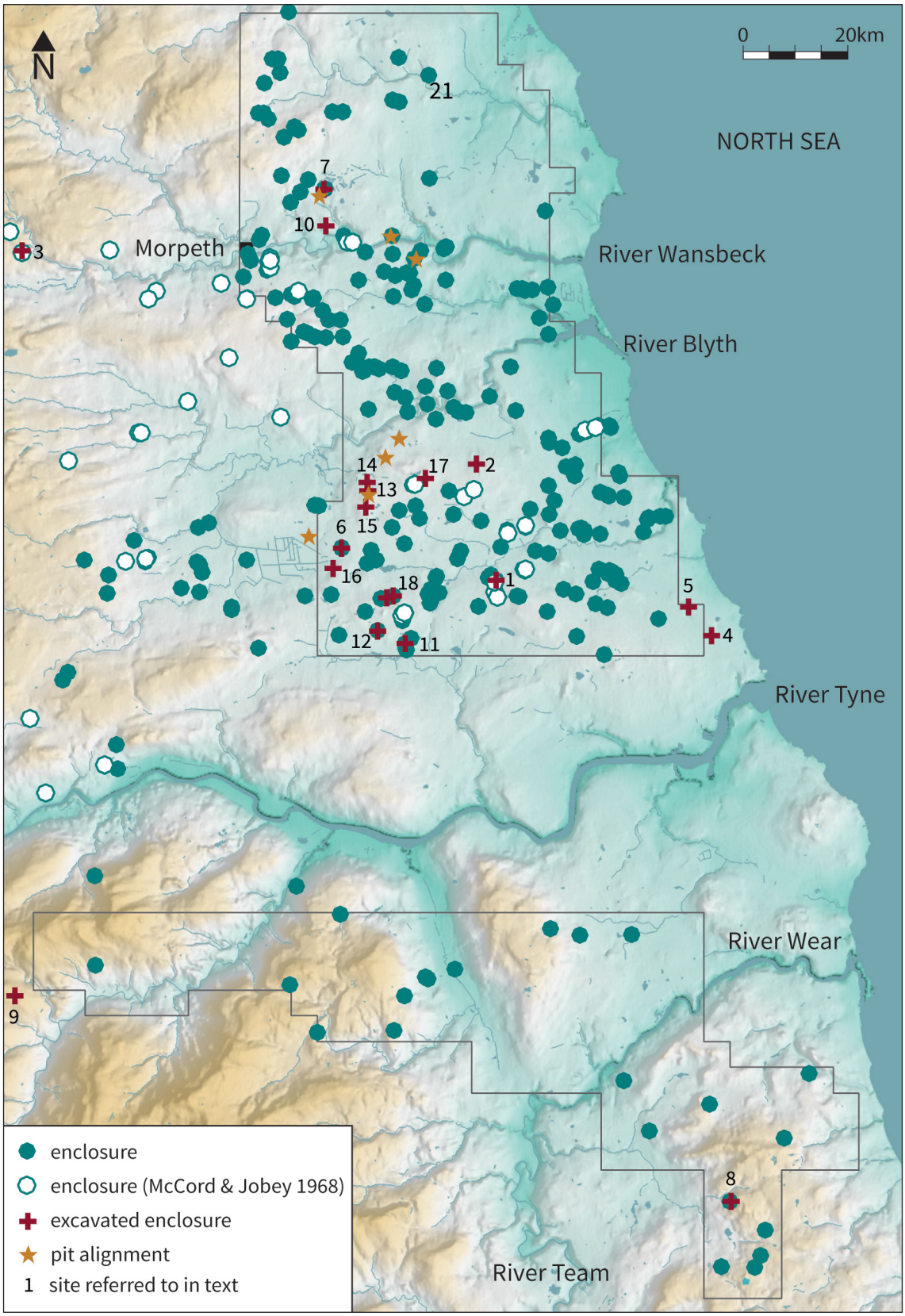


Figure 6: Distribution of known and possible late Iron Age enclosures, collated from multiple sources. [background generated from height data © Bluesky International/Getmapping PLC]

There has long been an interest in these monuments. In 1832 Hodgson had noted the presence of '... a series of small camps ... that run in a line northwards out of the Cramlington grounds, through Plessey & Shotton, into the east part of the township of Stannington (Hodgson 1832, 306). In his travels Henry MacLauchlan observed a group of four ditched 'camps' 'more easily traceable by the ditch than the remains of the rampart' near Netherton Station (now Stannington Station) (1867, 2).

It was McCord's aerial reconnaissance in the 1960s and 1970s that began to proliferate evidence of similar enclosures in the South East Northumberland. This was soon complimented by Jobey's excavations at Burradon, Hartburn and Marden (Jobey 1970, 51-95; 1973, 11-53; 1963, 19-35). Initially of the opinion that many of these enclosures represented 'a pattern of native settlement in the Roman period', Jobey's thinking evolved to accommodate an earlier, Iron Age origin for these sites (McCord and Jobey 1968, 53; Jobey 1970, 93). For several decades Burradon became the site type for Iron Age/Roman settlement in the region: a small broad-ditched rectilinear enclosure with a substantial internal round house and smaller houses and an outer ditch.

It is the developer-funded excavations undertaken since the late 1990s that have exposed the complexity of settlement from the late Bronze Age to early Roman period settlement in this area. The following excavations have informed this assessment of the aerial photograph and lidar evidence and they will be referred to frequently in the discussion below:

- Burradon (Jobey 1970) (Fig. 6 no. 1)
- Cramlington Centre Point (McCord and Jobey 1968) (Fig. 6 no. 2)
- Hartburn (Jobey 1973) (Fig. 6 no. 3)
- Marden (Jobey 1963) (Fig. 6 no. 4)
- Tynemouth (TWHER5102) (Fig. 6 no. 5)
- Gardener's Houses, Dinnington (geophysical survey) (Biggins et al. 1997) (Fig. 6 no. 6)
- Pegswood Moor (Proctor 2009) (Fig. 6 no.7)
- Eppleton Quarry (geophysical survey only) (ASDU 2010) (Fig. 6 no.8)
- Hoodsclose (TWM 2011) (Fig. 6 no. 9)
- St George's Hospital, Morpeth (ARS Ltd 2016) (Fig. 6 no.10)
- East Brunton (Hodgson et al. 2012) (Fig. 6 no. 11)
- West Brunton (Hodgson et al. 2012) (Fig. 6 no. 12)

- Blagdon Park 1 (Hodgson et al. 2012) (Fig. 6 no. 13)
- Blagdon Park 2 (Hodgson et al. 2012) (Fig. 6 no. 14)
- Brenkley Lane (Headland Archaeology 2015) (Fig. 6 no. 15)
- Front Street Dinnington (Wardell Armstrong 2016) (Fig. 6 no. 16)
- Arcot, Cramlington (ASDU 2019) (Fig. 6 no. 17)
- Morley Hill Farm (Headland Archaeology 2019) (Fig. 6 no. 18)

Most of these excavated sites are located between the Rivers Tyne and Wansbeck, further north there have been fewer of the developmental pressures that prompt archaeological investigations. Less is reported from south of the River Tyne but archaeological evaluation at Hoodsclose (just west of this project) and geophysical survey at Eppleton Quarry are relevant to this discussion (TWM 2011, ASDU 2010).

Although not without diversity the excavated settlements have revealed a common suite of features: round houses, palisaded enclosures, rectilinear enclosures with substantial ditches and a second or outer enclosure ditch, though not every element is present at every excavated settlement. In 2012 Hodgson et al. posited a sequence of development that was repeated at several of the recently investigated sites. This can be briefly summarised as singular or small unenclosed groups of round houses in the late Bronze Age sometimes concurrent with a division of land marked by pit alignments, the construction of palisaded enclosures in the late Bronze Age and early Iron Age, a phase of open settlement in the middle Iron Age and in the late Iron Age the creation of a more substantial enclosure, usually with a large central house and often superimposed on the earlier settlement (Hodgson et al. 2012, 183-212). Construction appears to cease at East and West Brunton and Blagdon Park 2 in the early Roman period (Hodgson et al. 2012, 213). The Brenkley Lane and Morley Hill Farm settlements have similar histories, the former is described as 'diminished' by the Roman period, compared to its apogee, and the latter was in use until the 2nd century AD (Headland 2015, 46; Headland 2019, 36). Again, not every phase is represented on every excavated example, at Blagdon Park 1 for example only ever comprised a small unenclosed settlement (Hodgeson et al. 2012, 13-14)

The excavations on Pegswood Moor revealed

> A Later Iron Age settlement ... clearly of a markedly different settlement type to these distinctive rectilinear enclosure homestead sites which were bounded by substantial ditches. (Proctor 2009, 92).

Here a small late Iron Age open settlement preceded the creation of fields or paddocks and sub-divided enclosures with unremarkable ditches abutting the axial field boundaries (Proctor 2009, 5-6). Initially the small settlement was contained within one of the enclosures but later shifted north-westward to an open situation

that was adjacent to more small enclosures. The excavations demonstrated a well-ordered landscape with certain spaces dedicated to specific to activities around the settlement. (Proctor 2009, fig 19).

The following discussion will explore if and how the features uncovered at the excavated sites are manifest on the aerial photographs and lidar imagery.

Round houses

Settlement in this period is usually defined by the presence of one or more structures that can be identified as a house or, in their absence and more rarely, on the basis of long-lived pits and hearths. Structures built with stone, as is common in the upland regions are relatively durable and amenable to non-intrusive survey (Jobey 1960, figs 1 and 2). However, in lowland zones, timber or wattle structures were more prevalent and these leave a less durable footprint. Most of the excavated houses of this period (in this project's area) are round houses that survive only as narrow timber slots and/or drip gullies, their circuits are often incomplete and, as a consequence of medieval and later ploughing, these are often relatively shallow features. Furthermore, the geology and soils both north and south of the Tyne are far from optimal from cropmark production. With these limiting factors it is unsurprising that there are relatively few round houses visible on the aerial photographs.

This is not to say that round houses are entirely absent in this dataset. Thirty-five of the enclosures record by this project display evidence of one or more round houses. However there is only one example of possible round houses without an enclosure; at Dunces House, east of Morpeth, a group of four ring ditches, 9-12m in diameter are visible (NHER28778). This may be an open settlement that did not have a phase of enclosure. It has parallels with the small and shifting open settlement excavated at Blagdon Park 1 (Hodgson et al. 2012, 13-14). Clearly, open settlements with no phase of enclosure are likely to be greatly under-represented in this data.

Where cropmarked round houses do appear in conjunction with enclosures they are often single or in low numbers, frequently at or near the centre of the enclosure. Excavations, on the other hand, have shown that round houses are often very numerous; there were more than 25 at Blagdon Park 2 and 30 at East Brunton. Round houses often show diversity in overall size (diameter), width of trenches and gullies and the depth to which they were originally cut and now survive. The inevitable conclusion is that the round houses that are visible as cropmarks are probably only a fraction of all the houses that had been built and occupied in any one settlement. Significantly, the excavations have also shown the frequent presence of one or two individual structures with a noticeably larger footprint in terms of diameter and/or trenching and these are often located near the centre of the enclosure for example:

- the central enclosure at Burradon (Jobey 1970)
- the later Iron Age principal houses R21/40 and R13/14 in the inner enclosure at Blagdon Park 2 (Hodgson et al. 2012, 23)

- the later Iron Age central roundhouse in Enclosure 1 at East Brunton (Hodgson et al. 2012, 54)
- the later Iron Age Roundhouse F3 in Enclosure 2 at East Brunton (Hodgson et al. 2012, 54)
- the later Iron Age central roundhouse 1B in Enclosure A at West Brunton (Hodgson et al. 2012, 91)
- the later Iron Age central roundhouse 29 in Enclosure B at West Brunton (Hodgson et al. 2012, 91)
- Mid Iron Age Zone III Ditch A at Brenkley Lane (Headland 2015, 33)
- Undated Structure 14 in MHE2 at Morley Hill Farm (Headland 2019)

Moreover as well as being more substantial they often follow several iterations at the same location so overall these particular house sites are significantly more likely to produce visible cropmarks than their less substantial neighbours. So, whilst the Burradon architype is certainly not the sum of all Iron Age settlement, it is characteristic of a distinct and defined phase of late Iron Age to early Roman period settlement activity.

Palisaded enclosures

Several of the excavated settlements have a phase in which one or more palisaded enclosures were constructed and used. At St George's Hospital, Morpeth there were three intercutting palisaded enclosures and there was a single example at Arcot, Cramlington. Both were contemporary with one or more internal round house gullies, at the former contemporary houses also stood outside of the palisaded enclosure. The St George's palisades are dated to the 4th to 3rd centuries cal BC and the Arcot example to 350-200 cal BC (ARS 2016, 86; ASDU 2019, 11). The settlement at Arcot was abandoned in the 3rd century BC and not reoccupied (ASDU 2019, 12). Activity and occupation continued at St George's Hospital into the 'Roman Iron Age' (ARS 2016, fig. 55). In neither example was a more substantial enclosure created, at least not within the area opened for excavation.

In contrast, palisaded enclosures at East Brunton and West Brunton (P3) preceded the more substantial enclosures built on the same spot (Hodgson et al. 2012, figs 28 and 38). The East Brunton palisades were cut by a swathe of round houses that also predate the enclosure. The palisaded enclosures excavated at Brenkley Lane and Hoodsclose probably preceded the slightly largely enclosures that encircled them (Headland 2015, 44; TWM 2011, 21). However cropmarks of possible palisaded enclosures should be interpreted cautiously, the 'timber enclosure' at Pegswood Moor is dated to the late 1st century to early 2nd century AD and interpreted as a stock enclosure (Proctor 2009, 39).

Whilst a number of palisaded settlements have been identified from aerial photographs in the upland areas of Northumberland, far fewer have been recognised in this project area (Gates 2009, 142-149). The same limitations discussed for the round houses apply to this type of feature. Furthermore, as the excavated examples show, the palisade circuits were often partly recut or closely followed by the ditches of the more substantial enclosures. These examples are known because the later enclosure was larger or deviated from the original palisade circuit, but where the later follows the former then all evidence of the palisade is likely to have been removed.

Examples of possible palisaded enclosures have been recorded by this project. One at Fulbeck, north of Morpeth (1629483) and up to three enclosures at Whitfield (NHER28791). Both are within 3km of the St George's Hospital example. At both locations these and other cropmarks around them are finer and detailed than is usual is this project area. This suggests that locally the soil conditions are more favourable to cropmark production. Interestingly the Whitfield examples, a rectilinear palisade within a larger curvilinear palisade, is associated with one of the few pit alignments recorded from the aerial photographs. At neither of these two locations was a more substantial enclosure observed suggesting that, like the scenario at Arcot, these were earlier settlements that either eschewed changed, were abandoned or relocated out of the immediate vicinity.

Enclosures

The discussions above have demonstrated that the cropmarked and earthwork broad-ditched rectilinear enclosures that are so prevalent and that constitute the main body of evidence for the pre-medieval activity in this area are a proxy for a specific phase and form of settlement, which had its florescence in the late Iron Age and continued into the early Roman period. As a consequence settlements that did not include a phase of enclosure digging, however long-lived they might have been, are under-represented in this project's data.

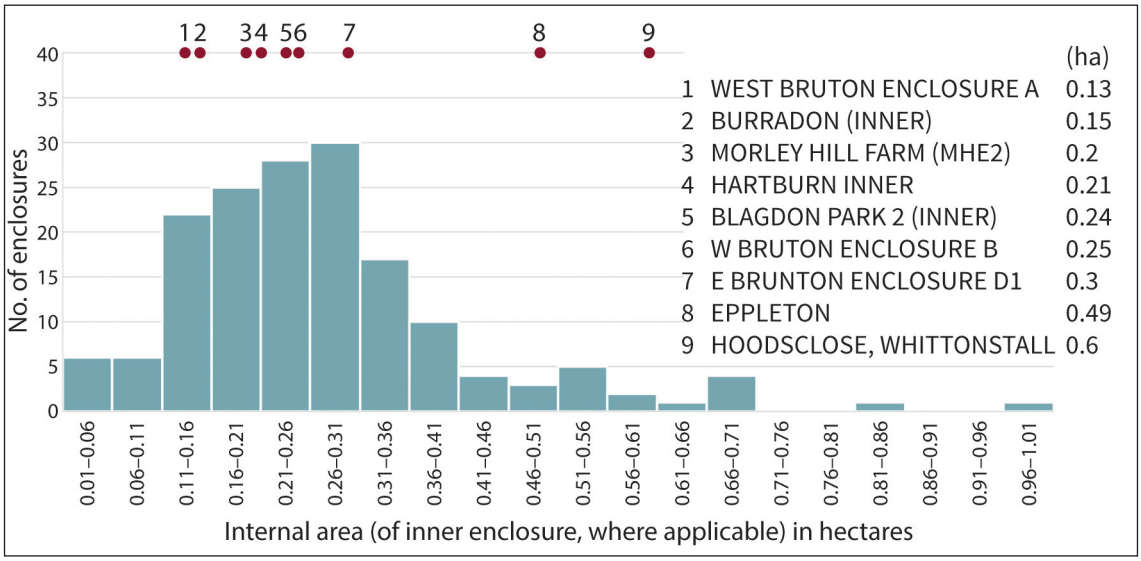


Figure 7: Chart showing the internal area of probable late Iron Age enclosures compared to excavated examples.

It is clear from the excavation evidence that the enclosures themselves are complex entities and that the cropmarks, soilmarks and occasional earthworks lack chronological and morphological definition. However this body of evidence does have the advantage of being a significant sample size from which to attempt some simple analyses of form and distribution.

Enclosure shape

As a group the cropmarked, soilmark and earthwork enclosures display some homogeneity in certain aspects of their form. They are often near-square in plan, that is to say they are not significantly longer than they are wide. It is not uncommon, however, for opposites sides to be unequal resulting in a trapezoidal rather than a strictly rectilinear plan.

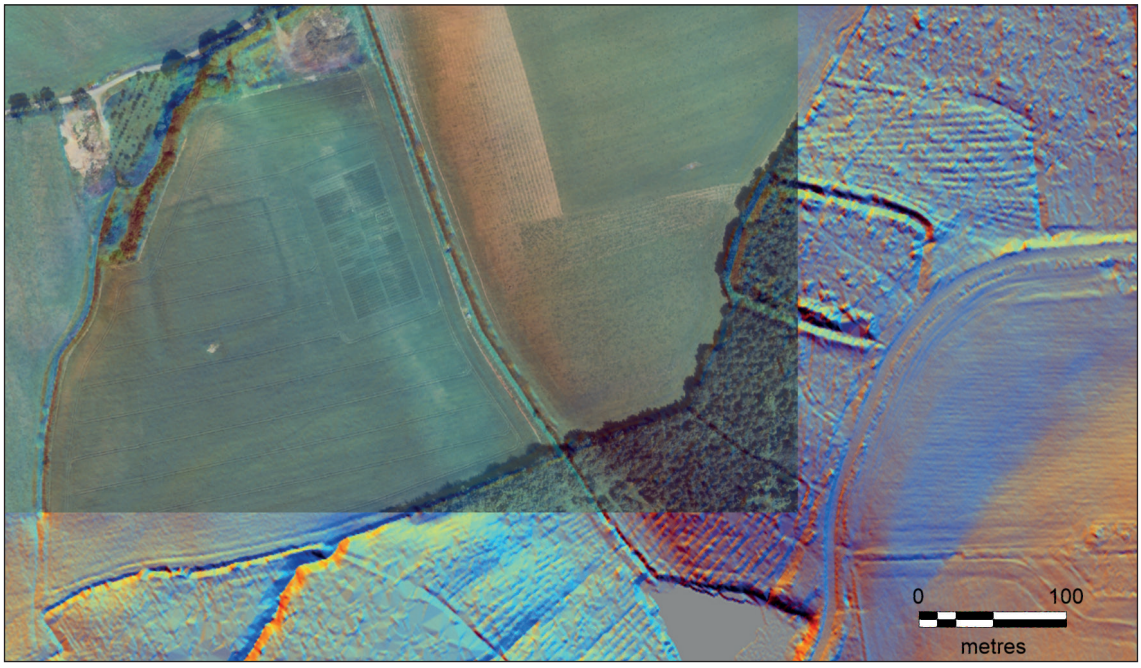


Figure 8: Two large rectilinear enclosures in Cockle Park. [background lidar DTM 2018 © Historic England; source Environment Agency overlain with aerial photography 07-June-2014 © Bluesky International/ Getmapping PLC]

Enclosure size

The internal areas of the enclosures mapped from the aerial photographs and lidar imagery range from 0.01ha to just over 1ha (Fig. 7). These measurements are calculated to enable comparison between sites and no account is made for internal banks that may have impinged on the space available to inhabitants. The smallest enclosure to yield cropmark evidence of a round house was just 0.1ha, which is just slightly smaller than the smallest of the excavated examples: Burradon at 0.15ha and West Brunton Enclosure A 0.14ha (Jobey 1970, 63; Hodgson et al. 2012, fig. 38). It is conceivable that many the enclosures of less than 0.1ha served another purpose, such as the corralling of livestock.

Two thirds of the enclosures recorded by this project measure between 0.11ha and 0.31ha internally (Fig. 7). The excavated sites in south east Northumberland lean towards the middle and lower end of this range, from the inner enclosure at Brenkley, which measured 0.27ha and Enclosure 1 at East Brunton which measured 0.28ha to the two smaller examples mentioned above (Headland 2015, Ilus 5; Hodgson et al. 2012, 54).

The two enclosures investigated south of the Tyne: Hoodsclose and Eppleton are slightly larger at 0.6ha and 0.49ha respectively (TWM 2011, 22; ASDU 2010, fig. 4). Fewer than half of the cropmark, soilmark and earthwork examples south of the river were complete enough to estimate the internal area, but those that were reflected the same broad range that is observed to the north.

The largest of the enclosures recorded by this project is located in Blackdean Wood in Cockle Park, north-east of Morpeth (1629503) (Fig. 8). At 0.83ha it has nearly three times the internal space of the average enclosure. As noted above, this enclosure is unusual for this project in only being visible on the lidar imagery. It comprises a broad ditch with a slight bank along the outer lip of the ditch and a low and disturbed inner bank. No other internal features are visible on the lidar imagery, though this is not to see they are absent, and the possibility remains that this is a secondary ditch around a smaller unseen enclosure. This enclosure bears some comparison to the example at Houghton, Heddon on the Wall (22862). Recorded by the Hadrian's Wall NMP project, the Houghton enclosure measures just over 1ha internally and like the Blackdean Wood example has a broad ditch but only slight traces of internal and external banks. Houghton is slightly more curvilinear in plan with well-rounded corners. Any internal or external features have been obscured or destroyed by medieval and post medieval ploughing. The Houghton example is described as a 'slight univallate hill slope enclosure' by Challis and Harding (1975, 51). Another of the larger enclosures (0.69ha) lies less than 400m to the west of the Blackdean Wood example, on the opposite side of a small burn (now canalised) (Fig. 8). Interestingly, though perhaps coincidentally, these two enclosures and the Houghton earthwork like close to the interface between the coal measures and the older Yoredale Group bedrocks**.** Although it is precarious to suggest function based on the unproven absence of interior settlement, these large enclosures may be the occasional meeting places posited in the NERF Framework (Heslop et al. n.d.).

Also worth a note in this respect is the potential promontory fort north of West Hartford Farm (NHER11492) (Fig. 9).

Strictly speaking no more than a broad arc of ditch with a very slight inner and outer bank, this feature sits high above the River Blyth. The eastern side of the potential enclosure may have been lost to erosion on the valley side, or never constructed, the southern side abuts the steep cut of a small tributary. Internally this enclosure, if indeed it is, measures approximately 0.6ha not accounting for any ground lost to erosion.

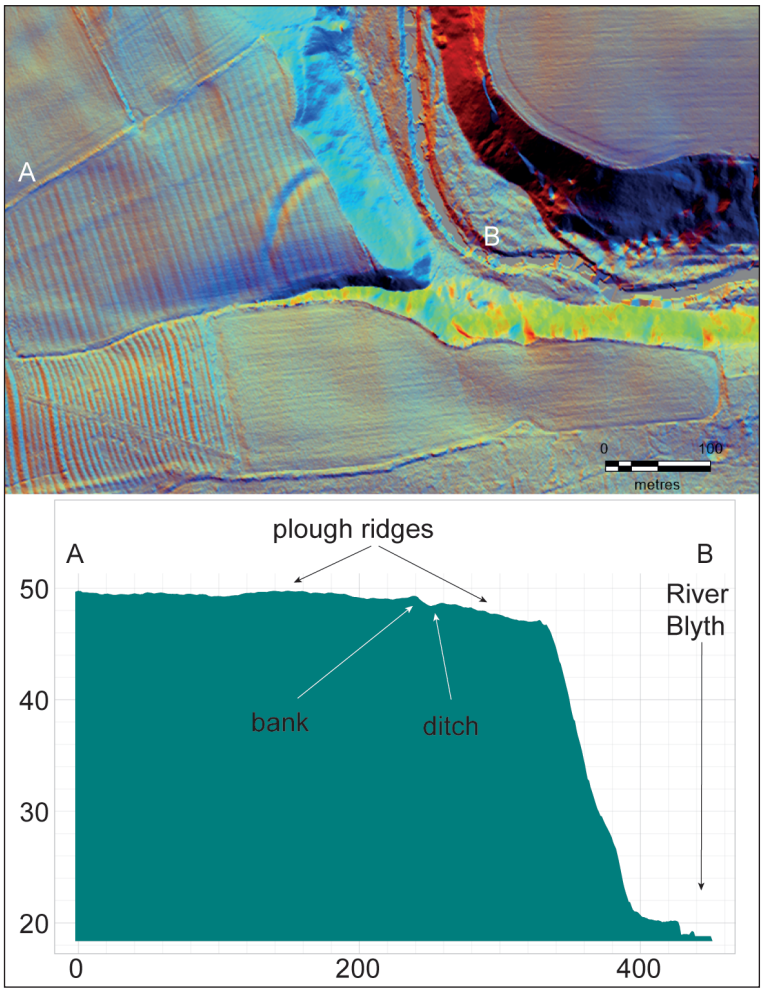


Figure 9: Possible promontory fort or enclosure at West Hartford Farm and profile through the enclosure ditch. [lidar DTM 2018 © Historic England; source Environment Agency]

Width of enclosure ditches

A broad ditch is a key characteristic of many of the excavated late Iron Age enclosures. Where excavated, these circuits are often wider than most other cut features on a site, including any secondary circuits (see below) or linear boundaries. Assessing the width of a buried ditch from the cropmark it produces is problematic. For any wide-profile ditch there is likely to be a more visible response in the crops growing over the deepest part of the cut than those growing towards the shallow edges. In this project area there are few opportunities to directly compare ditch width to the cropmarks that they produce. At Morley Hill Farm MHE2, the ditch was 5.2m wide at a point west of the entrance causeway (Headland 2019, illus 6). A 1948 RAF aerial photograph shows a faint cropmark of this enclosure that is approximately 5m wide at this point. It is unlikely that all cropmarks correlate quite so closely to the underlying ditches but it is possible to infer the relative wideness of a ditch cropmark compared to other cropmarks in the vicinity or indeed the absence of any other cropmarks. Nevertheless, the width of the perimeter ditches in regard of the enclosures that have been levelled and appear as cropmarks remains a subjective observation.

Secondary or outer enclosure ditches

Approximately one-fifth of the enclosures recorded by this project have a second or outer ditch but in these there is variation. In a few examples the outer ditch is close to and near concentric with the inner circuit; there is less than 9 metres between the two ditch circuits in examples near Burradon House (TWHER177), north of Park House, Morpeth, (NHER11550) near North Choppington (NHER28818) and south of Hazelrigg (TWHER174). None of the enclosures excavated so far have this particular arrangement of closely-spaced doubled ditches so it is difficult to determine the purpose of this arrangement.

More often the outer perimeter ditch marks off a substantial area around the inner enclosure and is slightly or significantly eccentric to the inner enclosure. Excavation at Hartburn revealed a gap 15-20m wide, a space reflected in examples near Mitford Steads (NHER11274), East Moor (NHER11714) and at Southfield, Cramlington (NHER28418). In these cases the outer area is approximately one to one and a half times the area of the inner enclosure.

Other examples are more akin to the sites of Burradon, Blagdon Park 2 and Brenkley where a relatively-small, broad-ditched enclosure sits centrally or to one side within a rectilinear enclosure three to five times its size. A less rigid arrangement is suggested by the curving arc of Enclosure Ditch 3 around Enclosure Ditch 1 at East Brunton and possible similar arrangements near East Cramlington (NHER11475), West Hartford Farm (NHER11435) and Backworth (901062). Of note in this respect is the arrangement near Holywell Grange where a rectilinear enclosure sits within a large, substantially-ditched tear-shaped enclosure that appears to encircle a small knoll (TWHER745).

Having excavated the 'twin-ditched enclosure' at Hartburn and the 'double rectangular enclosure' at Burradon, Jobey was of the opinion that the outer enclosures on these sites encircled the earlier round houses and represented a pre-Roman settlement whilst the 'homesteads' comprising large round houses centred in small enclosures were of Roman date (1973, 11, 48-50; 1970, 53). He conceded that the creation of the latter was likely in the knowledge of the former, and that there may have been some overlapping use of the inner and outer enclosures, given their spatial relationship and aligned entrances (1970, 90).

However. the excavations at Brenkley (Headland 2015, 44-45), Blagdon Park 2 and East Brunton (Hodgson et al. 2012, figs 25 and 28) each point to the inner and outer enclosure being contemporary and integral to the function of the settlement as a whole.

Of the 31 enclosures where a part or whole of a secondary ditch could be detected, all but two lie between the Rivers Tyne and Wansbeck.

Enclosure entrances

Causewayed entrances could be detected in approximately 13% of the enclosures recorded by this project, the other enclosures were either too incomplete or there was no observed hiatus in the ditch circuit. Of the 30 entrances observed, 27 were oriented to the north-east, east, south-east or south, which reflects the trend at West Brunton, Burradon, Blagdon, Gardeners Houses and Brenkley. But this orientation is not universal: the entrance in Enclosure 1, East Brunton opened to the south-west.

Land division and trackways

Pit alignments

The open area excavations at Shotton, Blagdon Park and Fox Covert, Horton Grange revealed four individual pit alignments. According to Hodgson's projections, these markers divided the swathe of land between Prestwick Carr and the River Blyth (2012, fig 99). Optically stimulated luminscence (OSL) dating, where applied, indicated that these examples were 'consistently late Bronze Age or early Iron Age in origin' (Hodgson et al. 2012, 107).

None of these examples were visible on the aerial photographs predating the excavations. Unsurprisingly, given the limitations already discussed above, very few pit alignments have been recorded by this project. However fragmentary arrangements were detected on either side of the River Wansbeck near Bothal (NHER28790 and NHER28791). The appearance of these and other cropmarked features, including up to three palisaded enclosures (see above), suggests that the local soil conditions are more favourable for cropmark formation than is usual in this project area. These fragments of pit alignments hint at the large-scale land division suggested by the excavated examples, particularly when taken in association with ditches in the area.

A single cropmarked pit alignment was tentatively identified on Pegswood Moor (NHER28757), just to the south-west of the 2000 excavations (Proctor 2009, fig.1). If this alignment is of similar late Bronze Age to early Iron Age origin as the OSL-dated examples, then it may have predated any of the settlement concentrated approximately 400m to the north.

Field boundaries and trackways.

The excavations on Pegswood Moor revealed a late Iron Age and early Roman period field or paddock system in the late 1st to early 2nd century AD (Proctor 2009, Fig 4). As noted above the settlements associated with these fields are not typical of the examples excavated so far in south east Northumberland.

Further south in England, across the Sherwood Sandstones in North Nottinghamshire and Magnesian Limestone in West and South Yorkshire in particular, aerial photography has produced a significant record of the cohesive and extensive arrangement of the land during the Iron Age and Roman period.

Cropmarked field systems and trackways covering many hundreds of hectares are not uncommon (Riley 1980, Fig 11; Roberts et al. 2010, fig 19)

However in this project area the evidence for fields and trackways is very sparse. Occasionally ditches are seen to run from the settlement enclosures. The Stannington Station enclosures are associated with a series of north to south aligned ditches, some of which, like the enclosures, survived as earthworks on the earliest aerial photographs, despite being overploughed in the medieval and post medieval periods (NHER11700). Some enclosures abut the ditches, other sit between them.

There are multiple reasons for the apparent absence of boundaries and trackways despite the plethora of cropmarked ditched enclosures. Across the whole area the soils are poorly drained, so cropmark formation above all except the most substantial ditches is likely to be impeded. Land under current or recent arable cultivation, which is necessary for cropmarks, is fragmented by modern development, historic and recent extractive industries and persistent medieval and post medieval ridge and furrow earthworks. Even where pre-medieval field boundaries do produce cropmarks it is difficult to detect patterns and continuity across disjointed landscapes and to ascribe origins with any confidence. Furthermore, although the Pegswood Moor field systems were defined by ditches it is possible that other boundary markers that leave little physical trace were also used.

Location and distribution

Drawing together data from this project, the Hadrian's Wall NMP Project and the NE RCZAS presents the opportunity to assess the distribution of enclosures of possible late Iron Age and early Roman date for an area of approximate 880sq km. As shown on Figure 6, this has been supplemented with examples from other investigations such as geophysical survey and excavation and, for the northern part where the swathe of aerial photograph and lidar data narrows, with sites from McCord and Jobey's 1968 catalogue.

It is clear from this distribution map that the known cropmark, soilmark and earthwork enclosures of possible late Iron Age and early Roman date are very numerous but they are not evenly distributed.

South of the River Tyne enclosures are sparsely distributed across what is a heavily industrialised and developed area. This distribution peters out to the west and cropmark or earthwork evidence is absent from the urban zone along the south bank of the River Tyne. As well as being sparse the evidence for these enclosures is often rather fragmentary and ambiguous. In very few cases is the whole perimeter of an enclosure visible. Aside from the Hasting Hill Neolithic and Bronze Age complex (see previous section) there is a real deficit of specialist aerial photography across this area.

North of the River Tyne there is a 5-7km wide urban zone that, as would be expected, is devoid of enclosures. However the northern periphery of the urban zone is also the southern edge of the densest concentrations of enclosures in the project

area. This persists northward for approximately 6-7km, then from Seaton Burn the distribution slightly thins, no doubt the impact of open cast mining and the presence of the large towns like Cramlington and Blyth. There is a slight increase in known sites along the south bank of the River Blyth.

Between the River Blyth and River Wansbeck there are swathes of enclosures between the towns of Morpeth, Bedlington and Stakeford, historical coal mining and more recent surface mining. Although the footprint of most individual 19th-century and early 20th-century mines was not large compared to more recent surface workings, they were numerous and together they create a sizeable lacuna in the record.

North of the Wansbeck there is a notable bias in distribution towards the western edge of the project area. This coincides with the change in bedrock from the coal measures that dominate across the project area to Yoredale Group - Limestone, Sandstone, Siltstone and Mudstone in this north-west corner. However the superficial deposits continue unchanged and these would diminish any improvement in ground drainage offered by limestone bedrock. A more pertinent factor is the extensive surface mining that operated on the coal measures in the late 20th and early 21st century. Most of this ground has been relandscaped but is now archaeologically sterile. However, this does not fully explain the apparent scarcity of enclosures on the land between the former surface mines.

Looking at the evidence of the individual enclosures north of the River Wansbeck, most lack any of the characteristic features of the substantial late Iron Age enclosures: the near-square or trapezoidal shape, the broad ditch, the well-defined entrances, one or more substantial roundhouses or an outer enclosure. Some of this is certainly due to the inadequacies and limitations of the cropmark record but the difference between north and just south of the river is quite marked. It is worth noting that Pegworth Moor, the excavated site that indicated a different arrangement of settlement and land division in the late Iron Age, is itself located north of the River Wansbeck.

The distribution of enclosures between the Rivers Tyne and Wansbeck

Focusing on the area with the most prolific distribution, between Newcastle upon Tyne urban fringe and the River Wansbeck, this project has recorded approximately 172 enclosures across 194sq km of land. This suggests a density of 0.9 enclosures per square kilometre. If the land now compromised by surface mining and development is excluded, along with any enclosures that were recorded on that land from earlier aerial photographs, then there are 156 enclosures on 138sq km or 1.1 enclosures per square kilometre. This supports Hodgson et al.'s estimation of settlements at average 1km intervals, which was calculated for a smaller sample area around on Seaton Burn (2012, fig 99 and 192). Figure 10 shows that many of the enclosures recorded by this project are less than 1km from their known neighbours. Calculations indicate that 60% of enclosures are within 500m of their nearest known neighbour and 40% are within just 250m, and this is without correcting for the sites that lie close to the edge of this project, whose nearest neighbours may lie just outside.

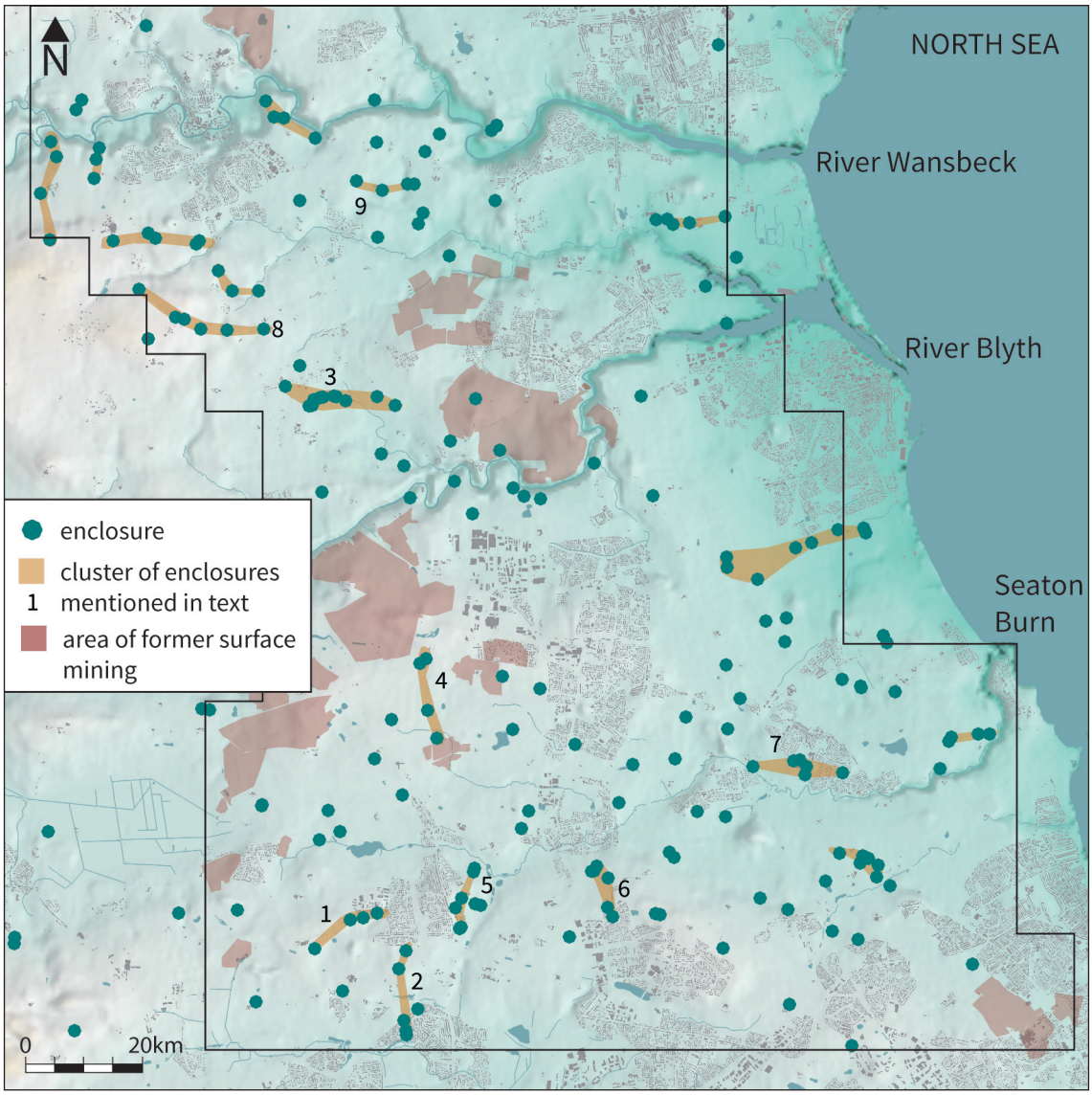


Figure 10: Distribution of known and possible late Iron Age enclosures between the Rivers Tyne and Wansbeck and speculative groupings of settlements. [background lidar DTM 2017 and 2018 © Historic England; source Environment Agency]

The excavated enclosures at Morley Hill Farm exemplify this pattern of close proximity: a line of at least three enclosures with less than 150m between them (623385) (Fig. 10 no. 1). They are located on a very gentle, north-facing slope with Seaton Burn 1km to the north and Ouse Burn 2km to the south. There was evidence for activity in the area from the Mesolithic onwards and the limited dating evidence points to the central enclosure MHE2 being in use from the 4th century BC and that from the 2nd century AD at least two of the enclosures were occupied at any one time until the early 2nd century AD (Headland 2019, 33). The East and West Brunton settlements lie just 1.3km and 1.8km south and south-west of Morley Hill. The Brunton enclosures were occupied simultaneously in the last two centuries BC and into the 1st century AD, and so probably co-existed with all three of the Morley Hill enclosures at some point (Hodgson et al. 2012, 189). The two unexcavated enclosures at Hazelrigg that lie between Morley Hill and East Brunton, may further

reduce the spacing between likely-contemporary enclosures in this area (NHER174 and NHER175) (Fig. 10 no. 2).

The linear arrangement of the Morley Hill enclosures and the shared north-north-east orientation of the individual enclosures is striking and can be detected elsewhere. The Stannington Station group identified by MacLauchlan in 1867 comprises a line of at least six very closely-spaced enclosures with a seventh 500m to the north-west and two further enclosures 850m to the east, on the opposite side of Pegwhistle Burn (Fig. 10 no. 3). The enclosures to the west of the burn are oriented north-north-west, those to the east veer to the north-north-east. Some lines of enclosures, like those at near Plessy South Moor Farm, Wideopen and Burradon run perpendicular to the rivers and burns (Fig. 10 nos 4-6). Others like the Seaton Delaval, Tranwell to High Clifton and Healey Wood groups run along the low watersheds or river valleys (Fig. 10 nos 7-9). The compelling evidence that these enclosures represent settlement in the short period from the late Iron Age to the 2nd century AD, increases the likelihood of at least some contemporaneous occupation within a group. More intractable however is the nature of the relationship between individual settlements. As discussed above the non-settlement features that might demonstrate physical relationships between settlements: the contiguity of field systems, the routing of trackways or hollow ways or perhaps the axial ditches mentioned in the NERF are lacking in the data from the aerial sources and from excavations (Heslop et al. n.d.).

Hodgson et al. refers to the concentration of settlement into enclosures as 'agglomeration' (2012, 189). It is quite different from the levels of late Iron Age nucleation observed further south in Yorkshire such as at Kirk Deighton (1568822), Wattle Syke (54896) or Dalton Parlours (1398980).

Survival, condition and protection

Many of the enclosures recorded by this project now survive only as subsurface deposits revealed as cropmarks or soilmarks and a number have been destroyed by development or surface mining since the 1950s. Many enclosures that survived as earthworks on the earliest of the aerial photographs were later levelled or destroyed. In the 1940s the Stannington Station enclosures survived as earthwork ditches with traces of internal and external banks albeit slighted by medieval or post medieval ridge and furrow. The absence of any of the plough ridges or furrows on the recent lidar imagery along with the shallowness of the surviving earthworks demonstrates the consequence of 70 years of modern ploughing.

Medieval or post medieval ploughing around or across the Iron Age enclosures is commonplace and may indicate there was high demand for cultivable land in those periods. Ploughing continued right up to the outer of edges of the ditch and across the interior of the large enclosure at Houghton, Heddon on the Wall (22862). At Mitford ploughing appears to have continued without deviation across the enclosure's broad inner ditch and secondary outer ditch, whilst ditches of a slightly smaller enclosure to the south may have been a little too deep to tackle (see Fig. 11a).

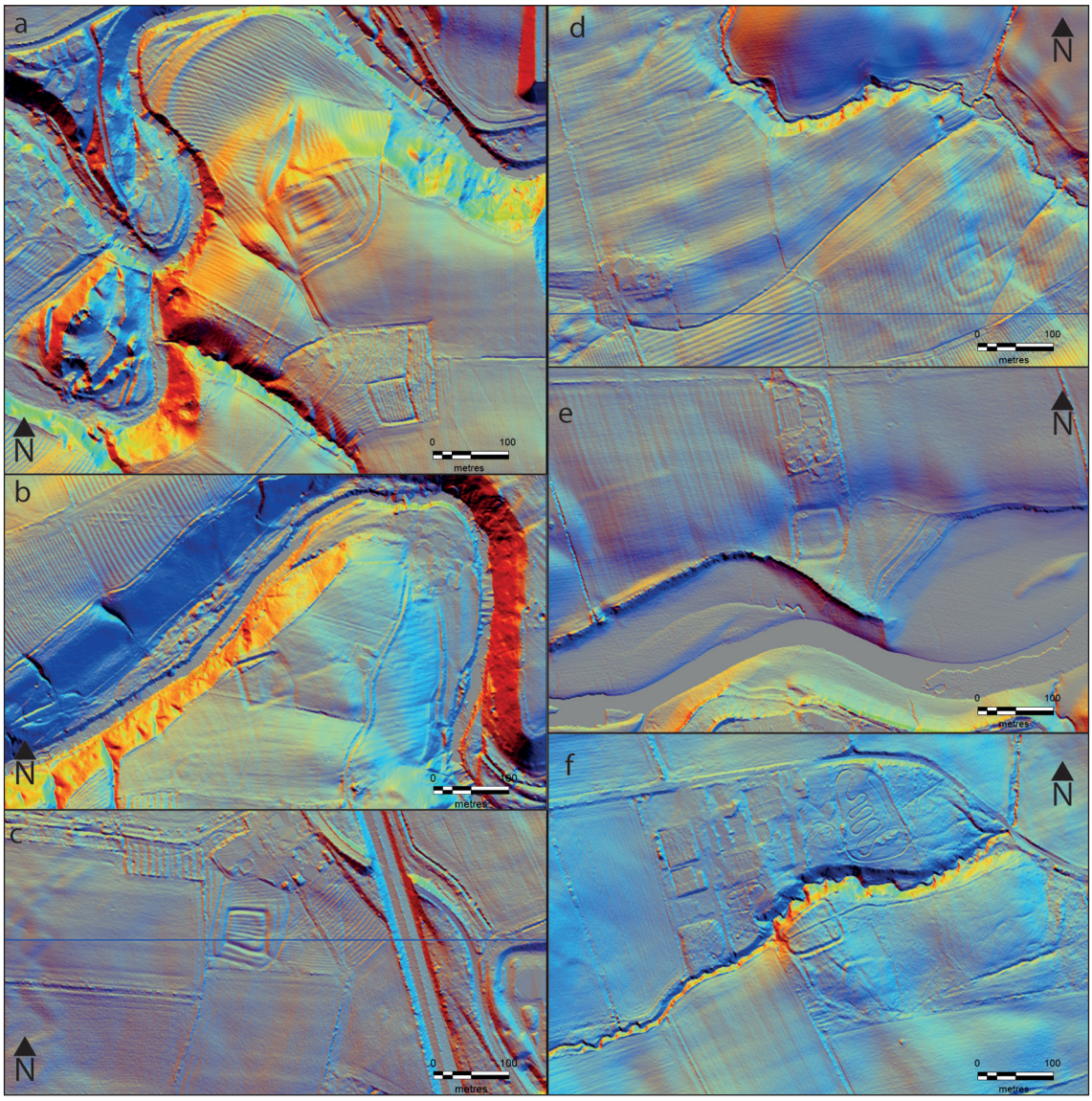


Figure 11: Well-preserved late Iron Age enclosures: a) two enclosures near Mitford (NHER11119 & NHER11115), b) north-east of Plessey Hall farm (NHER27767), c) Seven Mile House Farm (TWHER1323), d) East Moor (NHER11714 & NHER27771) e) near the mouth of the River Blyth (NHER27766) and f) Mitcheson's Gill (1627942). [lidar DTM 2017 and 2018 © Historic England; source Environment Agency]

A small number of late Iron Age enclosures have Scheduled Monument protection.

- 1003496 Gardner's Houses settlement, cropmarked enclosures.
- 1005912 Enclosure 600yds (540m) NE of Burradon House. The Scheduled Area covers the double-ditched cropmarked enclosure but not an abutting enclosure. The lidar suggest these remains have been comprehensively truncated.
- 1006493 Roman camp near Mitford Steads. Likely to be a late Iron Age settlement with possible earlier unenclosed phase rather than a 'Roman Camp'. Lidar imagery suggests it is truncated by ploughing but there are hints of a very low and spread bank between the two enclosure ditches.

- 1020703 Two rectilinear enclosed settlements, south of Castle Street. The Scheduling description includes reference to a geophysical survey in 2000. The lidar imagery indicates that there are no significant earthwork remains on either enclosure.

The Scheduling of these sites was implemented in the first flush of discovery in the later 1960s and 1970s. There are now five-fold more known examples between the Rivers Tyne and Wansbeck alone, and many survive better than these Scheduled examples. It may be a time to reassess which monuments should be protected as exemplars of their type for the future. The following sites may be suitable for consideration:

- N1629503 Blackdean Wood. Large enclosure of possible late Iron Age date. Now in woodland, encroached by open cast mining to south. Similar to the site at Hougton, which is scheduled NHLE1014076 (Fig. 8)

- NHER11119 & NHER11115, near Mitford. Two well-preserved enclosures of likely late Iron Age date but with possible earlier origins. One with a secondary outer ditch. Both overlain by medieval and post medieval ridge and furrow. A commanding position overlooking the River Wansbeck and of considerable landscape value when taken together with the Scheduled Monument Mitford Castle (NHLE1017318) (Fig. 10a)

- NHER27767 A well-preserved near-square enclosure with trackway, in a commanding position of the south bank of the River Blyth. (Fig. 11b)

- TWHER801 Enclosure with a broad and well preserved ditch and possible secondary ditch at Seven Mile House Farm. Overlain by medieval and/or post medieval ridge and furrow but is surprisingly good condition considering it proximity to the A1 (Fig. 11c)

- NHER11714 & NHER27771 A pair of typical late Iron Age enclosures, traversed by medieval and post medieval ridge and furrow. These survive as low earthworks, NHER11714 with traces of internal and external banks, which could be significant for the understand of this monument type and for sealing and preserving earlier occupation. (Fig. 11d)

- NHER27766 A well-preserved near-square enclosure on the banks of the R. Blyth. (Fig. 11e)

- 1627942 A small well-preserved enclosure in woodland on the banks of Mitcheson's Gill close to its confluence with the River Team. A rare survivor in this industrialised zone south of the River Tyne (Fig. 11f).

Conclusion

The evidence for pre-medieval settlement derived from the aerial photographs and lidar is largely limited to the small, broad ditched enclosures built in the late Iron

Age. Some other features are present in small numbers: round houses, pit alignments and palisade enclosures. Excavations have shown that the late Iron Age enclosures are very often built on sites with a long history of settlement.

The late Iron Age enclosures are very numerous but are noticeably concentrated between the River Tyne and Wansbeck. The difference in distribution and character on either side of the River Wansbeck hints at a quite different organisation of settlement and land north of the river, perhaps akin to site excavated at Pegswood Moor.

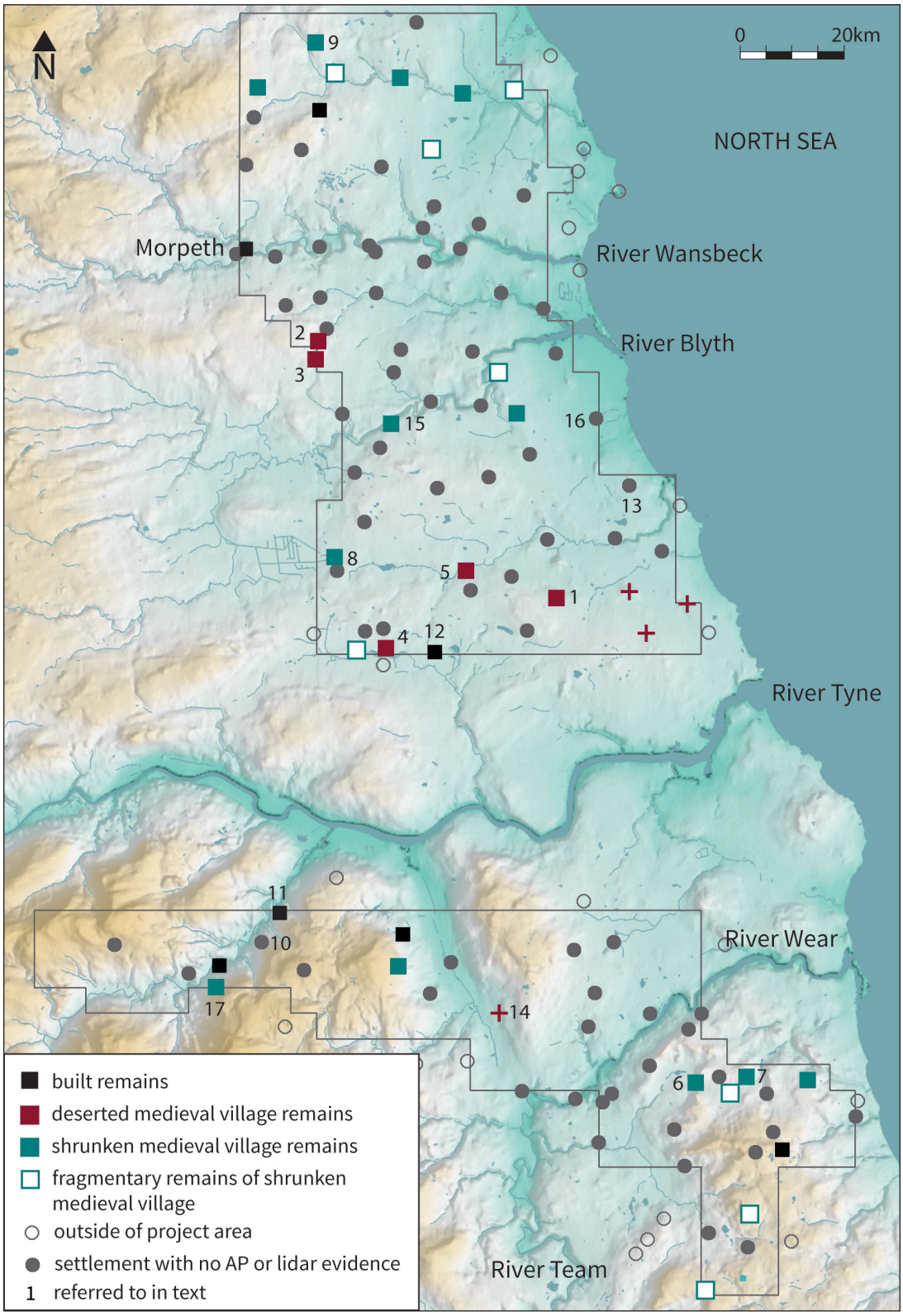


Figure 12: Distribution of medieval and early post medieval settlements collated from: Wrathmell 1975, Bolden Book 1982, Speed's maps of 1610 and aerial imagery. [background generated from height data © Bluesky International/Getmapping PLC]

Introduction

This survey has generated new information for some of the known medieval settlements in this area, and new evidence for some of those that were less-well recorded. The chapter will begin with an overview of the resources consulted for this chapter, then briefly review the evidence arising from this project and consider some of the limiting factors that are specific to pre-industrial settlement remains in this part of the country.

The evidence for the medieval villages and other settlements arising from this project has been informed by the Bolden Book (1982 edition), Wrathmell's thesis on medieval villages in south-east Northumberland (1975), Beresford and Hurst's *Deserted Medieval Villages* (1989), Roberts and Austin's *Check List of Rural Clusters* (1975), the Historic Environment Records and the Northumberland and Durham county histories. Together these sources have indicated the existence of over 100 known or potential medieval or early post medieval settlements within the area of this project. Using these sources with the historical maps: Speed's maps of Northumberland (1610) and Durham (1611), the late 18th-century Armstrong maps and late 19th-century Ordnance Survey maps, the likely locations of these settlements have been plotted. As Figure 12 shows, these settlements are well-spaced and show a slight preference towards the river valleys.

There are tangible remains in the form of earthworks, soilmarks or cropmarks associated with approximately one-quarter of these settlements, although some have been lost in recent decades. Some of these remains are no more than fragments in now empty plots amongst living settlement, possibly indicating shrinkage or drift of the original zone of occupation. There are also, however, examples of now-deserted settlements.

Deserted medieval or early post medieval settlements

West Backworth (Fig. 12 no. 1)

One of the better-preserved village sites is West Backworth. Late 13th-century sources refer to two settlements: East and West Backworth but only 'Blakworth' is depicted on Speed's map of 1610 (Wrathmell 1975, 295). East Backworth is presumed to have stood in the area now occupied by Backworth Park and the living settlement, which had expanded in the 19th century to accommodate workers in the Backworth collieries. Wrathmell deduced that West Backworth was deserted by the 16th century (1975, 295). Its earthworks stand in a field to the west of the small park, a full description is available in the monument record (25285). Ridge and furrow running north to south across all the village earthworks attests to its abandonment. These earthworks have Scheduled Monument protection (NHLE1016974) and are relatively well-documented. Far less is known about some of the other examples.

Coldwell and Dovecote Farm (Fig. 12 nos 2 and 3)

There are two areas of intriguing earthworks near Clifton, 3km south of Morpeth and close to the Great North Road.

Earthworks on Coldwell Hill indicate at least three crofts arranged along a narrow hollow way. As was observed at West Backworth, these enclosures and the hollow way are cut by medieval or post medieval ridge and furrow. These remains coincide with the purported location of the village of Coldwell, as described by Hodgson in 1832 (284-285). Like Hodgson's Coldwell, this site lies on the 'way-side between Clifton and ... North White House and on the west side of the great road, nearly opposite the twelfth milestone.' The Ordnance Survey map of 1883 shows this milepost stood *circa* 750m to the south-east of these earthworks. These putative settlement remains are slight and obscured by the overlying ridge and furrow, which may explain why they have eluded detection.

Coldwell, if these earthworks are its remains, stands on the north bank of a dry valley. Less than the 700m to the south there are extensive earthworks on the south bank of the same valley. They stand in the field to the immediate north of Dovecote Farm. Hodgson lists 'Dovecoat House' in a footnote associated with his Coldwell description so presumably would have used it to place these more impressive earthworks, if these were his Coldwell. That he and seemingly many others have overlooked the Dovecote Farm earthworks is puzzling. There is no indication of a settlement at this location on Armstrong et al.'s map of 1769 but the Ordnance Survey map of 1866 shows a well and, intriguingly, the claim 'ROMAN REMAINS Found in this enclosure'. These were 'dressed stones and Roman cinerary urns' but little else is known (23321).

Interpretation of this site would clearly benefit from detailed topographic and geophysical survey but the two main sources: 1995 aerial photographs and the lidar data indicate complex earthworks with several distinct phases of activity (Fig. 13). Towards the south-west corner of the field at there is a group of small crofts, several with evidence of rectilinear building platforms (Fig. 13 no. 1). This is linked by a trackway or hollow way to a smaller group of possible buildings *circa* 170m to the east (Fig. 13 no. 2). To the north of this is an irregular area of flat ground (Fig. 13 no. 3). This is cut by drainage ditches and may be the result of deliberate in-filling. The features described so far are flanked by broad S-shaped plough furlongs but there are also traces of cultivation on some of the crofts. Along the western edge of the field there is a chain of ponds held by dams to the west (Fig. 13 no. 4). The ponds are interconnecting and appear to have been cut into a broad plough furrow, which may indicate that they are more recent than some of the settlement remains. The ponds may have been fed by the burn that now flows southward from North Whitehouse towards Catraw Burn. East of the ponds there are multiple overlying and intercutting earthworks (Fig. 13 no. 5). It is difficult to isolate individual features but amongst these is a low curvilinear flat-topped mound which appears to overlie plough ridges and an irregular circuit of ditch that cuts plough ridges. These are likely to be later features, as are the straight ditches that cut across the field.

Hodgson does note from the historical records the presence of a grange at Coldwell named 'Scarplaue' held by the monks of Newminster, which lies approximately 4.5km to the north of this site. These earthworks may be are associated with this property (1832, 285).

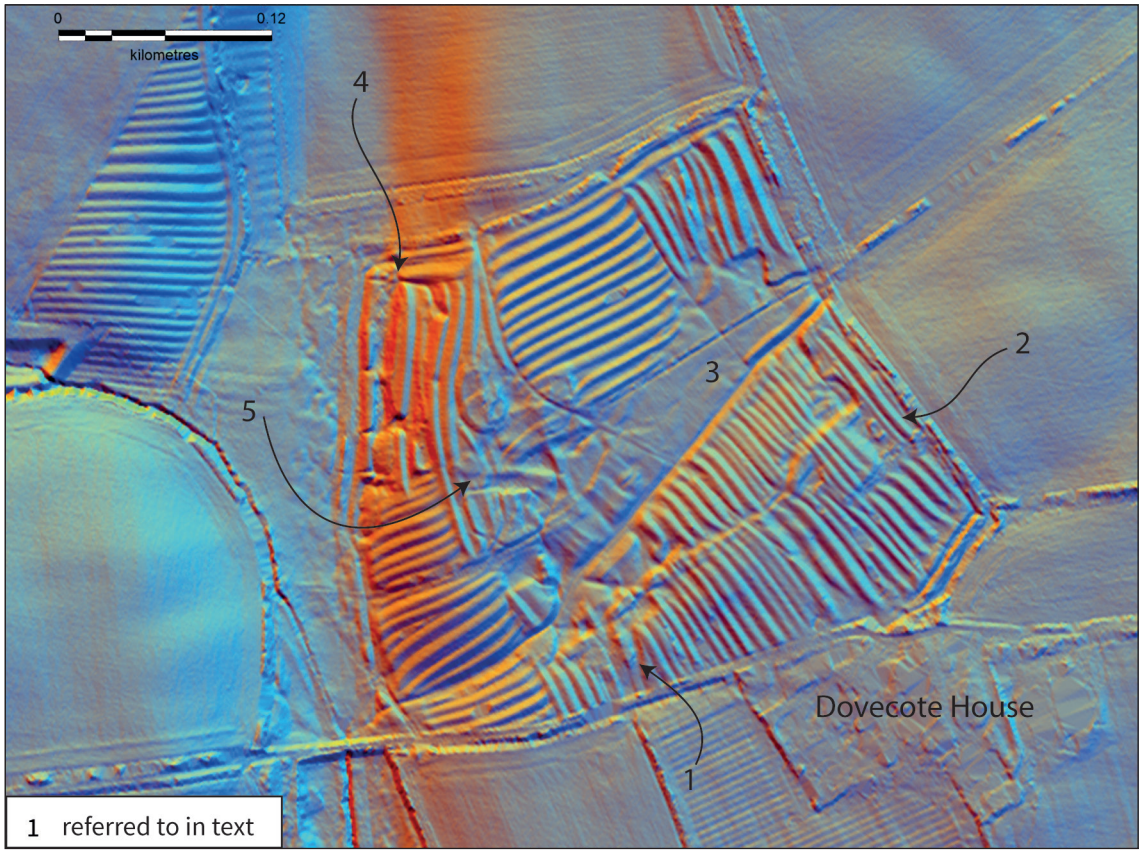


Figure 13: Lidar visualisation of earthworks north of Dovecote Farm. [background lidar DTM 2018 © Historic England; source Environment Agency]

East Brunton (Figs 12 no. 4)

Aerial photographs taken in 1980 show a fleeting glance of complex soilmarks south of the small hamlet of Middle Brunton, on the north bank of Ouse Burn (Fig. 14). In the late 1940s the area appears to be unploughed and under pasture, but the lighting was too poor to reveal any earthworks. The soilmarks on the 1980 aerial photographs have the appearance of recently levelled earthworks.

In the late 19th century this was a rural area dotted with farmsteads with the Brunton name. Documents from 13th and 14th century indicate the presence of two settlement: East and West Brunton (Wrathmell 1975, 322-323). Speed's map of 1610 refers to the 'Bruntons' and in 1769 Armstrong et al. recorded North and South Brunton. Fragmentary earthworks on the north banks of Ouse Burn next to Brunton Lane may be the associated with latter (1627319).

Far more extensive though are the remains that lie between Middle Brunton and the Ouse Burn. A hollow way runs north-west to south-east, running near parallel to Ouse Burn and flanked on either side by small crofts (Fig. 14). Being soilmarks the appearance of the features is coarse but it does suggest that building platforms and ponds are also present. This site has been identified as East Brunton and in 2000 large quantities of 12th- to 14th-century pottery was recovered by field walking the area (TWHER1331). A small part of the site was subject to geophysical survey and trial trenching. The current condition of this site is uncertain. The A1 has now been re-routed across the core area of soilmarks and there has been significant earth movement and construction on either side of the road. The HER record states that the 'the remaining cropmarks were covered by spoil 1 metres - 6 metres deep'

Figure 14: Soilmarks that may pertain to the medieval and early post medieval settlement of East Brunton. [part of OS/80076 V 281 11-MAY-1980 © Crown Copyright. Ordnance Survey]

(TWHER1331). The site is clearly in a more deleterious state than it was prior to 1980 (TWHER1331).

North or South Weetslades (Fig. 12 no. 5)

Speed's 1610 map of shows 'Weteslades' on the north side of the Seaton Burn. In 1769 Armstrong et al. shows 'N.Wetslitt' on the north side of the burn and 'Wetslitt' some distance to the south. Greenwood's map of 1828 records these as 'Lower Weetslade' and 'High Weetslade' respectively. By the latter part of the 19th century the small surviving hamlet of 'Low Weetslade' had been partly subsumed by Dudley Colliery. Wrathmell notes that the vill of 'North', or 'Low Weetslade' is documented in 1242 and again in 1312 and also the presence of two messuages and six cottages as late as 1748 (1975, 526-528).

It has been suggested, however that soilmarks in the field named Town Steads, on the south bank of Seaton Burn may be the location of 'North' or 'Low Weetslades' (TWHER792). Cropmarks and soilmarks observed in this field, although rather faint and diffuse do suggest the settlement remains including possible enclosures and house platforms. (1627094). A substantial linear feature runs through this putative settlement. It is visible as short earthworks on the unploughed bank of the river and then as soilmarks and cropmarks over a distance of 600m. Its alignment is marked as a field boundary on the Ordnance Survey map of 1864 but the soilmarks and cropmarks suggest the field boundary may have followed an earlier, more substantial feature such as a trackway.

However if this is the site of 'North Weetslade', which records suggest was still inhabited in the mid-18th century, then it seems unlikely that both Armstrong et al. and later Greenwood would persist in placing this settlement north of the burn on their maps. On the other hand, 'South' or 'High Weetslade' are consistently shown on the historical maps as lying some distance south of the burn. A farmstead located approximately 800m to the south of Town Steads now carries the name.

Although there is ambiguity as to the origin of these soilmarks they warrant further investigation. As the field walking at East Brunton demonstrated, even non-intrusive investigations can go some way to reconcile the nature of such features. If these are indeed the remains of medieval or early post medieval settlement there is potential for the survival of archaeologically significant features and deposits at this site, despite the history of ploughing and truncation. This area has been included in the Strategic Green Infrastructure Network the Development and Allocations Plan 2015-2030. 6.13.9 so whilst set aside from major construction proposals this land may still be impinged by green infrastructure development.

It is the ultimate desertion of these settlements, whether they be of medieval or post medieval origin, that enabled the survival of the survival of their remains into the 20th century. In some cases this is despite being ploughed over in the medieval or post medieval period.

It is significantly more challenging to identify remains where occupation continued and persisted through the post medieval period.

Other medieval or early post medieval settlement remains

Herringtons (Fig. 22, no. 6)

There is a narrow window onto a medieval landscape between the villages of West Herrington and East Herrington in Sunderland. This window is constrained by settlement to the east and west and ploughed land to the north and south and it is bisected by the A19 but for a short stretch the old course of Herrington Burn is flanked by relatively well-preserved earthworks (1628146, 1628149,1628150 &1628153).

The Boldon Book (Austin 1982, 53) records the 'Two Parts of Herrington', Speed in

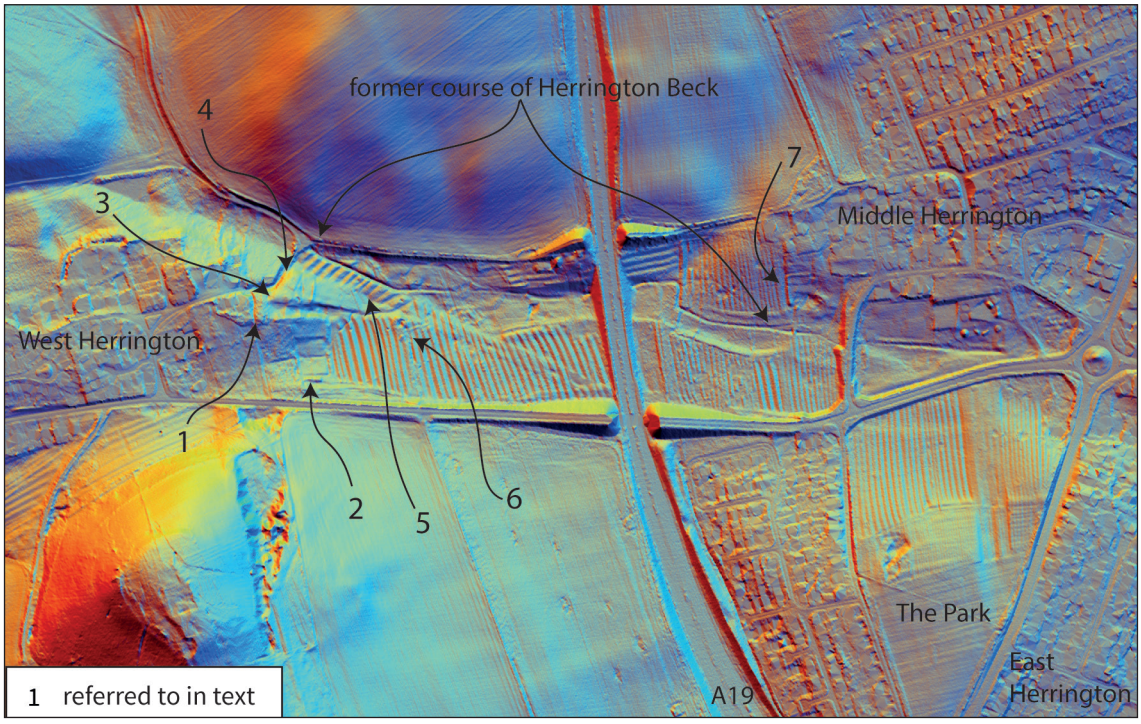


Figure 15: Lidar visualisation of earthworks between the Herringtons. [background lidar DTM 2018 © Historic England; source Environment Agency]

1611, the 'Haritons' and Armstrong et al.'s map of 1768 show a West Harrington and East Harrington in the same locations as villages of these names are seen today, the latter lying east of a small park with hall. Greenwood, in 1820, has Middle Harrington on the north side of the park, where it lies today.

Today, the eastern edge of West Herrington is marked by a small plot of land that contained the remains of at least four adjoining buildings, probably of post medieval date (Fig. 15 no. 1). These are depicted on the Ordnance Survey maps of 1862 but

had been reduced to low ruins by the late 1940s. South-west of these buildings are three small plots of land defined by scarps, ditches and banks: these may be the remains of medieval crofts (Fig. 15 no. 2). The earthworks to the north of these are more puzzling. There is a wide channel, broadest where it leaves the village and tapering to a ditch as it runs eastward towards the old course of Herrington Burn (Fig. 15 no. 3). The broader section is traversed by a series of degraded banks or baulks, these appear to have divided the channel into a series of small squarish ponds. North of these putative ponds the ground is slightly raised and smoothed and has the appearance of modern overburden (Fig. 15 no. 4). However it is cut by a series of small ditched enclosures or paddocks that are depicted on the Ordnance Survey 25inch map of 1880 so this may be upcast material from the pond construction. Between here and the old course of Herrington Burn the ground was disturbed by a service trench and easement in the late 1960s. These groundworks did slight the earthwork ridge and furrow further to the south-east but previously there were no earthworks visible in this area. Inexplicably, when this ground was restored a series of earthwork plough ridges were built where none had previously existed (Fig. 15 no. 5). Genuine well-preserved plough ridges flank the possible crofts and extend eastward and into the park at East Herrington. The plough was turned well short of the old course of Herrington Burn so that it is flanked by a narrow band of flat ground. An older intrusion on this ridge and furrow is the site of the Boiling Well (Fig. 15 no. 6). The octagonal platform surrounding the well was exposed during excavations in the mid-20th century and is thought to date to the late 17th or early 18th century (see Herrington Heritage). There are further earthworks, possible enclosures north-west of the park, these may be part of Middle Herrington, or remnants of East Herrington, divorced from the core of the village by emparkment (Fig. 15 no. 7). A small undated structure was identified by geophysical survey approximately 50m to the north of these earthwork (ASDU 2010).

Farringdon (Fig. 22 no. 7)

Farringdon Hall, now demolished, stood a short distance to the north-east of East Herrington. It was the site a monastic grange belonging to Hexham Priory. The historical air photos show earthworks in the field to the east of the hall and grassed-over building remains to the south-west (1628183). The latter appear to be structures that were depicted on the late 19th-century Ordnance Survey maps, but the earthworks are cut by ridge and furrow and may be of medieval origin. These earthworks include possible building platforms and a lane that continued eastward as extant feature. All these features have now been built over.

Mason and Dinnington (Fig. 12 no. 8)

The small hamlet of Mason and its larger neighbour of Dinnington are now as one and located just to the north-east of Newcastle Airport. Previously known as ' Medisfen' or 'Merdesfen', (meaning Merdo's Fen), there is a mention of Mason in 12th-century documents (Harbottle 1995, 3). The fen is Prestwick Carr, which was drained in the late 19th century. Speed's map of 1610 shows only 'Dunnyington'

and Armstrong et al. show a tributary of Hartley Burn draining the carr from it western tip with Mason to the north and Dinnington to the south of the burn (1769). This map places Mason in the area of Venture Cottage. Greenwood 1828 names Mersfen Cottage at that location and Mason and Dinnington to the south. The Ordnance Survey map of 1864 shows the burn rising further to the east, probably a consequence of draining the carr in the mid-19th century but, this map clearly shows Mason immediately adjacent to Dinnington. Wrathmell suggests Mason did not survive after the mid-14th century (1975, 430).

Historical air photos show an earthwork lane, possibly a pre-cursor to Horton Grange Road and from that another lane that would have led westward towards the edge of the carr (1627310). Adjacent to this is an enclosure or platform of possible medieval date and broad plough ridges extended right down to the former edge of the carr. Whether these are the remains of settlement associated with Dinnington or Mason is not known

Although the Armstrong et al.'s map suggests that Horton Grange Road marked the western edge of Prestwick Carr, Greenwood's 1828 map, Harbottle's analysis and geological data all indicate that the carr extended east of the road (1995). This is reflected in the dark peaty soils that continue at least as far west as the tree copse, and there is potential for this area to contain well-preserved remains associated with the medieval settlements.

There were similarly fragmentary remains at Horton Sheriff, now largely destroyed and at some of the smaller more rural villages in the northern part of the survey area including Tritlington, Fenrother, Ulgham and Linton. It should also be acknowledged that there was very little evidence visible on the aerial photographs of the medieval village at Shotton, which was excavated in advance of open cast mining in the early 2000s (Muncaster 2014, 10).

As Wrathmell outlines the causes for desertion and shrinkage of settlements in south-east Northumberland: the reorganisation of monastic land, persistent attacks from the Scots in the 14th century, and a population in decline from the Black Death (1975). However, how the land where settlements once stood was then used is a key factor in their survival and visibility in the 21st century.

Survival and visibility of medieval and early post medieval settlement

The examples discussed above represent the best of the air photo and lidar evidence, there is little or no visible above ground trace of many of the other known settlements. Some of the factors influencing survival and visibility are worth considering a little further here.

Pre 20th-century cultivation

As shown at West Backworth and Coldwell, some settlements were not simply abandoned to pasture or natural regeneration. Both examples had, at some point, been ploughed and converted to cultivation. From a 20th-century English

perspective, the notion of ploughing up land to grow crops where houses once stood is unfamiliar. Contemporary experience is very much vice versa. Undoubtedly the exceptional durability of modern building materials compared to their medieval counterparts is a factor but it is not entirely unprecedented in more recent times.

Whilst is seems reasonable to assume that the structural elements of a village in decline were removed either purposefully or by decay it is difficult to deduce the condition of the remaining earthworks and what, if any, hindrance these may have had on subsequent ploughing.

The case of Earsdon, Northumberland is another useful example (Fig. 12 no. 9). Williams Senior's plan of 1632 depicts Earsdon as a sizeable settlement either side of a narrow green that opens out as it descends to Eardon Brook (reproduced in Plackett 2000, fig. 1). The green is flanked to the south by 11 long and narrow yards and two short yards. To the north of there are six or so 'crofts' or 'garths', slightly wider and longer than the yards. Senior depicts at least one building in every garth, croft and yard and often two, all adjacent to the green with the land to their rear: accommodation for approximately 18 households. In the early 18th century (possibly 1737) Lord Oxford's survey records that there were 'many tenants here ... fifteen at least' but in 1832 Hodgson stated that 'Earsdon consists of two farm premises, and a few poor cottages' (136-137). This is the situation reflected on the Ordnance Survey map of 1866, with the green reduced to a narrow lane. Some of the buildings shown on that map are now still standing, others have now gone and there are some new, mostly agricultural buildings.

The field to the north and east of Earsdon Farm contains very straight plough ridges running east to west. These would have traversed part of the green, the adjacent houses and three of the western most crofts/garths. This ploughing probably ran against the grain of any earlier plough ridges in those north to south oriented crofts. Opposite Earsdon Farm the modern field coincides with the three western-most long yards. Straight plough ridges run north to south and continues right up to the edge of the road where they cut across very slight undulations where Senior's map indicates houses once stood. Similar disturbance can be see east of the farm on the north side of the road.

As well as being a useful reminder that ridge-forming ploughing continued well through the post medieval period, Earsdon demonstrates that in less than three centuries a once sizeable village can be rendered almost undetectable on the surface.

The impact of emparkment of visibility

The creation of parkland, both in the medieval period for hunting and later to convey status and wealth, and its impact on existing settlement is much discussed (Way 1997; Wrathmell 1975, 213-214). Emparkment also provided a specific environment where heritage assets may survive better than they might otherwise have done, as is the case at Belsay in Northumberland, Towthorpe in Belton Park, Lincolnshire and Holkham in Norfolk (Oakey 2017; Deegan 2011, 6; Deegan 2021, 7-8). However,

endeavours within the park such as large-scale landscaping and construction of large buildings can also be to the detriment of earlier remains.

Speed's map of 1611 depicts Gibside and its neighbour Hollinside next to the River Derwent (Fig. 12 nos 10 and 11). The nature of any settlement at Gibside, prior to development of the house and then parkland from the late 17th century seems to be poorly understood. By contrast the late 13th-century fortified hall house at Hollinside still stands, albeit in ruins and there are nearby earthworks that may be of similar origin (1627733).

Wrathmell suggests that prior to the creations of the parks at Gosforth the settlement of North Gosforth had already been reduced to a few houses (Fig. 12 no. 12). There are no settlement remains visible in the area, though a small medieval chapel does survive and is Scheduled (NHLE1016488). There is, however, surprising well-preserved ridge and furrow within High Gosforth Park, despite the intrusions of the long-established racecourse and golf course (1627084). A reminder of the toll later post medieval and 20th-century ploughing has on earthwork survival elsewhere.

Similarly at Seaton Delaval (Fig. 12 no. 13), historical records show the decline of what had been, in the 13th century, one of the largest vills in the south of the county (Wrathmell 1975, 478). Wrathmell suggests changes to the economy of the estate had already reduced the population by the time Seaton Delaval Hall and its parkland were created in the early 18th century. He suggests the core of the settlement stood south-west of the hall, between the Norman chapel and the Village farm. Others have suggested that air photos taken in 1994 show the site of the deserted village further to south, near the obelisk (NHER28510). However aerial photographs taken in 1964 show spoil being deposited across this area and there is no indication of earthworks on earlier images.

Blagdon, and the smaller parks at East Backworth, East Herrington, Woolsington have each produced evidence of post medieval ridge and furrow and some have hints of earlier field systems in the form of fragments of plough headland. None however have produced any identifiable evidence of medieval or early post medieval settlement on the aerial photographs or lidar imagery. This is not to say that such remains do not survive undetected below ground level.

The industrial and population growth to the mid-20th century

The population of Northumberland grew nearly five-fold between 1810 and 1931 (see Vision of Britain). In the south-east of the county the continuing growth of the coal industry was a significant factor in this increase. Ashington, an important centre for the coal industry, is described as having 76 inhabitants in 1848 which had increased to nearly 14,000 by the turn of the century and then more than doubled again by 1921 (see British History Online and Vision of Britain).

However the impact of population growth and the coal industry itself on the survival and visibility of medieval and early post medieval settlement remains on the air photos taken in the late 1940s is inconsistent.

The location of the mines and collieries was determined by accessibility of the coal seams with the prevailing technological ability and access to the land from which those seams could be reached. This in turn determined how and where workers were accommodated and often this did not coincide with the historical settlements. Ashington for example, is shown as a farm on Greenwood's map of 1828, approximately 500m north of the River Wansbeck, Ashington Colliery and associated housing was established more than a kilometre further. Similarly, south of the River Tyne, 19th-century New Silksworth developed at some remove from the older village of Silksworth. In these circumstances the coal industry and population growth had little direct impact of the survival and visibility of medieval and early medieval settlement remains.

However, where industry developed close to existing villages then that activity, its infrastructure and housing impacted heavily on the survival of any above and below ground remains. The village of Birtley (Fig. 12 no. 14), near Washington, is listed in the Bolden Book and described as having and irregular two-row plan with green (Roberts and Austin 1975, 23). On the Ordnance Survey map of 1862 it was already showing considerable change. With the Birtley Iron Works and brick works at its south-west corner, some of the abandoned plots had been truncated by the mineral railway running across the village and others had been infilled with some short rows of terraced houses, typical of worker's accommodation. Aerial photographs taken by the RAF in the late 1940s show short rows of terrace house, yards and allotments on the green, new housing along the original road frontages, large open claypits to the west, extensive allotments to the east and new housing to the north. In short, if any medieval earthworks did still survive above ground they would have been so fragmented and piecemeal as to elude detection from the air.

White Hall Farm (Fig. 12 no. 15), near Cramlington is thought to be the site of a hamlet mentioned in 1278, 1336 and 1420 (Wrathmell 1975, 533). Opencast mining was already operating on three sides of the farm by 1949 so the potential for recovering evidence for this settlement, either from aerial sources or on the ground is extremely low.

Wrathmell suggests that at Newsham (Fig. 12 no. 16), near Blyth, crofts overlain by ridge and furrow were visible near the Newsham Colliery spoil heap (1975, 458). Parcels of ridge and furrow are indeed visible in this area on historical aerial photographs, raising the possibility that further remains may have been sealed beneath the spoil. Unfortunately, the recent lidar imagery indicates that much of the spoil has now been removed and the ground has been levelled for sports pitches.

On the south side of the River Derwent and two kilometres west of Burnopfield, the Ordnance Survey map of 1862 depicts a moat as a hachured earthwork at Middle Friarside (Fig. 12 no. 16). This site may be Speed's 'Briarside' and Armstrong et al.'s 'Fryerside' (1610, 1768). 1940s aerial photographs show the site of the moat partially covered by spoil from the nearby drift mine. This could, inadvertently, have allowed for the continued survival of the moat earthworks, depending on their condition at the time of burial but further investigation on the ground is required.

Recommendations

Remains at some of the sites discussed above: Middle Friarside, Town Steads at Weeslade, Coldwell and near Dovecote Farm, and others at Ulgham, Tritlington and Lynton could yield fruitful results from more detailed investigation, either topographic survey where there is good earthwork survival or geophysical survey at site such as Town Steads where there is not. The remains at Dovecote Farm are particularly are well preserved and may be highly significant. A proposal that this site be Scheduled will be prepared.

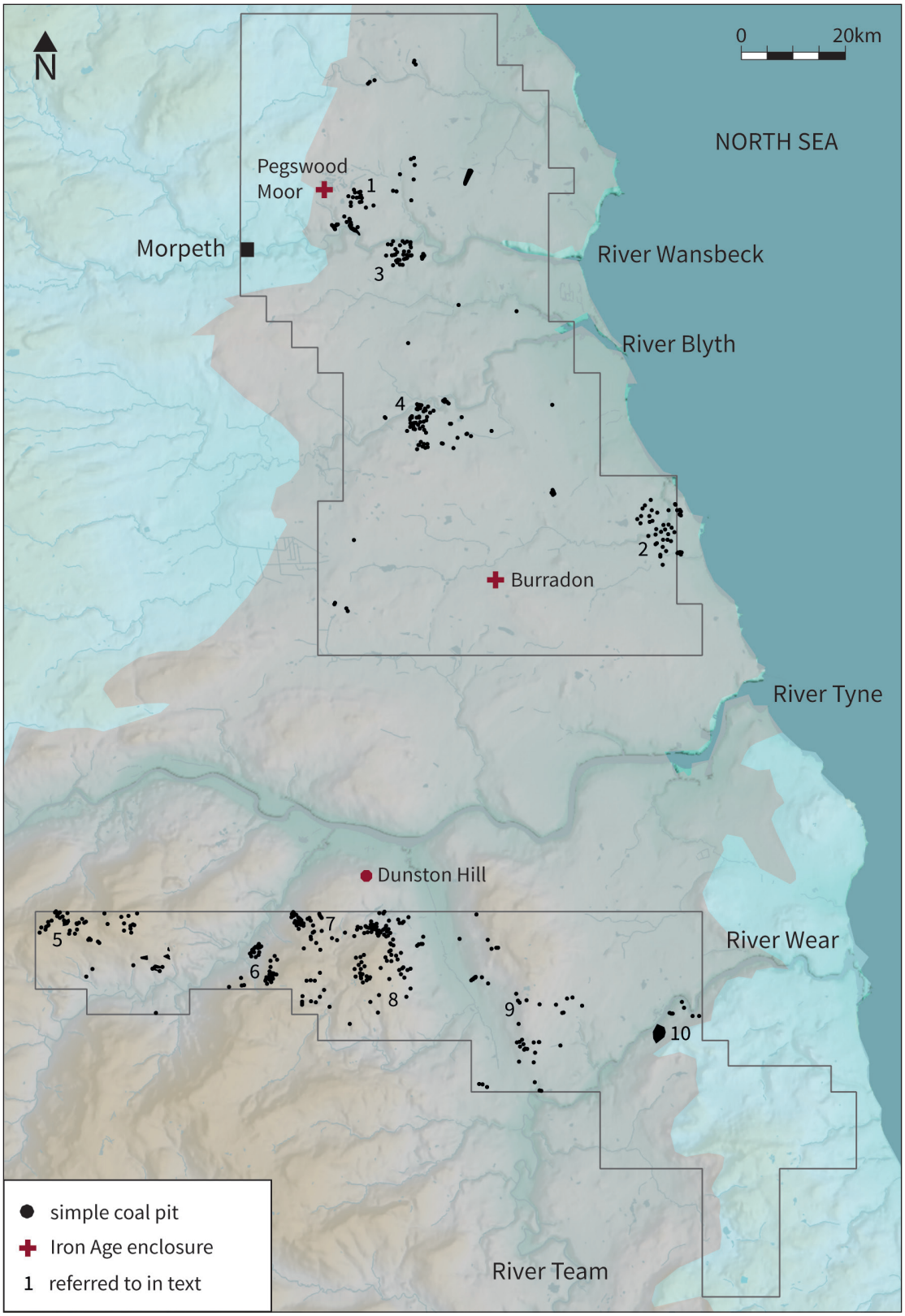


Figure 16: Distribution of simple coal pits and clusters of small-scale coal workings. [background generated from height data © Bluesky International/Getmapping PLC]

Introduction

The project area sits on one the most significant coal fields in England and the exploitation of this resource has shaped the landscape on an expansive scale. Over its long history, mining has created a diverse range of structures, earthworks and landforms. The scale and nature of these remains make them amenable to recording from the air, but because of persistent and ongoing development a considerable proportion of the features that survived into the middle of the 20th century have now been lost or built over. This makes the aerial photographs taken in the 1940s and earlier a particular valuable resource. 'Colliery Landscapes' documented the industrialised coal mining landscape at a time of considerable change using historical and contemporary aerial photographs (Ayris and Gould, 1994). This section will look at other elements of the coal mining landscape including pre-19th-century mining, infrastructure, the survival of the 19th- and 20th-century collieries and worker's housing.

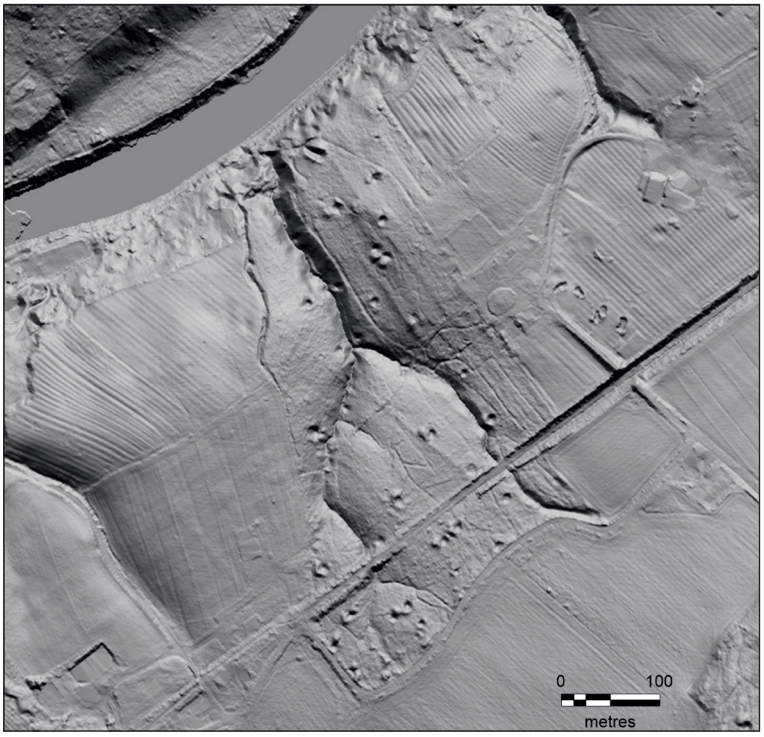


Figure 17: Coal pits in Ayton's Wood, Cox Green. [lidar DTM 2018 © Historic England; Source Environment Agency]

Coal extraction before the mid-19th century

The use of coal in the Iron Age and early Roman period in this region is evidenced in the settlement remains excavated at Burradon and Pegswood Moor. Analysis suggests that the coal at Burradon was sourced from the seam exposed along the coast between Seaton Sluice and Tynemouth, a distance of at least 8km (Jobey 1970, 86). Significantly this coal was thought to have been cut from the seam rather than sea-washed coal from the foreshore.

The inhabitants of the settlement at Pegswood Moor may have been able to access nearer deposits. Undated workings in the form of a dense cluster of small pits along the banks of the River Wansbeck suggest coal could have been retrieved from

relatively shallower workings here (N28764) (Fig. 16 no. 1). Spent coal was found in the ditches of a small enclosure of likely 2nd-century BC to 1st-century AD date, alongside other residues of turves or peat (Proctor 2009, 27).

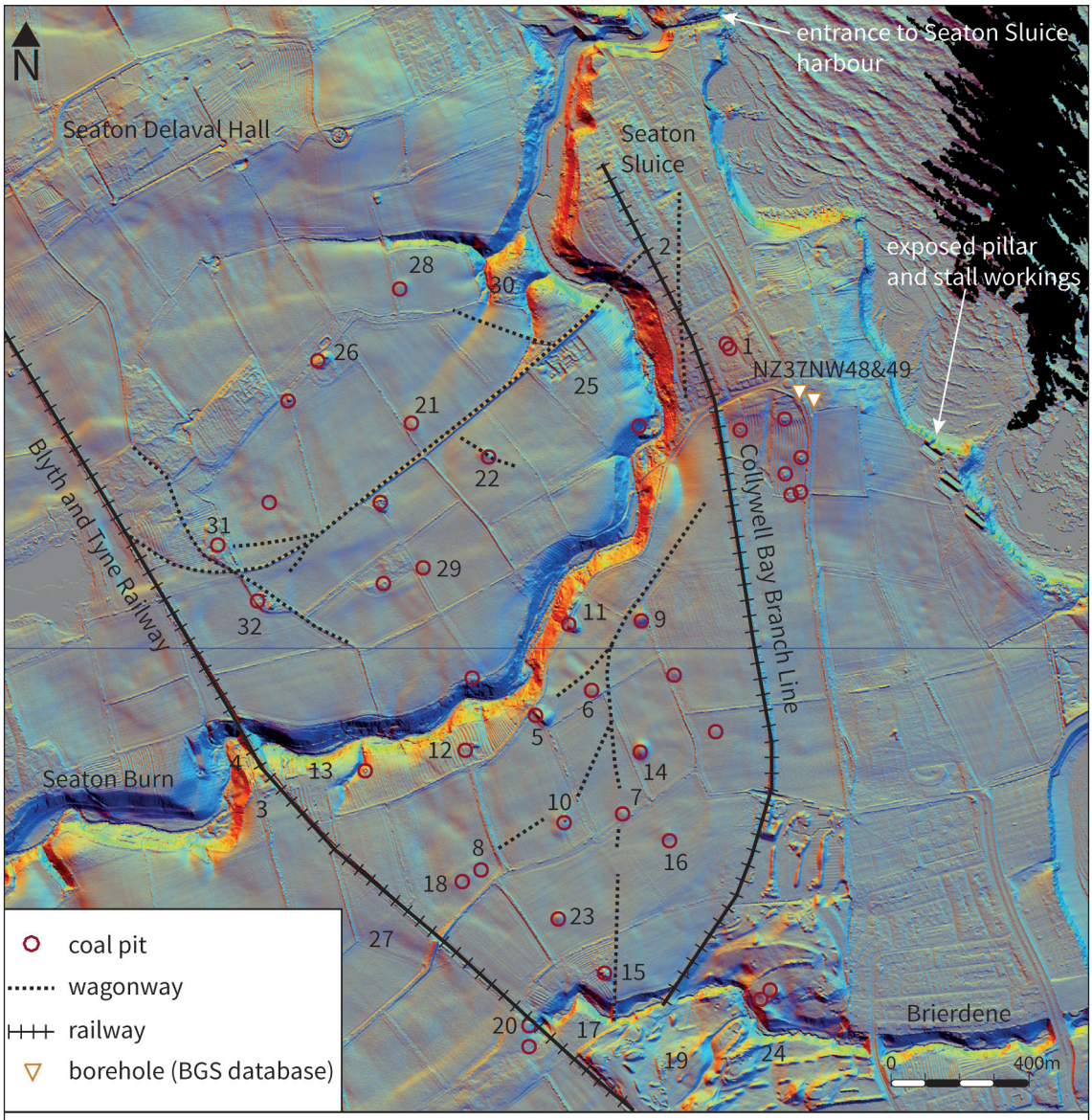
In their summary of the mining history on the Northumberland and Durham coalfields Andrews et al. suggest mining developed from adits (horizontal shafts) cut into coastal cliffs and valley sides, and bell pits (single shaft mines 'belled-out' at the level of the coal seam) (2020, table 1). These were thought to be fairly shallow in their reach, descending to no more than 7-10m. The obstacle to working at greater depths was not the digging technique but the water table; voids below this level would flood and have to be pumped or abandoned. By the 1500s the pillar and stall technique permitted more expansive coal workings. Slots of worked coal seam, the stalls, were separated by untouched seam, the pillars, to support the seam roof so workings could extend further outwards from the entrance shaft. Although variants of these workings have been exposed by open cast mining in Northumberland, for example at Portland Burn, Ashington, it is the archaeological excavation of the remains exposed at the Lounge opencast site in Leicestershire that proves the early use of this technique (Hartley, 1994; Jackson 2020, Figure 3).

As Figure 16 shows there are distinct concentrations of the type of coal workings that is represented at the surface by small shaft entrances surrounded by small low spoil heaps and often occurring clusters (Fig. 17). North of the Tyne there are clusters on the coast at Hartley, at Shadfen on the banks of the River Wansbeck (Fig. 16 nos 2 and 3). On the River Blyth the works at Plessey are extensive and fan out through the northern side of Cramlington (Fig. 16 no. 4).

South of Tyne the coal pits occur in looser groups: spreading out across Hedley Fell, up the moorside between the River Derwent and Blackamoor Hill (Fig. 16 nos 5 and 6), the well-studied Whickham mines (Levine and Wrightson 1990) (no. 7), a swathe of pits around Burdon Moor (no. 8), along the east bank of the River Team (no. 9) and then a dense cluster on the edge of the coal measures at Cox Green (no. 10).

In this region, the only example of this form with Scheduled Monument protection is the small group of pits on Dunston Hill, these earthworks were not recorded by the Hadrian's Wall Project (NHLE1018227).

Undoubtedly amongst these there are shafts of later 19th-century or even 20th-century origin, sunk to provide ventilation for more extensive working accessed some distance away. Others may be the result of similarly recent prospecting. A photo taken in 1929 at Ravensworth Castle shows the sort of shaft boring apparatus still in use at that time (see Sunniside Local History Society). However, many are likely date to the 18th century and earlier.



1 Hospital before 1745
2 Whin 1754
3 Fox 1759
4 Duration 1759
5 Success 1761
6 Good Intent 1761
7 Corn before 1774
8 Godspeed before 1774
9 Hedge before 1774
10 Lark before 1774
11 Lane before 1774
12 Prosperous before 1774
13 Hair before 1774
14 Fame 1776
15 Fortune 1777
16 Farewell 1777-78
17 Spring 1779-81
18 Tryal before 1781
19 Thistle before 1781
20 Delight 1781-84
21 Chatham 1784-85
22 Fortitude 1784-85
23 Content 1787
24 Expedition 1787-88
25 June 1787-88
26 Park 1789-90
27 Speedwell 1790-92
28 Bloom 1791-92
29 Moss 1792-93
30 Swallow 1793-94
31 Nightingale 1797-94
32 Delaval 1811-12

Figure 18: Schematic plan of coal workings at Hartley, with additional information from Tomlinson 1915. Pits are numbered chronological by date sunk. Not all pits are named and not all named pits were recorded by this project. [background image lidar DTM 2018 © Historic England; source Environment Agency]

Case study: coal mining at Hartley

The small coastal township of Hartley has an unfortunate role in the history of coal mining. In 1862 at the Hartley Colliery's Hester Pit the main pump beam snapped and was pulled down into the shaft, trapping and killing the workers already on site for their underground shifts. In response legislation required that all mines should have at least two shafts or outlets from 1865 (Jackson 2020, 16).

Of interest here are the remains of coal mines that were active prior to the mid-18th century. The area under consideration lies south-west of the Hartley Colliery Hester Pit and Seaton Delaval Hall. The land is relatively flat and undulating but is deeply incised by Seaton Burn and Briardene Burn as they approach the North Sea coast. The coastline is marked by low cliffs approximately 10m high that descend onto a rocky foreshore. Coal seams exposed and washed out from these cliffs and beyond have been exploited since at least the Roman period. Mining at Hartley is documented in 1318 (Craster 1909, 112). Without technology to dig safely at depth and control ground water ingress this activity was probably limited to the exposed coal faces along the cliffs and chased inland along the steep sides of Seaton Burn and Briar Dene. Control of the resource was asserted by 'a royalty carefully guarded by the lord of the manor'. A byelaw passed in the manor-court in 1560 provided 'that no man shall herafter work eny ground under the hughe for coles,' and in 1564 the tenants were restricted from buying any coal except from the lord's pits.' (Craster 1909, 112).

By 1704 Hartley was a significant exporter of coal and it developed through the century into a zone of integrated industrial activity that included copperas and glass works that consumed the small coal, local clay and seaweed form the foreshore and all served by the small port at Seaton Sluice and its improved harbour in 1763 (Craster 1909, 128-130).

Into this potted history can be added the detail of mining at the old Hartley Colliery. In 1915 Tomlinson published his analysis of the accounts from this enterprise together with a map of the coal pits sunk and the date they were worked in the late 18th century (73-82). The pits and some of the associated wagonways correlate with earthworks, cropmarks and earthworks that are visible on the historical aerial photographs, giving an uncommon opportunity to name and date these individual archaeological features (Fig. 18).

The two earliest pits, Whin and Hospital were sunk in 1754 and before 1745 respectively. These stood close between Seaton Burn and the coast. By 1774 a cluster of pits were working between Seaton Burn and Brierdene Burn. This was followed in the mid-1780s by pits sunk north of the Seaton Burn to the edge of Seaton Delaval Hall grounds. In total Tomlinson names 38 pits. Some had been obscured by the date of the earliest air photos: Duration and Fox, were likely covered or obscured by the embankment for the Blyth and Tyne Railway, the fields in which Expedition, Spring and Thistle stood had become the Whitley Bay Golf Course. The Hospital pit had been built over at Hartley Square and the nearby Whin pit was probably covered by the embankment for the short-lived early 20th-century Collywell Bay Branch

line (NHER28994). The June pit entrance is concealed amongst an arrangement of shallow rectilinear hollows now covered by scrub and trees. A plan of 1841 suggests these workings were associated with the adjacent wagonway, perhaps providing material for the embankments supporting the bridge across Seaton Burn (NHER20794).

Many of the old Hartley Colliery pits are now marked by low, well-spread mounds of spoil in the fields (NHER20798 & TWHER12543). The better-preserved examples are concealed in small copses on the southern margins of the park at Seaton Delaval Hall: Park, Phoenix and an unnamed pit in Dark Plantation. Hair and Prosperous are also well preserved on the unploughed ground above Seaton Burn and east of Crow Hall Farm. The latter is located on likely medieval ridge and furrow, the former clips the edge of post medieval plough ridges. At Brier Dene Farm the spoil from Fortune pit sits on top of well-preserved medieval ridge and furrow.

Significant parts of the branching network of wagonways depicted by Tomlinson on the plateau of land between Seaton Burn and Briardene are visible on the aerial photographs. Most survive only as cropmarks or soilmarks and it is not clear what physical remains may survive beneath ground. The lidar imagery suggests a short section of cutting for the wagonway survives alongside Fortune pit. Some parts of this wagonway served pits that were finished by the 1770s and was probably no more than shallow embankments and cuttings, probably extended and repaired and perhaps tracks removed and relocated as need be, probably until the last of these pits closed in the mid-1780s. It linked these coal pits to the harbour at Seaton Sluice.

North of Seaton Burn the substantial earthworks of a wagonway run eastward from the old Blyth and Tyne Railway to Seaton Burn and on the opposite bank on the approach to the harbour. Records show it was originally built to serve Chatham pit (worked 1785 to 1788) (Tomlinson 1915, 77). It was probably extended to the railway when that was built in the early 19th century. Rabbits burrowing along this embankment have exposed quantities of domestic waste, which tallies well with items relating to 'rubbishing' wagonways in the accounts (Tomlinson 1915, 77 and 80). The historical aerial photographs also suggest a substantial spur off to Bloom pit and to Nightingale and Delaval.

Most of these pits were retired by the end of the 18th century. As Tomlinson explains, the limitations of the technology at the time limited the depth and extents to which they could be worked (1915, 73). Of course, the presentation of these pits on the aerial photographs: the pit entrances, spoils and occasionally working areas, can be belie the complexity of the underground workings. In his account of the Hartley Colliery Disaster Jackson suggests that these old Hartley Colliery shafts were 'were likely to have been single shaft operations but either by design or accident there can be no doubt many of the workings were interconnected'. The fairly regular spacing of the cropmarked and earthwork evidence suggest shafts sunk to coal level and then worked out in radius of no more than about 90-100m if the walls between neighbouring works were not to be breached. True bell pits, shafts that flared out a limited distance into the coal seam, with some use of timber props would perhaps be more closed spaced. Tomlinson makes a brief mention of 'Filling up and taking

timber of the 'Expedition' pit shaft' which may allude to the use of timber shaft linings and pit props in relation of the Old Hartley Pits (1915, 76). It is also likely that pillars of rock were left in place to support the working ceilings as coal was chased away from the shaft in multiple directions.

Old workings were detected by boreholes reported by the British Geological Survey (BGS) (NZ37NW49 & 48) at Hartley East Farm. Both encountered old workings at approximately 20m. The nearest known shaft entrance is 95m to the south-west (NHER17593) and is one of a cluster of pits and spoil cut through medieval ridge and furrow.

Along the cliffs at Hartley the coastal erosion that once expelled coal onto the foreshore is now exposing old mine workings. Underground pillar and stall workings are exposed in the cliff face between Hartley and St Mary's Chapel (Andrews et al. 2020, fig. 2). The rate and nature of the erosion is clearly visible in the condition of the late 19th-century firing butts on the cliff top (1414465). In 1922 the OS six inch map shows there was enough space for a footpath between the edge of the most northerly butt and the cliff edge, today the central portion of the butt itself has fallen into the sea (1414465). The location of the entrance shaft for this mine is not known but geologists studying its collapse suggest these workings could date from 1550 to 1710 (Andrews et al. 2020, 3).

The demise of many of the old Hartley pits also marked a northward shift of workings. Near Dairy House the Nightingale pit, continued until 1811 then the Delaval Pit was sunk nearby and worked until 1830 (Tomlinson 1915, 82). The Nightingale Pit is marked on the OS map of 1865 and labelled 'Old Coal Pit', Delaval is marked as 'old shaft'. Earthworks at the Nightingale location comprise fingers of spoil emanating from the direction of Delaval suggesting that once abandoned it became a convenient area of waste ground on which to dump spoil (NHER12010). It also suggests that Delaval produced considerably more spoil than its predecessors, reflecting the longer lifespan enabled by improved ventilation and pumping technology. Mill Pit was opened close to Seaton Sluice in 1830 then the Hester Pit at the Hartley Colliery was sunk in 1845-1846 to the northwest of Seaton Delaval, working until the disaster in 1862.

Case study: Gibside and environs

The aerial photographs and lidar imagery have revealed a variety of earthworks, cropmarks and soilmarks likely to relate to the recovery of coal between the River Derwent and Byermoor (Fig. 19).

Snipes Dean and Leapmill Burn the Derwent meanders along its valley floor flanked by low lying haughs or meadows. Moving south-eastward the land then rises abruptly to a broad terrace 500-600m wide and then in more gentle steps up onto Byermoor and to its summit, Blackamoor Hill, at approximately 230m above sea level (Fig. 20). The striking ruins of Gibside sit on the edge of the valley with gardens and parkland arranged across the terrace and woodlands spreads up the moorside and along the deeply cut Snipes Dene and Leapmill Burn. Byermoor Lane skirts

around the south-west edge of the upper moor and Lobleyhill Road runs over the more via Blackamoor Hill.

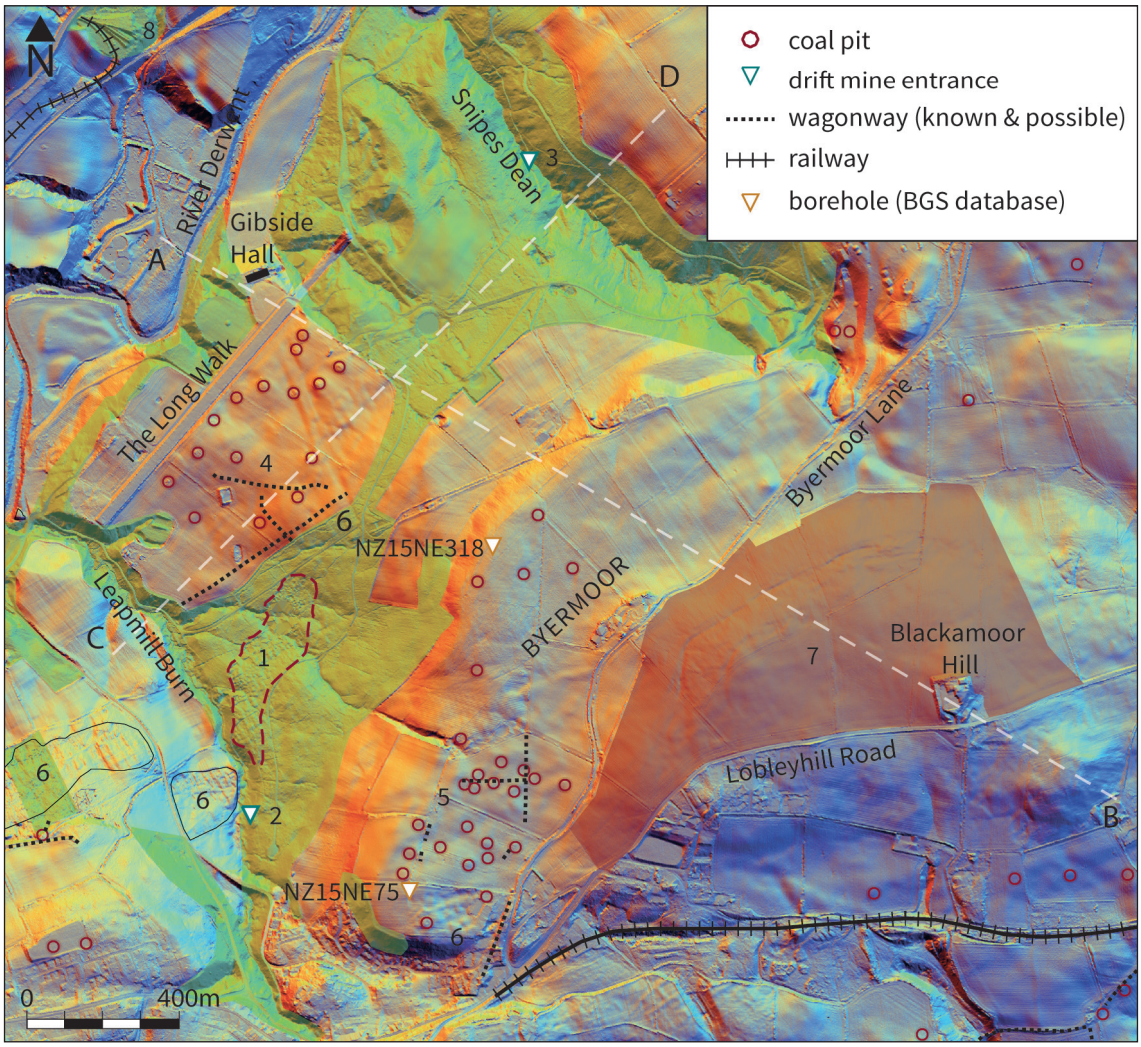


Figure 19: Schematic plan of coal workings at Gibside and environs. [background image lidar DTM 2018 © Historic England; source Environment Agency]

Whickham to the north-east and Winlaton to the north have been the subject of deep and detailed historical analysis of their industrial heritages (Levine and Wrightson 1990, Clavering and Rounding 1995).

Gibside and its environs sit on the Lower and Middle Coal Measures, but these are covered with alluvium and sand and gravel along the valley floor and till elsewhere, except on the slope between the terrace and the moorside.

Westwood conceals a swathe of small pits running northward from Leapmill Burn and along this till-free zone (Fig. 19 no. 1). These pits run between the 80 to 100 contours. Unfortunately, the tree cover is so dense that the lidar only penetrates sufficiently in small patches but it suggests small pits a few metres apart, with little or no spoil and in places the collapse of the ground left between pits. They cover an

area of approximately 5ha. These earthworks suggest the exploitation of a surface or shallow seam unhindered by problems of drainage, probably an outcropping of the 'Busty Seam' (see National Trust 10638 / MNA125352). Exposed coal would have been exploited and exhausted before underground workings were attempted, Clavering and Rounding suggested deposits on the top of nearby Winlanton Hill could have been exhausted by the end of the 15th century (1995, 250).

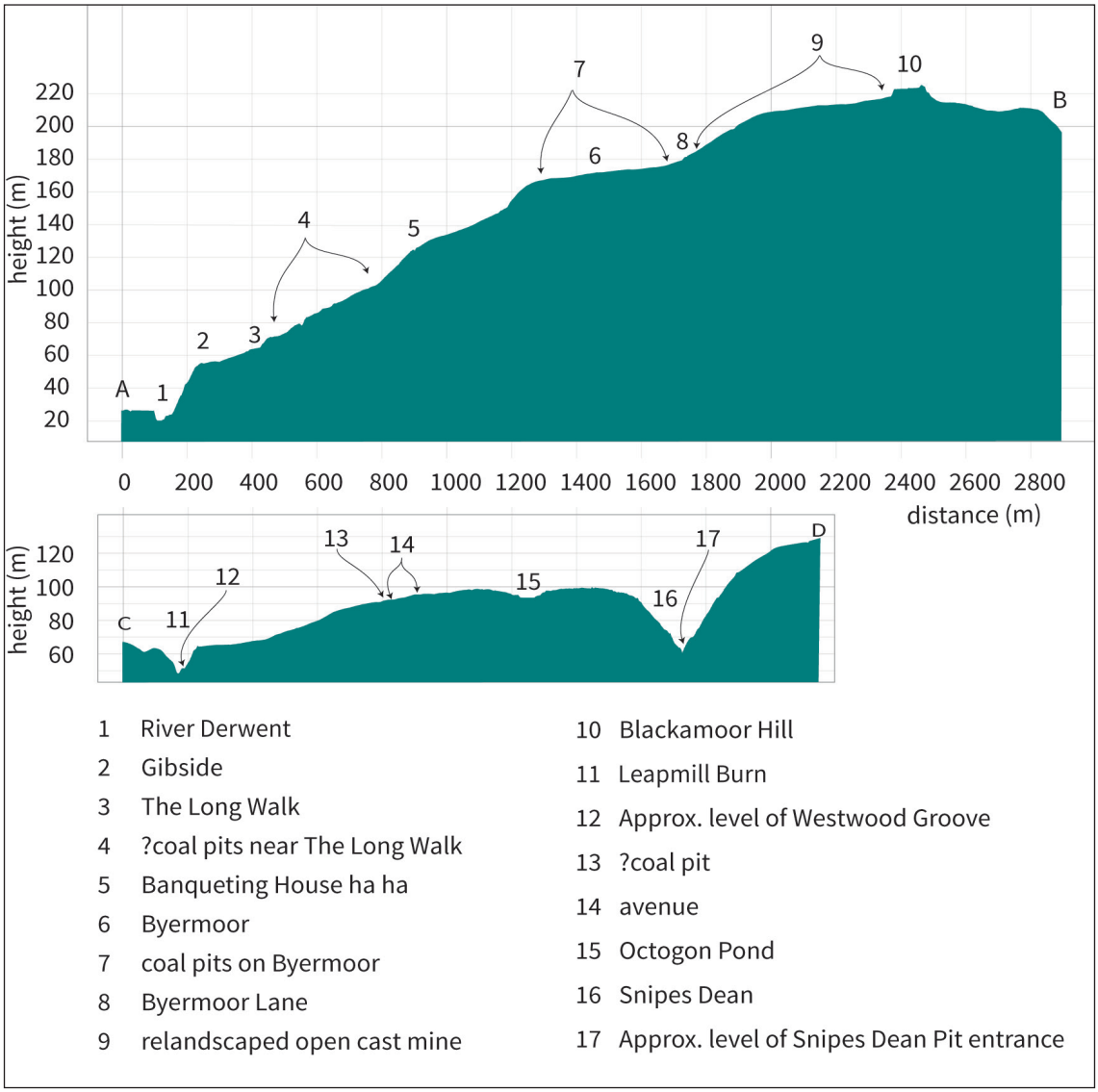


Figure 20: Two topographic profiles across the landscape at Gibside.

Later, a drift mine named Westwood Groove was cut into the valley side above Leapmill Burn, and another in the Snipes Dean Pit. Neither are visible on the aerial photographs, on the surface they survive only as bricked up entrances. It is unclear when these drifts were first worked, though there are references to coal mining on the Gibside estate from 1607 (TWHER5112) (Fig. 19 nos 2 and 3).

The flat terrace between Westwood and the steep slope down to the River Derwent is interrupted by at least 14 low mounds (Fig. 19 no. 4). Most are obscured by trees, and the lidar evidence suggests their margins have been squared off, perhaps by ploughing or deliberate earth moving in the past. The trees themselves were certainly in place on the OS map of 1862 and possibly on Greenwoods 1820 map. It is the semi-regular arrangement of the trees, and the mounds beneath them, that seems incongruous to the designed landscape, it leans neither to a strict formal design of an earlier era nor naturalism of the late 18th-century design. There is faint evidence of linears which might be plausibly be the remains of wagonways. It is possible that these are the remains of coal workings.

Further upslope on Byermoor there is a scatter of low mounds, possible pit entrances and the remains of wagonways (Fig. 19 no. 5). Some are depicted and labelled as 'Old Pit' on the Whickham tithe map of 184 (DDR/EA/TTH/1/251).

A borehole sunk at the south-western edge of this group encountered coal at a depth of 25m below ground level and again at 35m (BGS NZ15NE75). Old workings were also detected at this depth. Further north old workings were present at depths as shallow as 10m, as observed in borehole NZ15NE318.

At the southern end of Byermoor the lidar imagery shows deformation of the land surface: a semi-regular pattern of slumping between areas of slightly higher ground (1627777) (Fig. 19 no. 6). A similar pattern can be seen on east side of Leapmill Burn, not far from the entrance of Westwood Groove drift mine. In this example earthwork ridge and furrow of medieval or post medieval date continues across the slumped ground with only a little loss of profile in the individual plough ridges. Undoubtedly this subsidence is due to coal mining, but changes in ground water level are also a factor (Mccormack et al. 2013). The pattern of the subsidence on Byermoor suggests pillar and stall mining, where baulks of coal were left in situ to support the roof of the seam.

Between Byermoor Road and Blackamoor Hill the land was extensively mined in an open cast operation from the late 1940 and has now been reinstated (1627980) (Fig. 19 no. 7).

Power, drainage and transportation

Most accessible coal on the north east coal field had been exhausted by the late 17th century and this drove innovations in powered pumping technology. This power was generated by water-powered coalmills (also known as chain mills) until the early 18th century (Clavering 1994, 124). Water supply and drainage were important considerations in early mining but the channels dug for these purposes are probably under-represented in this record. They are easily overlooked because the direction and extent of the underground workings is not usually known so there is a spatial disconnect between the features that can be seen on the surface: the ditches and the mine entrances.

However, there is a well-documented water channel at Ravensworth, named The Trench. Commissioned by Sir Thomas Liddell, it was part of 'a most elaborate system of water-powered chains at Ravensworth ...' (Hodgson 1990, 81) and this is discussed in more detail in the case study below.

In the early 18th century the development of the Newcomen steam engine, fuelled by the resource at hand, enabled mines to be drained more effectively and deeper coal could be sought. (Palmer and Nevell 2022, 75). This technology was eventually adopted across the north east coal field.

The gradual exhaustion of the most easily-won coal along the coast and rivers, together with increases in production and diversifying markets inevitably required the movement of this heavy and bulky resource either along poor roads or across uneven terrain. The solution was rail transport: simple wagonways on which carts with flanged wheels (to prevent de-railment) were pulled by horses. The earliest example in this region is thought to have run between the coal pits and saltpans at Bebside in the early 1600s (Lee 1951, 136).

The early wagonways that served short-lived workings, like those at Hartley (see above) were no more than simple wooden tracks and rails, and may have been lifted and relocated once a pit was abandoned. However, for longer distance transportation, where the terrain posed topographical obstacles that either required cuttings or embankments or unfirm surface required some compaction or making up, then some physical remains of early wagonways may still persist.

Most coal was destined for the river staiths or seaports, but there were also lines to local consumers such as the glasshouses at Seaton Sluice, brickworks, which were widespread and, towards the end of the 19th century, the coke works. Railways were used in the late 19th- and early 20th-century colliery complexes, to move coal from pits to screens to the wider rail network and to take waste out to spoil heaps. Often lines extended into associated worker's villages to take coals to the inhabitants and to collect waste (Palmer and Neville 2022, 91).

Wagonways were quickly adopted and their reach spread across the north east coal fields linking individual collieries to staithes along the navigable rivers. By 1700 there were already 37 miles of wagonways in the North East, rising to 146 miles in 1800 (Palmer and Neville 2022, 88). There were, however, issues. Colliery owners required access or 'wayleave' across the land of others to reach the river staithes and some of the topographic obstacles could not be overcome until stationary steam-powered engines could pull up and let down heavy loads on steeper inclines (Lee 1951, 137). These would be housed in engine houses at the side of the track. In the first half of the 19th century the wooden rails of important routes were replaced with steel and new routes were constructed (Lee 1951, fig 8).

The result is a complex network of routes that developed by increment, often involving obliteration or upgrading of existing lines. This project took an inclusive approach to the recording of such features excluding only those routes that are still in use. Most of these routes are depicted on the late 19th-century and early

20th-century Ordnance Survey maps but this project offers a record of their current condition, section by section and also points to the relevant historical aerial photographs. Unfortunately, the boundaries of the project area mean that few of the wagonways are pursued to their fullest extent and the links to the staithes on the Tyne are absent. It is outside the remit of this project to untangle the history and development of the wagonways, there are HER records for most routes that can elucidate further on names, origins and source documents.

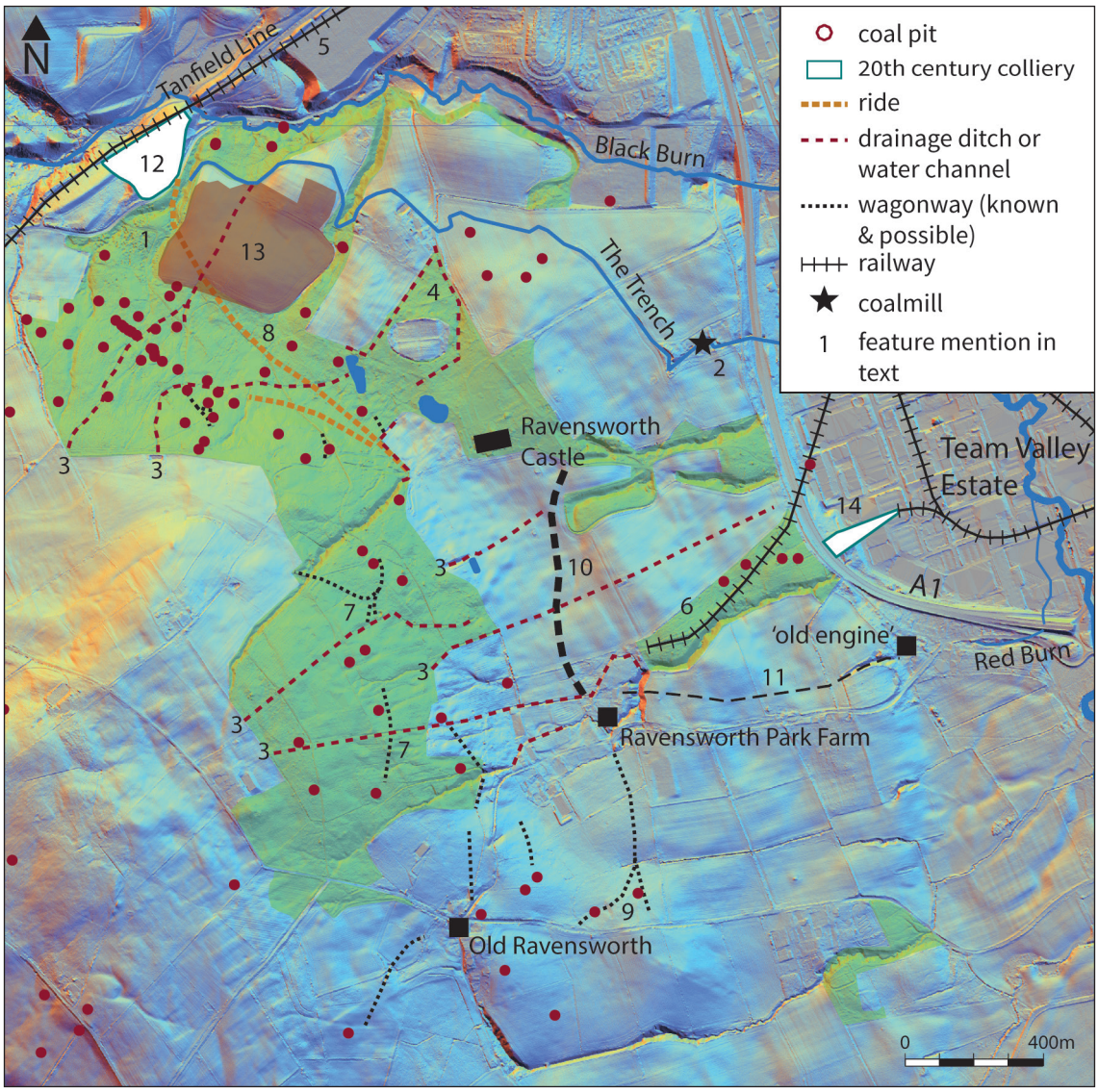


Figure 21: Schematic plan of coal workings at Ravensthorpe Gibside and environs. [background image lidar DTM 2018 © Historic England; source Environment Agency]

Case study: Ravensworth

In the grounds, woods and fields around the ruins of Ravensworth Castle there is complex spread of archaeological features that are associated with the extraction and movement of coal. These are interlaced with medieval and post medieval

agricultural remains, garden features and Second World War anti-landing obstacles. The landscape is further complicated by early to mid-20th-century coal extraction and encroached from the east by the A1 and the Team Valley Estate. This is a broad overview of the heritage assets in the park that are associated with coal mining infrastructure.

The chronology of features identified as earthworks, cropmarks or soilmarks is often speculative but the dense clusters of small coal pits cut into the steep north-facing bank in Fugarfield Wood are, perhaps, the earliest coal workings that survive in this area (1627914) (Fig. 21 no.1).

The early colliery at Ravensworth was run by the estate's owners, the Liddells, and considered to be one of the most innovative on the Durham coal field (Hodgson 1990, 39). By 1669 the colliery was operating with the benefit of water-powered coalmills that drained the mines and kept them workable for longer. To this end Sir Thomas Liddell had commissioned 'The Trench' to be constructed to carry water from Black Burn in the north-west to a coalmill close to the River Team in the east. The Trench can still be traced as an earthwork running from Gateshead Road and Trench Hall Farm and on the approach to Sawmill Cottage, the site of the former coalmill, but further east it is has been built over (Fig. 21 no.2). A short section of The Trench and the site of the coalmill are Scheduled.

South of The Trench several long ditches run eastward from the higher ground in the west, sometime extending or using the deeply-incised natural denes and gullies (Fig. 21 no.3). In Hill Head Wood and High Park Wood the hillside is peppered with small mine entrances that still survive as earthworks. It is possible that the ditches were cut either to drain the mines, or supply water to other coalmills to power the drainage pumps. Some of these ditches fed the ornamental ponds to the north-west of the castle, but little is known about the design of the Ravensworth landscape so there may have been some cross-over between industrial needs and aesthetic design (Fig. 21 no.4). The name Red Burn, a tributory of the River Team rising at Lady Park, may allude to the ochre-stained waters that arise from old mine workings.

Sir Thomas Liddell, again pioneering efficiency, had by 1669 also built a wagonway to take coal from the estate's colliery to staithes on the River Team. Lee suggests the Ravensworth wagonway was a forebearer of what would become the Tanfield Line (1951, 139) and that it ran around the western side of the parkland at Ravensworth (Fig. 21 no.5). Tyne and Wear HER records only one wagonway in the park (3749), which it suggests was the wagonway in use by 1670. This feature survives as a distinct earthwork running through Robins Wood, where it was also labelled as 'Old Wagonway' on the OS map of 1862 (Fig. 21 no.6). Beyond the woods it can be seen continuing as a distinct embankment running to the Tile Sheds on historical aerial photographs but this section has now been destroyed.

In High Park Wood and Hill Head Wood and in fields to the south-west of Old Ravensworth fragments of low banks leading away from some coal pits may the remains of short-lived wagonways (Fig. 21 no.7). How these then transferred coal to the main routes to the staithes is not known, but the origin of some of the carriage

drives and rides through the park could warrant further investigation in this respect (Fig. 21 no. 8).

Ravensworth Park Farm is the confluence for a number of interesting features. From here broad cropmarks and soilmarks suggest short-distance wagonways, one running south and seemingly ending at Haggs Lane, the other branching eastward towards old Ravensworth (Fig. 21 no. 9). They link to coal pits so there is a strong likelihood that these routes were used for hauling coals, even if not by rail. These routes are not depicted on a 1712 map of the Ravensworth Townfields (Hodgson 1990, fig 6.8; Tyne and Wear Archives MV022i). Neither is there any indication on this map that the fields along these routes had been disturbed and restored, so it is reasonable to suggest that these putative wagonways were built later than 1712.

Heading north from Ravensworth Park Farm a broad linear feature sweeps gently north-eastward towards the southern end of Cross Lane, south-east of the castle (Fig. 21 no. 10). On the earlier air photos, taken when ridge and furrow in this area still survived as earthworks, this feature can be traced as minor interruptions in the plough ridges it intersected, but in one area it marks the divide between ridges in different orientations. It is unclear whether this feature pre-or post-dates the plough ridges, which are likely to be of post medieval rather than medieval date. On more recent aerial photographs it can be seen a broad, dark toned soil mark. This features loosely correlates with the road between Ravensworth and Ravensworth Castle that it is depicted on Armstrong and Jefferys map of 1768 and it is shown as a footpath on the OS map of 1862. Intriguingly, it is positioned to be both a possible southward continuation of Cross Lane, and a northward continuation of the wagonways south of Ravensworth Park Farm.

A narrow linear runs east from the park farm towards Lady Park Wood (Fig. 21 no. 11). It comprises a narrow bank and ditch; the former may be upcast from the latter, or the ditch may have provided material for the bank. It is formed of several straight lengths and appears to deviate slightly southward, perhaps to avoid a low hillock. At its eastern end it meets a short, wooded gully that cuts steeply down to Lady Park. The OS map of 1862 labels an 'Old Engine' at the eastern end of this gully and the Greenwood's map of 1832 has the same but the location is more ambiguous. This linear feature may be the remains of another wagonway or, alternatively a continuation of a water channel from the east side of Park Farm. The point where this feature crossed the small gulley at the farm would be a good starting point for any ground investigation.

Coal mining persisted around the park well into the 20th century. The Watergate Colliery opened by the late 1940s and aerial photographs taken in 1956 show a small area of opencast mining to the south (Fig. 21 nos 12 and 13). The Ravensworth drift mine on the edge of the Team Valley was working in 1945 (Fig. 21 no. 14). These works have now been relandscaped or built over. When the Team Valley Trading Estate was established in the 1930s, it had its own internal railway system that linked to the main line. These rail routes were later replaced by the road network.

Nineteenth- and early 20th-century collieries

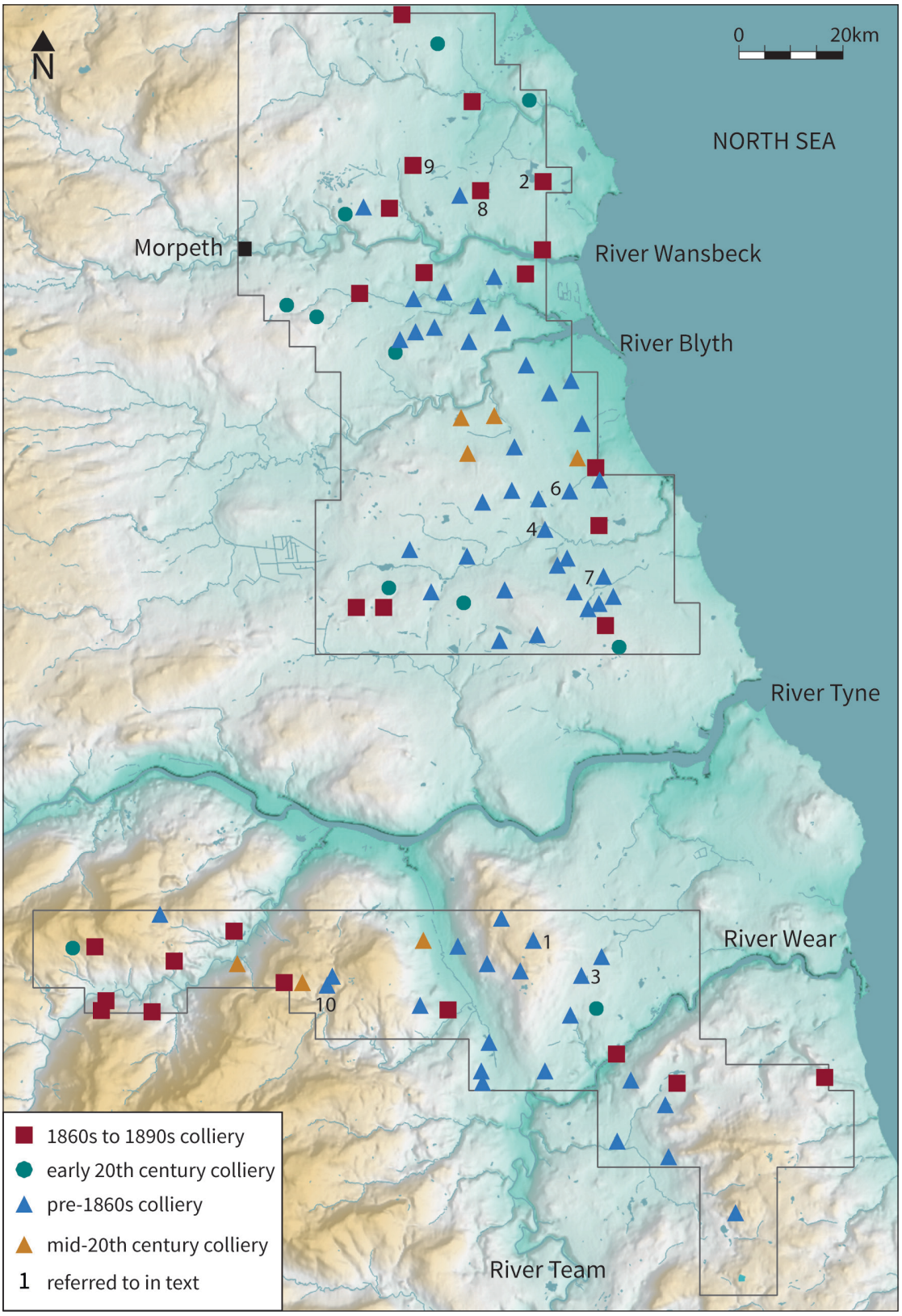


Figure 22: Distribution of late 19th century and 20th century collieries. [background generated from height data © Bluesky International/Getmapping PLC]

Technological advances in the 19th century including steam-driven winding machinery and the Davey safety lamp allowed coal to be retrieved from greater depths and greater reach (Palmer and Nevell 2022, 75). This precipitated the development of fixed mine entrances and the centralisation of key and ancillary structures and buildings: engine houses, winding gear, conveyors and processing areas, stables for pit ponies, and later fan houses and pithead baths.

The Ordnance Survey maps surveyed in the late 1850s and published in the mid to late 1860s record at least 56 coal mines that were working at that time (in the project area) (Fig 22).

The small colliery south-east of Killingworth is depicted on the OS map of 1865 but by the time of the 1898 edition it was described as 'Killingworth Old Pit'. In 1948, as RAF aerial photographs show, the small plot was devoid of any structures, but the low earthworks on this site are likely to be the remains of the former coal workings (1627196). This site remains undeveloped so elements of this mid-19th-century colliery may survive below ground level, as well as the underground workings themselves.

A small number of pre-1860s collieries had been decommissioned and abandoned by the late 1940s including Painshaw Colliery, Wideopen, West Holywell Colliery and Backworth Colliery C Pit. The plot of land on which the Wideopen colliery and housing had stood was largely untouched until the early 2000s; hedges still stood between the original allotment or garden plots (1627076). The earthworks and low structural remains that survived at Backworth Colliery C Pit and West Holywell Colliery were subsumed by later coal workings (TWHER2217 and N11523). The site of Earsdon Colliery had been buried beneath spoil by 1947 (TWHER1114).

The Hartley Colliery Hester Pit had closed following the disaster in 1862 and the site had been levelled by 1947 and remained as open ground until recently. The High Main Seam at Killingworth Colliery at West Moor was abandoned in 1934 and by 1947 the colliery site was in decay and several of the neighbouring terrace rows had been reduced to rubble (see Durham Mining Museum).

Despite these exceptions most of the pre-1860s collieries were still active on the aerial photographs taken after the Second World War. These provide a snapshot of the building and structures that were present at that time, and it is clear that on most sites that there had been much development and change over the preceding eight decades.

By the late 1890s a further 26 collieries had been added to the landscape including the large operations at Ashington, Silkstone and Ryhope (Fig. 22). Many of these mines continued in use into the second half of the 20th century and new deep-working mines were also opened in the same period, including Ravensthorpe Park Drift (1627973), Hartford Colliery (NHER28429) and Busty Bank (1627782). Surface mining has also been practised in this area since the late 1940s and was still active well into the early 21st century at Shotton and Pegswood.

Three of the late 19th-century collieries: Springwell, Woodhorn and Washington F Pit are now the foci of industrial museums (Fig. 22 nos 1 to 3). At Woodhorn the colliery (1016976), stables (1371395), workshops (1041395), offices (1389505), cage shop (1304416) miner memorial (1041386), winding houses and shaft head gears (1371394 and 1153123) engine house (1304432) and fan house (1041394) have been given Listed Building status. Only the engine house and headgear survive at Washington, these structures have also been Listed. Springwell Colliery and its surviving buildings are within the curtilage of the Bowes Railway Scheduled Monument. The historical aerial photographs, such as this 1924 image of Woodhorn, show the surviving structures in their original working context.

Aside from the Listed and Scheduled sites there are very few other tangible remains that are visible on the recent aerial photographs, within the project area. The following buildings appear to survive, using the Google Earth 2021 and 2022 imagery as a guide.

- At the site of Seghill Colliery (NHER11524) a range of buildings that coincide with the smithy and other building shown on the OS map of 1865 survive at the corner of Middle Farm and Front Street. A colliery and buildings is shown at this location on Greenwood's map of 1828. The 'smithy' building's lower half is stone, the upper half brick. The west wall has four infilled doors or large windows with stone or concrete lintels. The low buildings attached to the north side of the 'smithy' are rendered but appear to be thick-walled, the north gable end is partly exposed (above a later extension) and appears to be stone-built. (Fig. 22 no. 4)

- At Hetton Colliery a single structure built by 1947 survives (NHER661844). This appears to be the engine house that was proposed for destruction prompting event 141468673. (Fig. 22 no. 5)

- At Seaton Delaval Colliery substantial parts of the square depicted on the OS map of 1865 survives and are in use (NHER19273). Much is concealed by modern facades and roofs. This square was probably mixed used with some colliery workshops and worker's houses. The three entrances into the square are still legible, the north-east entrance has surviving gate piers. Along the north-east side of the square there are occupied houses to the south, stoned built, sash windows and facing out from the square. The northern half is a long range with many inserted doors and windows. This range may have been built for industrial rather than domestic use. (Fig. 22 no. 6)

- At East Holywell Colliery a single structure is still standing, surrounded by the concrete footprints of many others that survived until at least 2015 (TWHER1048). This is likely to be the winding house, which the HER indicates was built in 1946, replacing the original. (Fig. 22 no. 7)

- At Ashington colliery a long, single-storey, brick-built building, with bricked-up arch and stone or brick quoins survives on the footprint of a building depicted on the OS map if 1897 N11697. It is not certain that this is the original structure. (Fig. 22 no. 8)

At the following locations most standing structures have been removed but low earthworks do survive.

- Near Pegswood earthworks and a small structure survive on the site of a small pre-1860s mine (NHER11583). A low mound is located on the spot where the 'Old Enginehouse' stood on the OS map of 1866. Four walls of a reservoir, built by 1897 survive.

- The Seghill reservoirs were built by 1897 to feed the steam-powered Seghill Colliery (NHER11531). They survive as earthworks on either side of the A189, but have been partly truncated by the road corridor.

- The site of Longhirst colliery is now covered by trees. The lidar imagery suggests earthworks and possibly low structural remains may survive. This colliery was established by 1898, but was abandoned by 1947 (NHER28804). (Fig. 22 no. 9)

- Earthwork remains of the Andrewshouse Colliery survive in woodland (1627447). It is possible that foundation and low structural elements also survive. This colliery was already in a ruinous state by 1945 but despite large scale infilling of the adjacent valley it appears that the original land surface survives here. (Fig. 22 no. 10)

Even the tall conical spoil tips, once a commonplace and iconic symbol of the coal mining industry have been softened and blended into the modern landscape (Fig. 23). There are rare survivals of finger spoil accumulation concealed in woodland at Victoria Garefield Colliery (1627967) and in Long Horseclose Wood, near Rowlands Gill (1627728) (Fig. 18 no. 8).

Figure 23: Conical spoil heaps at Team Colliery (Betty Pit). [part of RAF/3G/TUD/UK/14 Vp2 5145 12-JAN-1946 Historic England Archive (RAF Photography)]

Palmer and Neville point to the hasty closure and clearance of the collieries at the end of the 20th century for the lack of surviving evidence, an impact that prompted RCHME's aerial survey of the coal industry in

the early 1990s (2021, Ayris and 1995, 7-8). However, in this area, some collieries, including Backworth (C Pit), Earsdon, Burradon, Bebside, Silksworth Eppleton and West Holywell had been already been subsumed by spoil heaps or destroyed by surface workings.

The discussion above excludes an assessment of the below ground remains, which are clearly beyond the scope of this project. The presence of underground workings is sometimes revealed in aerial photographs and, more extensively, on the lidar imagery as deformations in the land surface. Examples of this have been mapped near Dinnington (627313), Ashington (NHER28835) and at Gibside (Fig. 19. no. 6). These examples have been recorded for reference but no attempt has been made to record subsidence systematically or comprehensively.

Coal worker's housing

Although the coal mines, collieries, spoil heaps and surface mines underpin the landscapes of this survey area, their impact has now been remediated and re-developed almost beyond recognition. Houses built for the coal workers and their families, on the other hand, still survive both in small pockets and large swathes, and are a tangible, everyday link back to the industry at its zenith. Nineteenth-century housing, as an historical asset, has usually been outside of the remit of projects like this, but from its outset there was an obvious opportunity to link some of the earliest examples of the coal worker's accommodation to historical aerial photographs that convey a sense of these places when the industry they served was still thriving and the dominant employer. Some of these buildings were demolished before the earliest photographs so they can be seen as archaeology: low ruins and earthworks. Others survived into the post war period but were then cleared for mining, new housing stock and other developments. A great many still survive and form a significant proportion of the accommodation in towns like Ashington and Silkstone.

It goes without saying that there are considerable limitations on what a small-scale aerial view can reveal about an architectural subject, just as there are with regards to archaeological subjects, especially where the subject is still standing and accessible for closer observation. From the aerial photographs the presence and position of outhouses and back parlours, can sometimes be deduced. With the additional help of Google Street view particular architectural types may also be identified, such as the Sunderland Cottage: a one and half storey terrace, examples of which survive in Castlereagh and Quarry Streets in New Silkstone (1628023). Historical aerial photographs can however provide context and environment.

This discussion will look at two aspects of the evidence, the housing that had been abandoned before the late 1940s, and allotments and gardens.

Worker's housing abandoned by the 1940s

West Cramlington colliery, lying about 1km south of the village of Cramlington, opened before 1864 and by then was enclosed by a single line of terraced houses on two and a half sides, with gardens to their fronts or rears (NHER11505). The

West Cramlington Wagonway ran through the colliery and between the houses. By 1947 most of the houses had been reduced to earthworks and the colliery had been abandoned. The site of this colliery and its housing is now preserved in the footprint of Alexandra Park.

A short, single terrace row is depicted on the Ordnance Survey map of 1865 (NHER19272). It stood on a small triangle of land: the smaller portion of a field cut obliquely by the wagonway. A short spur line ran alongside the dwelling and they garden plots to the front and rear. Named as 'Camp Terrace' on the 1898 edition these houses stood just north of Seaton Delaval colliery and were possibly named in reference to one of the numerous Iron Age enclosures that stand within 750m of this site. By 1947 the houses had been demolished and reduced to the earthworks, which have now been levelled.

Havelock Place stood in the corner of a field, detached from the remainder by the West Cramlington Wagonway, just south of Backworth Colliery C Pit (TWHER8105) (Fig. 24). One long terrace row ran parallel with the wagonway, offset from the rails by long gardens, another ran along the eastern edge of the triangle. By 1947 a long thin tongue of spoil had been tipped all along the western row. The eastern row had long been demolished and was in low overgrown ruins, but some hedges between the former gardens still stood. The position of this small settlement is still marked by a triangle of tree belts. Surrounding areas have been impacted by surface mining, but it is possible that traces of this settlement survive below ground.

Figure 24: The remains of terraced houses at Havelock Place. [part of RAF/58(B)/40 5013 18-May-1948 Historic England Archive (RAF Photography)]

Likewise, Earsdon Square has been buried by spoil before 1947, leaving exposed only the very margins of the allotments that had surrounded these dwellings (1627281). Full or part square arrangements of short adjoining terrace rows were a distinctive form of the early worker's houses. Other examples include Benton Square (1627227) and the slightly irregular Holywell Square (1627250 earthworks). Both had been reduced to rubble and low earthworks by 1947.

Two other such squares, High Downs and Low Downs near Hetton Le Hole, are depicted on the OS map of 1861, along a few other terrace rows. John Bells map of Houghton Parish (*circa* 1827-1834) shows buildings at the site of both squares, though only High Downs is labelled (Collins et al. 1995, 326). They stood some distance north from Hetton, with only field between them and a trackway running eastward to coal pits at what would become Eppleton Colliery. Dene and Byer Street, north-west of Low Downs are clear shown. The Dene and Byer Street terraces are visible as low, recently demolished ruins on the 1947 aerial photographs. The allotments to their east and west appear to be long abandoned. Low Downs (1626995) was still standing, but there are new houses where High Downs had stood. The land between Low and High Downs had been filled by rows of terraces and gardens. Although several of the later 19th-century abd early 20th-century terraces do survive in this area, Low Downs was demolished by 1975.

A large open-sided square at Usworth Colliery, named Inkerman, is likely to date from 1854 or layer, the year of the Crimean battle of that name. By 1947 only the north-east corner survived, the north-west corner was now occupied by Hoffmann brick kilns, and the other sections reduced to low rubble (1628660 & 1628659). No element of this square still survives above ground

A rare survivor is the square at Seaton Delaval (NHER19273), which as discussed above probably contained both workshops and domestic accommodation. Some properties in this square are still occupied but ground investigation is required to establish the full extent of its survival.

Gardens and allotments

The historical Ordnance Survey maps show that, almost without exception, the houses built at or near the collieries for workers were paired with individual gardens or had access to allotments. One of the last residents of Netherton lamented that he would have to give up growing his own vegetables (The Journal 1973). The ability to produce food for a family on a low wage and often at some distance from the traditional markets was an important consideration. The allotments were also a focus of recreation, the 1873 account says the men of Netherton 'are skilful amateur gardners' and showed their produce locally. Gardens and allotments also gave space for the popular practise of keeping pigeons. The relationship between the birds, the allotments, the pigeon lofts and the colliery landscape is portrayed in Jimmy Floyd's *circa* 1938 painting 'Pigeon Crees'. A pigeon cree in allotments near the old Ryhope Colliery, just outside of the area of this project, has been granted Grade II Listed status (see NHLE1119716).

The quantity of land given over to allotments and gardens in and around the worker's housing was not insignificant. At Choppington A Pit terrace rows for the colliery workers were contained within the field in which the colliery sat, north of Puce Bush (NHER17982). Four long parallel terraces had been built by 1866: First, Second, Third and Fourth Row, as had short rows perpendicular to the east ends: South Front Row and North Front Row. Fifth Row had been added by 1898. Broad avenues ran between pairs of rows and narrow lanes along the backs, beyond each lane were

long gardens with shared out outhouses measuring some 110-130 sq. m. The front rows had gardens running from the rear of the houses to the edge of the colliery and wagonway. In the early 20th century Sixth, Seventh and Eight Rows were built in the narrowing north end of the field. There were narrower avenues between these rows, and outhouses were offset from the rear of the dwellings. The external space around these later additions appears to have been communal on the aerial photographs taken 1947. The OS map of 1924 does mark land on the other side of the wagonway as allotments but by 1947 this had been completely subsumed by a spoil tip. The settlement at Choppington A Pit was demolished in 1967.

Where the colliery workers houses are still standing then their gardens generally survive too. However, of the very many 19th-century allotments most have been removed either by surface mining or spoil tipping, or re-development. An exception is the strip of plots running along the old wagonway at Burradon (1627214).

Case study: Netherton Colliery

This recent aerial photograph shows the small village of Netherton and two farms (Fig. 25 inset). The village of Netherton, 5km south-east of Morpeth, is deemed to have medieval origins and is shown on Speed's map of 1610 (Wrathmell 1975, 554). Later in the 19th century a wagonway would run cut through the fields to the north-east of the old village but on Greenwoods map of 1828 that line still terminated at a coal pit east of Green Letch, the village was small and there were two outlying farms Blue House and Burnt House. A tithe award plan for Netherton drawn up in 1841 shows the 'railway' continuing west of the letch to a junction line that ran towards Morpeth (Fig. 25 nos 1 and 2). At that time all land was in the ownership of George, Earl of Carlisle (see Northumberland Communities).

The OS map of 1866 shows considerable development along the Netherton Wagonway. At the junction this map shows an area of spoil and structures land possible further works in the village itself, linked by an 'Old Wagonway': the Ironstone Pit and Bob and Joan Pit mentioned in an account of the Netherton in written later in the century (Newcastle Weekly Chronicle 1873) (Fig. 25 nos 3 and 4). Close by were the 'Old Row' dwellings, a short row of terraced houses that stood on the north side of the Netherton Wagonway, with gardens around and between the tracks (Fig. 25 no. 5). Old Row is described as a back-to-back row, with a 'brick-floored room below and a comfortless garret above' and outside 'an unsightly ash-heap and an open drain' (1873, 8). The 1898 edition shows all but one of the 'Old Row' were roofless by that date. The historical aerial photographs show that by 1947 this row had been demolished, its gardens, returned to cultivation but still made legible by their absence of the plough ridges that survive in the neighbouring field.

The 1873 account suggests that the two oldest rows were 'Cross' or 'Frances Row' and 'South Row', built around the Francis Pit in the fields flanking Green Letch (Fig. 25 no. 6). However South Row is named New Row on the OS map of 1866, suggesting that it was preceded by 'Old Row' at least. Francis Pit was opened in 1849 (see Durham Mining Museum) but on the 1898 edition it is marked as disused. Cross Row and parts of South Row, were single houses with a kitchen and projecting

pantry and an attic above with windows 'of the very smallest dimensions' (1853, 5). Some parts of South Row were three-roomed houses but most had been split into two dwellings that 'more miserable little cribs than these it is well nigh impossible to imagine (1853, 5). By 1947 these rows had been demolished, surviving only as a strip of a low overgrown earthworks between allotments and newer terraces, leaving the Methodist Chapel standing at the row end.

Figure 25: Collieries and colliery houses at Netherton. [photo mosaic: parts of RAF/CPE/SCOT/UK/221 RP 3412-13, RP 3415, 4302; RAF/106G/SCOT/UK/138 RP 3064 03-JUL-1946 Historic England Archive (RAF Photography), insert undated Bing™ imagery]

The 1866 map also shows Howard Pit, sunk in 1836, and a short terrace row on the north side of the wagonway (Fig. 25 no. 7). By 1898 the wagonway was flanked on both sides by over 300m of terraced houses: Yard Row to the south, Howard Row to the north and behind that Clifton Row (Fig. 25 no. 8). The pit however is marked as disused at this time. In 1878 the Morpeth Herald reports that Nedderton (as it was sometimes known) Colliery would close until the market for coal had recovered, leaving 300 'men and lads' to find alternative employment (see Durham Mining Museum).

In 1947 these terraces were still standing and their long gardens cared for. Spoil had continued to accumulate at Howard Pit and workings had extended around the back of Clifton Row (Fig. 25 no. 9). Four new terraces along First, Second and Third Streets, had been built next to the remains of South Row (Fig. 25 no. 10). The colliery had been revived at the end of the 19th century and a new pit, the Nethertonhall

Colliery, sunk on the south-west side of the old village (Fig. 25 no. 11). A report in the Sunderland Dail Echo marked the re-instatement of the railway, 'the colliery having been laid in for over 23 years' (see Durham Mining Museum). This new railway ran along the route of the Netherton wagonway and then cut across the site of the Bob and Joan pit to the new colliery.

The 1947 aerial photographs also foreshadowed the ultimate fate of the Netherton's coal village, surface coal mining was already active just fields away from the old village (Fig. 25 no. 12). By the late 1950s surface mining was hard up against the railway line and the newer terraces. The latter remained homes until the early 1970s when the demolition was finally ordered (The Journal 1973).

Today the old village survives, only slightly larger than it was in the mid-19th century, as do the Blue House and Burnt House but all trace of the old mines and the worker's houses is removed, except for spoil at the site of the Bob and Joan pit, and the very low and mutilated earthwork of Old Row.

Other industries

Figure 26: Coke ovens at Chopwell. [part of RAF/CPE/UK/2352 RP 3277 04-OCT-1947 Historic England Archive RAF Photography]

This discussion has focused on the coal industry but remnants of other industrial activities can be seen on the historic air photos. Brick manufacture was widespread and often located at or near the collieries. Clay was commonly retrieved during the mining process, the fuel to fire the brick kilns was on hand and the collieries and their associated infrastructure and housing consumed a great many bricks.

Brickfields frequently survive as low earthworks but none of the kilns that were observed on the historical air photos still survive.

Coke production was a common partner to coal mining in the later 19th and early 20th century, but very few plants survived into the post-war period. The ovens at Chopwell and Whinfield are rare exceptions that are visible on aerial photographs (22509 and 1627970) (Fig. 26). A small section of the Whinfield ovens still survive and this has been scheduled (NHLE1018226).

Conclusion

The coal industry has had an enormous impact on the landscape for this survey area but has left surprisingly few tangible remains. Of the 88 collieries that were identified from the historical Ordnance Survey maps and aerial photographs very few above ground structures survive.

DESIGNED LANDSCAPES

Introduction

The area of this survey covers several of Northumberland and the Tyne and Wear districts' diverse parks and gardens.

Cockle Park in Northumberland, was probably a late medieval deer park as indicated by its early 16th-century tower house/hunting lodge. The placename Cockle Park now refers to the small hamlet around the Grade II* listed Cockle Tower (NHLE1042088). Although this area is also notable for the earthwork survival of two substantial late Iron Age enclosures, there are few other tangible expressions of the original park or its boundaries. In the early 19th century the land was transformed into an experimental farm and a significant portion was impacted by surface mining in the second half of the 20th century.

Cockle Park is shown as enclosed parkland on Speed's maps of 1610, as are others at Bothal, Morpeth, and Beamish, suggesting that these too originated as medieval hunting parks. Again, this survey did not record any features conclusively associated with the Bothal or Morpeth parks, and Beamish lies largely beyond the boundaries of this project.

Whilst the estates of Gibside, Ravensworth Castle, Lambton and 'Seton Dalavell' are indicated on Speed's map, he did not distinguish these with his schematic park convention.

Seaton Delaval Hall and its gardens and park were built and laid out in the early 18th century on the site of what had been, in the 13th century, one of the largest vills in the area (Wrathmell 1975, 478). Armstrong et al.'s map of 1769 depicts the park as bound to the north by a long avenue running west from the hall, and a rather straight pale to the south and east. This map also indicates a short avenue running south from the hall to the Obelisk. The long avenue (NHER28536) is one of the key features of the surviving landscape, the shorter avenue has been levelled by ploughing but is occasionally revealed by cropmarks (NHER28513).

Gosforth Park was established in the second half of the 18th century to compliment the construction of Gosforth House (TWHER167). It came to comprise three distinct zones: open parkland, Gosforth Wood and the large Gosforth Lake. Well-preserved ridge and furrow of likely medieval origin is a conspicuous feature of the surviving open ground (1627084). The ploughing ridges are cut by the ditches of naturalistic tree clumps that were a key element of the 19th-century parkland (1627135). In the late 19th century a large portion of the park became a racecourse, this unusual pivot in use may have contributed to the survival of the ridge and furrow. The racecourse was used as a training ground in the Second World War and is now Northumberland golf course, both created their own earthworks. With this complex history it has not been possible to identify the origin of the series of half-moon shaped earthworks that sit on the northern-edge of the lake near the boat house (1627131).

The case studies presented below examine in potentially significant discoveries at Gibside and Ravensworth.

Gibside (Fig. 27)

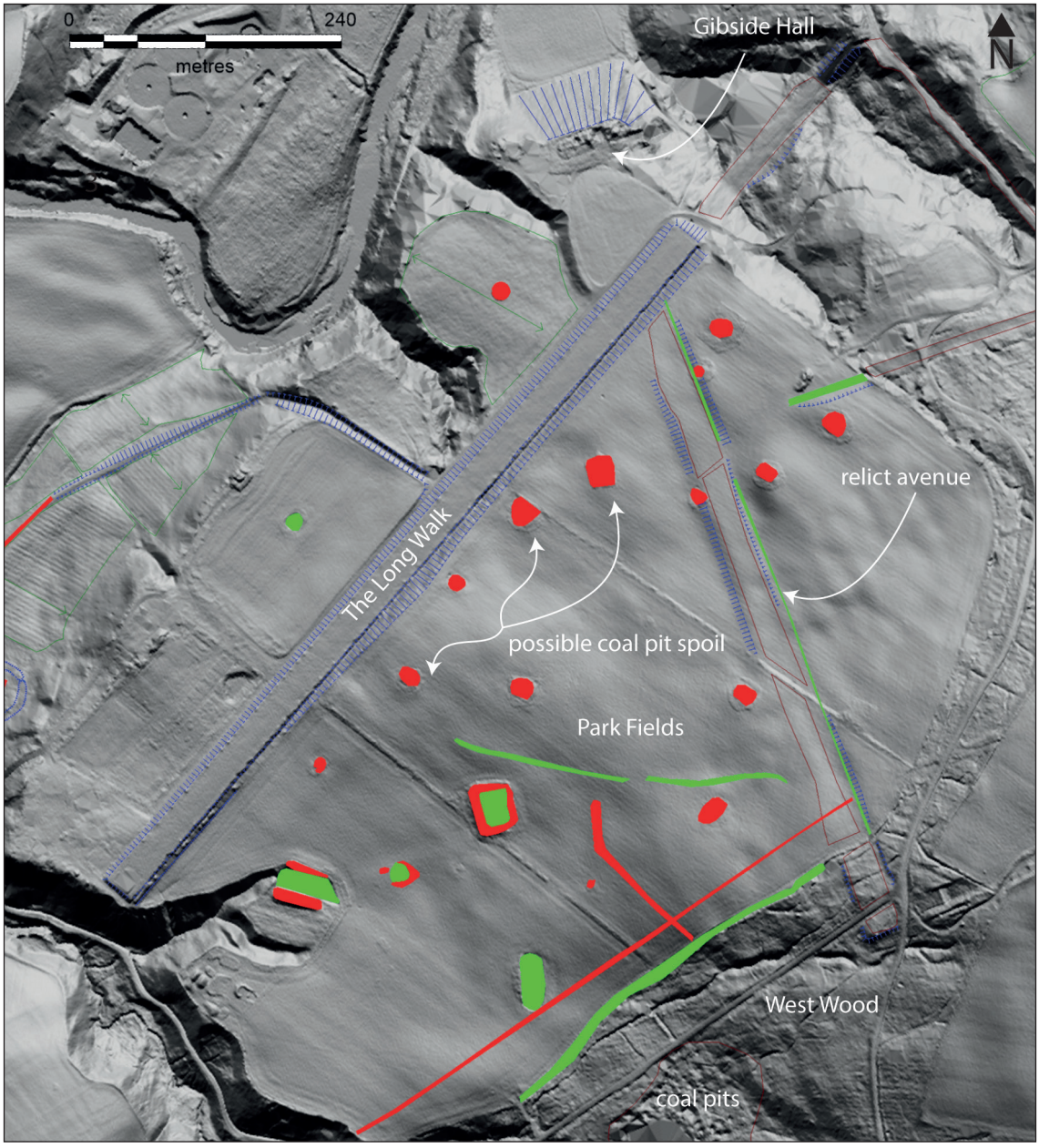


Figure 27: Landscape features and possible coal workings at Gibside. [background lidar DTM 2018 © Historic England; source Environment Agency]

The impressive ruins of Gibside Hall, overlooking the River Derwent to the north are flanked by open parkland and wooded denes to the east, south and west. The hall was built by William Blakiston in the early 17th century and later extended. Work on the gardens and parkland was initiated by George Bowes, who inherited the estate in 1722 (TWHER5006). Bowes had consulted with the architect William

Etty in 1727 and the landscape designer Stephen Switzer in 1731 but it is not known which, if any, of their planned schemes were implemented. James Stephenson's 1767 estate map records the layout at that time including elements that are still key to the landscape today: the Long Walk, Snipes Dene and West Wood, the Octagon Pond and the Banqueting Hall (Forestry Commmisson 2018, 5).

Gibside and its archaeological and historical remains are described extensively across the National Heritage list entry (NHLE 1000508), the Tyne and Wear HER record (5006) and the National Trust HER records. However the lidar imagery and aerial photographs indicate the existence of an avenue that is not depicted on the known historical plans of Gibside (1627743). From a squared-off terminus at Hillhead Lane in West Wood, it runs north-north-westward towards the bay window section of the Gibside Hall's south facing façade. Across Park Fields it is defined by a long level terrace emphasised by narrow cropmarked ditches to either side. The levelled area is approximately 25m wide. This avenue ends abruptly where it meets The Long Walk, which is at a slightly lower level. The land between the Hall and The Long Walk also appears to have been relandscaped so unsurprising there is no trace of the former avenue here. The possible origin of the tree clumps in Park Fields were discussed elsewhere in this report and their positioning makes no greater design sense in the context of this feature.

This avenue is not depicted on the 1767 map (Forestry Commission 2018, 5) and Armstrong and Jeffery's map of 1768 suggest the main approach to the hall came from the east via Snipes Dene at that time. The Long Walk (or Grand Walk) was laid out in 1746-1749 so it seems plausible that the avenue to Hillhead Lane was constructed in the earlier part of the 18th century.

Ravensworth (Fig. 28)

Ravensworth Park is centred around building remains that comprise, in varying states of decay, a medieval quadrangle castle, and early 17th-century Palladian Villa and the 19th-century Nash House (North of England Civic Trust 2008, 10). An early and prescient reference to the park, with mention of the right to work a coal pit, is made in a deed of 1356 (TWHER646).

The Conservation Plan for Ravensworth Castle and Estate lays out the detailed history of the estate (2008, 10-18, 44-50). In summary, the estate was acquired by the Thomas Liddell in early 17th century. The Liddells generated their wealth from coal and corn and held significant positions in Newcastle. Thomas Liddell's son, also Thomas was made 1st Baronet of Ravensworth in 1642, a reward for support given during the siege of Newcastle in 1644. Having been sequestrated during the interregnum the estate was bought back by the 2nd Baronet, also Thomas Liddell, in 1650. The 2nd Baronet industrialised the extraction of coal across the estate, building a coal mill and its leat on land close to the castle and a wagonway to transport the heavy coal to staithes on the River Team.

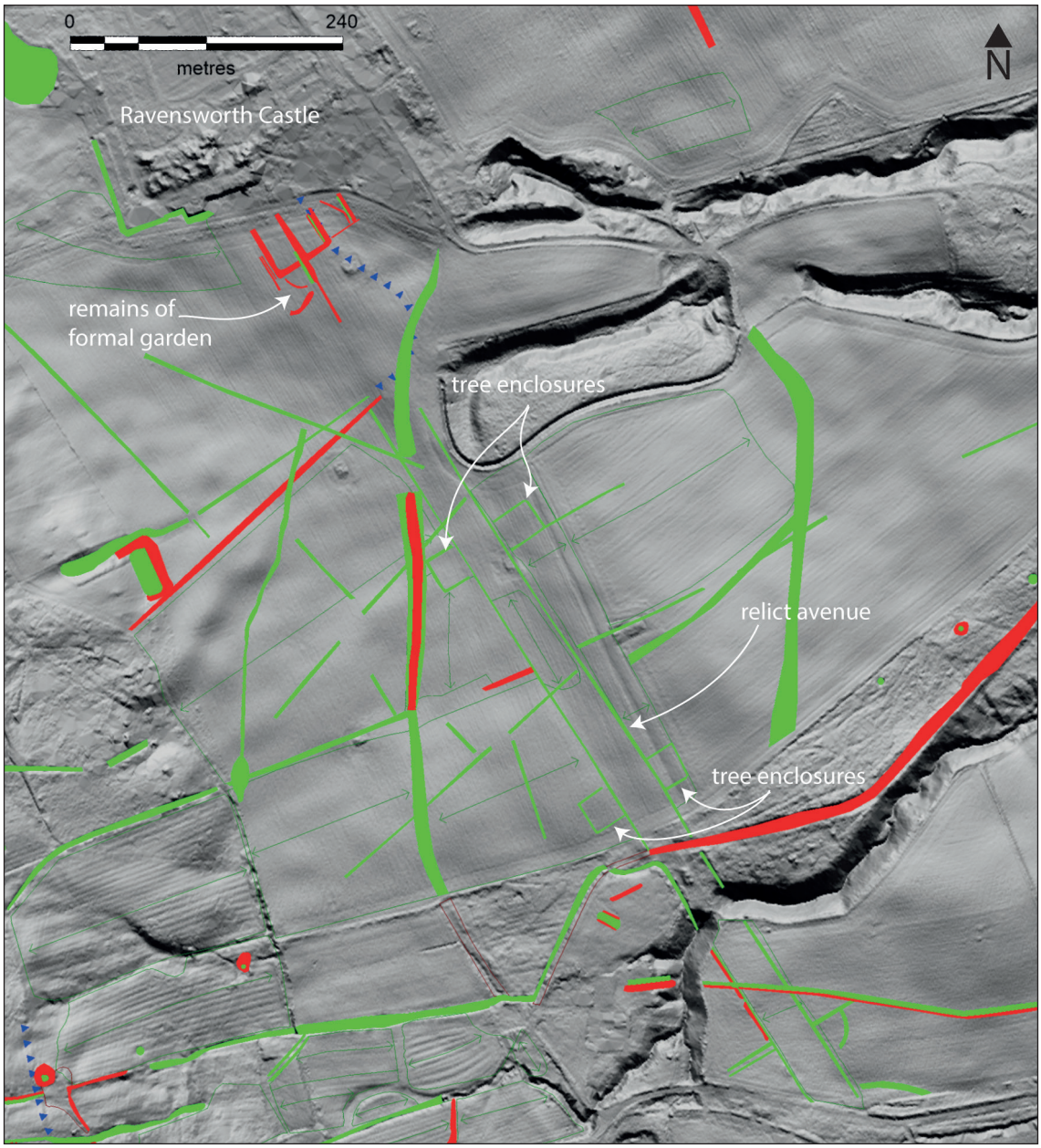


Figure 28: Landscape features in Ravensworth Park. [background lidar DTM 2018 © Historic England; source Environment Agency]

It was the 3rd Baronet, Henry Liddell, who having recognised its precarious condition, undertook remodelling of the castle and began to plan for the design of the grounds.

Early post war aerial photographs show Ravensworth Park before it was extensively ploughed for cultivation and reveal many earthworks that were then extant but are now barely detectable. Recent lidar imagery has revealed earthwork remains in areas that were obscured or concealed by trees on most of the conventional aerial photographs. These complimentary resources have revealed the archaeology of the park that perhaps has been overshadowed by the nature and variety of the structural remains. Some of these remains have been discussed elsewhere in this report.

Cultivation remains

Ridge and furrow survived across many areas of the open parkland in the 1940s (1627926). Broad sweeping ridges curve around the western side of the castle and in a small field to the west of Ravensworth Park Farm, these remains may be medieval or early post medieval in origin. Elsewhere the ridges are straighter and more closely spaced, which is usually an indicator of a later date.

The avenue and tree enclosures

There is a conspicuous absence of ridge and furrow in a broad band of land starting approximately 210m south of the castle and running south to Robin's Wood. Along this section narrow ditches emphasise the edges of this feature and mark it out as an intentional rather than consequential feature (1627922). In the context of this park this was likely to have been an avenue. There is a substantial causeway where the avenue intersects the steep narrow gully that runs along the southern edge of Robin's Wood. South of the wood there are post medieval plough ridges within the corridor, but the outer ditches still mark its trajectory down to Banesley Lane. The western ditch is flanked by a narrow bank, which appears to have acted as field boundary in the late 19th century.

Just north of Robin's Wood the avenue is flanked by a pair of small, ditched, near-square enclosures and a second pair 221m to the north. The post medieval plough ridges continue into these enclosures, but are slightly less-well preserved here than those immediately outside of the enclosures. Fragments of perpendicular and curving ditch south of the wood may be the site of a third pair. These features are likely to be the remains of tree enclosures.

The avenue is not depicted on Fryer's map of *circa* 1785, the Lamesley Tithe Map of 1847 nor the late 19th-century Ordnance Survey maps (North of England Civic Trust 2008, Appendix C, 8). However, two designs attributed to the early 18th century do allude to the planning of an avenue at Ravensworth (North of England Civic Trust 2008, Appendix C, 5 and 6).

Most of the land between Robin's Wood and the castle has now been converted to arable cultivation. The lidar imagery indicates that here the only surviving earthwork pertaining to the avenue is a short stretch of terrace. However there is better survival in the unploughed ground where it passed Robin's Wood and the causeway still survives. Soilmarks that are visible on Google Earth™ imagery indicate that elements of this feature did still survive in 2001, but how long they might persist under repeated ploughing is not known.

Feature south of the castle complex

The evidence for the avenue peters out approximately 210m south of the castle complex and where there are several intriguing features. The meandering hollow way, perhaps a route between the castle and Old Ravensworth is discussed elsewhere in this report (1627925). The historical aerial photographs show a gently curving

scarp running from the eastern corner of the castle towards Greenhouse Walks and then turning westward where it continues across the park to edge of High Park Wood (1627921). These earthworks correlate closely with a drive depicted on Fryer's plan of 1785 and another plan of the park that is dated, probably wrongly, 1890 (MV105).

West of the scarp and south of the castle the ground is devoid of earthworks on the early air photos and has the appearance or having been deliberated levelled. However modern ploughing has revealed cropmarks and soilmarks in this area (1627921). These are of the form of rectangular arrangement of banks. One of these banks, abutted by a quarter circle form, is oriented along the centre line of the avenue. These features echo some elements for the head of the avenue that are shown on the two early 18th-century plans (North of England Civic Trust 2008, Appendix C, 5 and 6.).

The 1945 aerial photographs also show Second World War anti-landing trenches cut across the open areas of the park. These too have been levelled by ploughing.

Further work

Gibside (NHLE100508), Blagdon (NHLE1001043), Gibside (NHLE100508), Lambton Castle (NHLE1001438) , Woolsington (NHLE1001322) and Seaton Delaval (NHLE1001052) are on the Register of Parks and Gardens and have the protection that this status confers. Ravensworth is not on the register but has been a Conservation Area since 1990 and the castle and site of the coalmill are Scheduled Monuments. This survey has identified a number of previously undocumented features that pertain to the industrial heritage and the designed landscape of this parkland.

Gibside is in the care of the National Trust. The Trust's archaeologists will be updated on the results for this property, highlighting the recovery of evidence for the Hillhead Lane avenue.

There is potential for surveys of this type to further enhance knowledge and management for those parks that are only partly covered by this survey: Blagdon Park in Northumberland, Beamish and Lambton Castle in County Durham and Woolsington, Newcastle district.

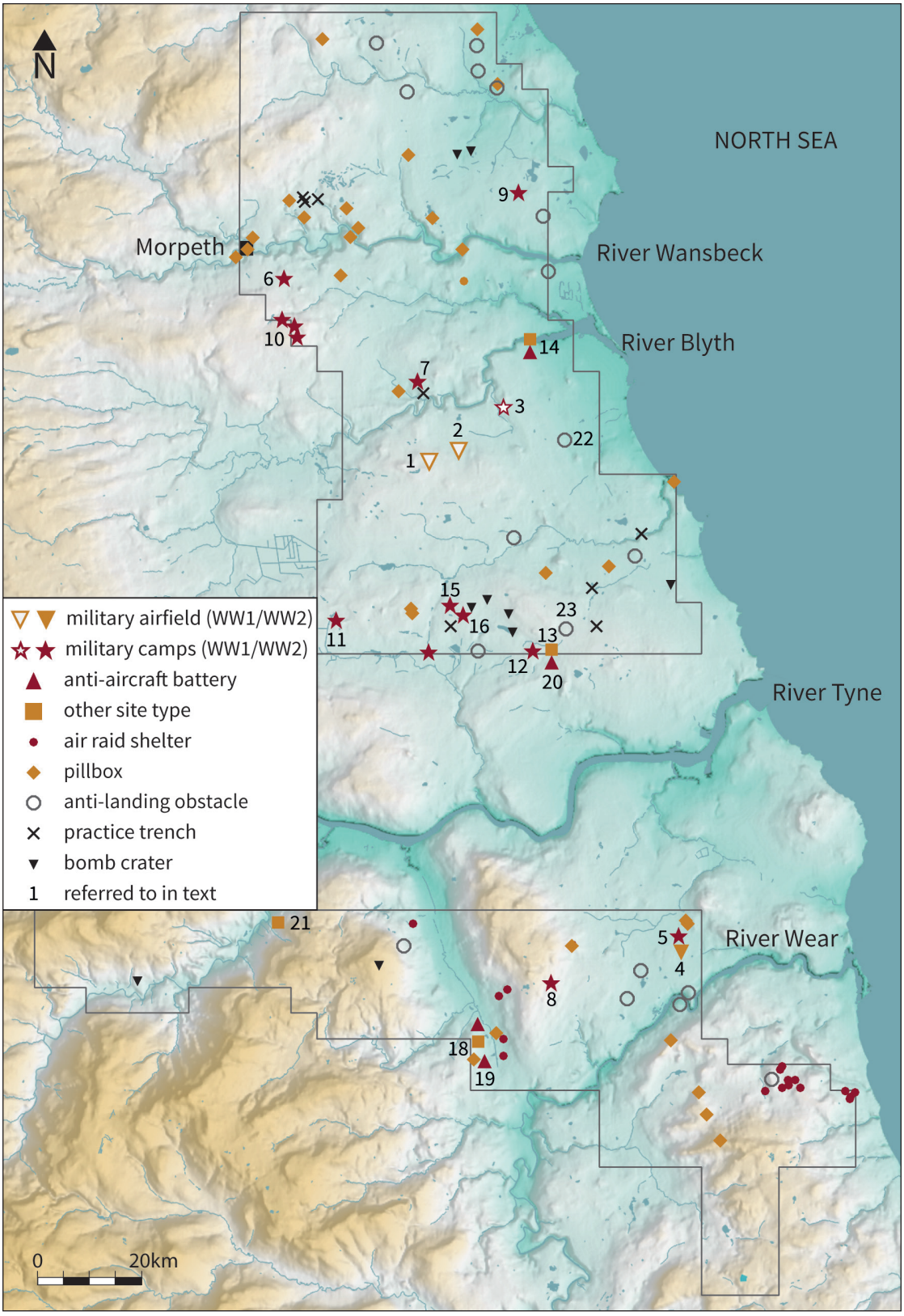


Figure 29: Distribution of First and Second World war remains, from aerial imagery. [background generated from height data © Bluesky International/Getmapping PLC]

Introduction

There is a diverse range of 20th-century military sites in the project area, reflecting its strategic North Sea coast location and industrial importance. However, because this project did not extend up to the shoreline, except at Seaton Sluice, this was covered by the NE RCZAS which mapped and recorded the rich 'Coastal Crust' military heritage of the immediate coastal hinterland.

Most of the features and installations recorded by this project pertain to the Second World War, but there are a small number of remains of known or possible First World War origin.

First World War installations

Cramlington Aerodrome was established as a Royal Flying Corps station in 1915, and was the first in the north-east of the country (NHER19481) (Fig. 29 no.1). It was used through the First World War but the Royal Air Force withdrew from the site in 1920. Cramlington Aircraft Ltd and then Newcastle Aero Club used the ground until 1935, when the latter relocated to RAF Woolsington (which would later become Newcastle International Airport). Thus the airfield was redundant before the Second World War commenced. Early aerial photographs show the part-dismantled state of the aerodrome in 1926. In the late 1940s some structures were still standing and its general layout was still legible but is was subsequently re-developed, with surface mining to the west of the road and Bassington Industrial and Business Parks to the east.

Figure 30: Cramlington airship hangar [part of RAF/CPE/UK/2352 4-OCT-1947 Historic England Archive (RAF Photography)]

In 1918 a site just to the north-east of the Cramlington Aerodrome was selected to be a base for airship operations (NHER26252). Airships were deployed to observe submarine movements and protect convoys crossing the North Sea. This airship

station was to replace ad hoc moorings at Chathill (inland from Beadnall Bay) and Kirkleatham (south of the River Tees near Redcar) (see NELSAM). The station comprised a large airship hangar, measuring approximately 106m by 33m and concrete tethering posts extending out from each corner (Fig. 29 no.2). By the 1940s housing had been built up to the southern corner of the hangar and but this structure still stood until the late 1960s (Fig. 30).

Far less is known about possible First World War remains on the east bank of Horton Beck. (NHER28436) (Fig. 29 no. 3). Cropmarks and very low earthworks indicate an arrangement of roads and paths flanked by rows of huts and possible parade grounds between them. A little to the north there are practice trenches, water tanks and paths (NHER28612). On late 1940s aerial photographs there are no above ground structural elements, which might be expected if this camp had been in use earlier in the same decade.

There is a possible reference to this camp in a list of the movements of the Gloucestershire Regiment 3/4th, 3/5th and 3/6th Battalions.

> Moved to Cheltenham in winter 1916-17, Catterick in March 1917, Horton in July 1917 and finally Seaton Delaval in October 1917 for duty with Tyne Garrison.

(see the Long Long Trail). The geography of these movements lends some support to this being the same 'Horton Camp'.

Second World War remains

Airfields

Only one Second World War airfield, RAF Usworth, lies entirely within the project area (Fig. 29 no.4). The airfield comprised two runways, one oriented near north to south, the other south-west to north-east and a perimeter track around it (1628538). The aircraft hangars stood around the perimeter track, a Lamella and a Callander on northern edge of the airfield, next to South Camp and two blister hangers on the west side. Eight E-shaped fighter pens and associated hardstandings were distributed around the edge of the airfield. The fighter pens were supported with flight offices, airfield sleeping shelters, ablutions blocks and air raid shelters. There were fuel depots on the north and south side of the airfield, and explosives stores set apart from the South Camp, one for detonator and the other for pyrotechnics. There was a firing range near the explosives stores and a cannon test butt on the south-east edge of the perimeter track. The whole of airfield has been re-developed and is now part of the Nissan complex; none of the original structures are in situ. The Lamella hangar survived until at least 2002 but was demolished by 2005. Interpretation of the historical aerial photographs was enhanced considerably by the 1945 Usworth Record Site Plan and its schedule of buildings, which is on display at the North East Land Sea & Air Museums, Washington. This museum occupies part of what was the North Camp at the airfield. North Camp stood between the north side of Washington Road and the now disused railway line (Fig. 29 no.5). It comprised domestic buildings including barracks, accommodation huts, food depots, ablutions

blocks, mess and sick quarters (1628534). There were several air raid shelters around the camp and a transmitter site stood on the northern edge. All of the Second World War structures had been demolished by the mid-1960s and it is unlikely that any of the earthworks that are now visible on the museum site relate directly to its historical activity.

Military Camps

Common Camp at Morpeth (NHER27595) is described as a 'Crash Camp', though the precise role of these in the Northumberland context is not known (Foot 2005, 18). After the war this camp was redeployed as a resettlement camp for Polish servicemen and their families and emergency housing for English families. The earliest available air photos, taken in 1946 and 1947, are a record of the camp at this time (Fig. 29 no.6). They show a large number of huts, Nissen huts and other buildings arranged around a dendritic road network. Contemporary accounts tell how the inhabitants recreated a form a self-sufficiency that reflected their roots by keeping fowl, growing fruit, vegetables and herbs and foraging (see Polish Resettlement Camps in the UK). The camp was demolished in the 1960s and the land is now fields, woodland and the Morpeth Town football club.

Foot recorded No. 1 / No.2 Crash Camps, "Hartford Bridge, East Hartford" on the River Blyth (2005b, Appendix 1). He identified this as an 'overlord camp', a station used to congregate but also conceal large numbers of troops in advance of major offensives. Usually the accommodation at these stations was very temporary (as in tents) and/or concealed but neither applies Hartford Bridge camp, at least not in 1947 (Fig 29 no. 7). The camp may already have been well-established by the time the 'Overlord' tactic came into play in which case

> No attempt was made to conceal some camps expanded for OVERLORD, ..., which had been established for years and where any attempt to conceal the extensions would raise suspicions (Foot 2005a, 21).

Alternatively, the 1947 layout may reflect later expansion and development.

Anecdotal evidence suggests that the huts were used for family accommodation and was a thriving community for many years after the war. By 1967 aerial photographs show that most of the camp huts on the east side of the road had been removed and the land returned to grass or cultivation. West of the roads many of the huts and some of the Nissen huts survived and appear to have been in use that time. Google Earth 2022 and Street View imagery suggest that now only a single-storey, brick-built hut survives on the east side of the A192, 1.2km north of the bridge across the River Blyth. Some earthwork remains may also survive in a small area of scrub 450m to the south-east of this structure.

There was a sizeable military camp, Blackfell Camp near Washington (1628622) and other smaller examples at Ashington (NHER27595), Tranwell (NHER28678, NHER28684 & NHER28674), in Foxcover Wood (1627292), near Low Gosforth

House (1627105) and at Killingworth (1627180). All were still standing at the end of the 1940s. Blackfell Camp continued in military use until the mid-1960s, but has then demolished and redeveloped (Fig 29 no. 8). Some of buildings at Ashington camp were still in place on the OS map of 1968, and identified as 'Government Buildings' but these too have now been demolished (Fig 29 no. 9).

The Tranwell camps may have been associated with RAF Morpeth, a World War II air gunners school, located just outside the area of this project. These were small accommodation camps arranged along roads and field boundaries near Tranwell (Fig 29 no. 10). Similarly the small camp in Foxcover Wood was probably linked to RAF Woolsington (now Newcastle International Airport) (Fig 29 no. 11).

The small camp at Killingworth (Fig. 29 no. 12) may have provided accommodation for workers at the Killingworth Moor anti-aircraft supply depot (162719). In the late 1940s this depot comprised large warehouses and five large ordnance stores each surrounded by earthern blast walls, amongst other buildings. Most of these structures were still standing until 2015 but the site has now been redeveloped for housing (Fig. 29 no. 13).

Prisoner of War camps

Several installations in the project area operated as Prisoner of War camps during the Second World War.

At Kitty Brewster's Farm the historical aerial photographs show a cluster of over 30 huts, including two in a road cutting for the not yet completed A189 (NHER15269) (Fig. 29 no. 14). Thomas classified this as a German Working Camp (2003, 41). The site is now a recycling centre and most of the wartime structures have been removed, however there are two structures at NZ2832 8209 and NZ2832 8208 that coincide with huts that are visible on the historical aerial photographs. These might be survivors or simply later buildings re-using existing bases or footprints.

At North Gosforth two camps are recorded north and south of Sandy Lane (1627115 and 1627114). Either of these might be the Prisoner of War camp known as Tyne J Camp (Thomas 2003, 50). The camp north of Sandy Lane has a formal arrangement of huts and buildings around a small parade ground, which suggests a military function (Fig. 29 no. 15). The other has a more residential-style layout with buildings fronting onto broad paths or roads (Fig. 29 no. 16). Just to the south of these camps and on the northern edge of the Gosforth Park racecourse, a series of practice trenches are cut into the well-preserved ridge and furrow. Some of these trenches are still visible as earthworks but the camps have been demolished

Anti-invasion defences

There are a number of sites that had a role in preventing invasion from the sea and air: a radar station, gun emplacements, searchlight batteries, anti-landing obstacles and pillboxes.

At Ouston the characteristic hexagonal layout of a radar station antennae array is visible on post war aerial photographs (1629140) (Fig. 29 no. 18). Although this is the only example within this project's area, the Hadrian's Wall and NE RCZAS project recorded a least seven such radar stations along the River Tyne and at least six along the North Sea coast between Ryhope and Blyth. The station at Ouston stood with a heavy anti-aircraft battery to the north and small camp to the west. The whole complex has now been demolished and built over. However, a possible searchlight battery located 850m to the south-west appears to survive as an earthwork (1629135) (Fig. 29 no. 19).

Kitty Brewster Farm, on the south bank of the River Blyth was the site of a heavy anti-aircraft battery, as well as the Prisoner of War camp discussed above (Fig. 29 no. 14). This site has also been demolished.

On Killingworth Moor aerial photographs taken in the 1940s shows fragmentary earthworks and a small structure that resemble the remains of gun emplacements. (Fig. 29 no. 20) (1627194). This site was located approximately 750m to the north of the Tyne K heavy anti-aircraft battery and radar station (just outside of this project's area).

Records indicate the presence of a bombing decoy site between Gibside and Old Hollinside (1413369). The aim of this particular decoy was to deflect attention from Blaydon Colliery and marshalling yards, which stood further to the north. Aerial photographs have revealed a small number of features in this area and some may be associated with the operation of the bombing decoy: the remains of a possible control building, possible fire-break ditches and other earthworks (Fig. 29 no. 21).

Anti-landing obstacles, essentially perpendicular arrangements of ditches and upcast-soil cut across large fields or flat ground, feature extensively along the eastern edge of the project area, particularly between New Delaval to New Hartley Fig. 29 no. 22 (NHER11515). Most of these obstacles were quickly filled in after the war so as not to impede cultivation but earthwork examples do survive at Holystone Farm (1627223) where they cut across post medieval ridge and furrow (Fig. 29 no. 23).

This project recorded approximately 39 pill boxes from the aerial photographs, most were located along the Rivers Blyth and Team and in a north to south alignment between Washington and Sunderland. Fewer than half of these are still standing. Many were sited on the edges of industrial complex such as collieries and quarries and were they cleared demolished when these sites were re-landscaped.

Concluding remarks

This appraisal has identified that aside from the pillboxes, there are only a small number of locations where 20th-century military features sites may survive: the remains of a possible First World War camp at Horton, a single hut at East Hartford and possible buildings at Kitty Brewster's Farm. These three examples warrant further investigation. The overwhelming outcome of this particular class of heritage asset has been demolition and re-landscaping.

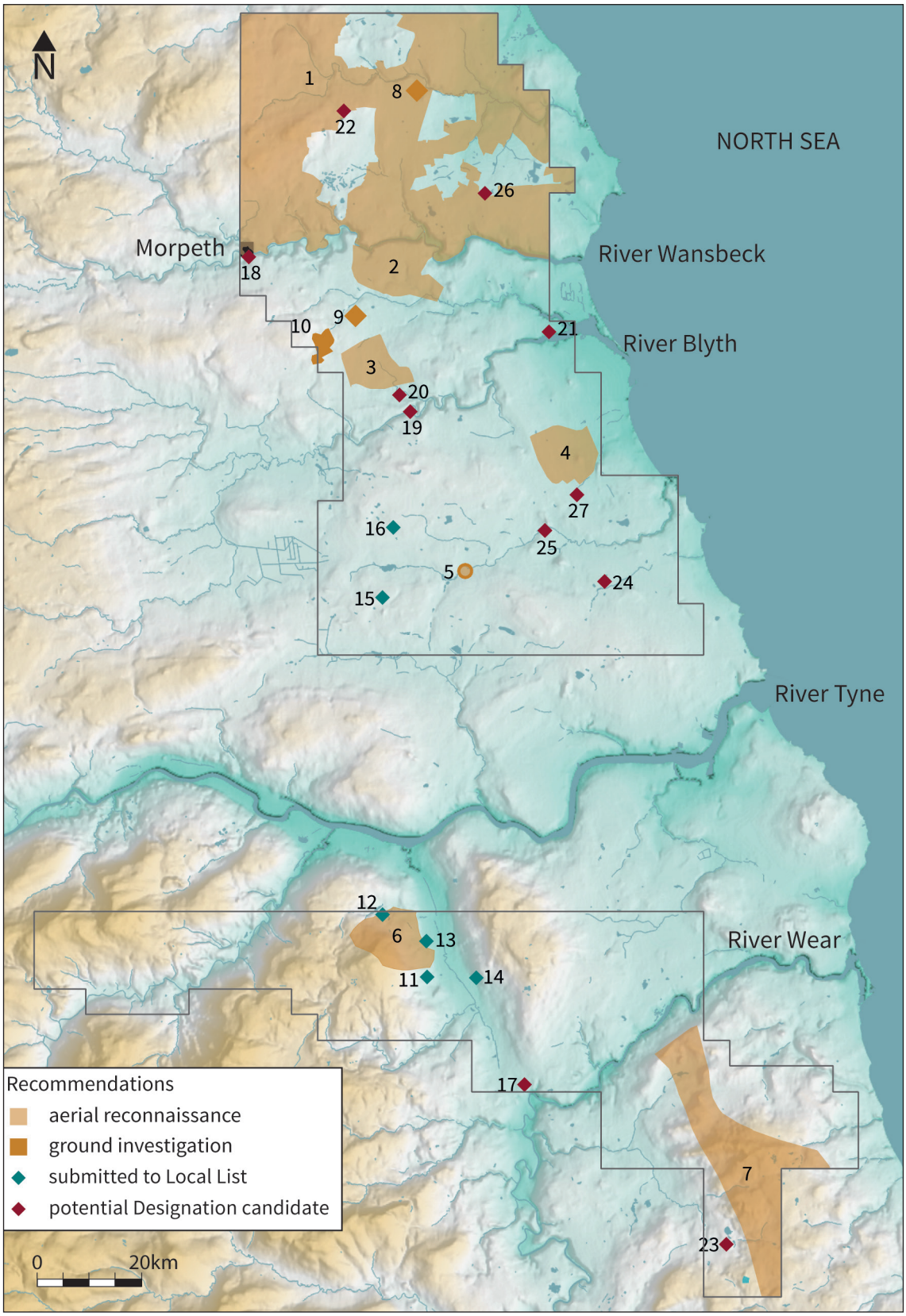


Figure 31: A key to the location of recommendations. [background generated from height data © Bluesky International/Getmapping PLC]

DISSEMINATION AND FURTHER WORK

This project has produced an extensive and comprehensive map of the archaeological and historical features and structures that are visible on a variety of aerial imagery. The imagery is from a broad range of dates and sources and includes visualisations generated from lidar data. This report has sought to highlight a selection of the project's results but there is wealth of information to be tapped from this extensive and diverse dataset. Due to the nature of the project area: dynamic and densely urbanised in many parts, many of these features have already been lost or rendered in-accessible to other means of investigation.

Dissemination of the project data

The core data generated by this project comprises the spatial data: GIS mapping with summary data including period, monument type, source imagery and condition and monument records, which mirrors some of the spatial data fields and includes a brief free text description and links to other types of sources including historical maps.

The spatial data is held by Historic England and is available on the Aerial Archaeology Mapping Explorer. It has also been passed to the relevant HERs.

The monument records have been generated in Historic England's Warden and Northumberland HER (refer to Introduction for full explanation), and will ultimately be available through Heritage Gateway and Keys to the Past. All monument records generated in Warden will ultimately be passed to the relevant HER through the Heritage Information Access Simplified programme. Access to this data will enable planning professionals to formulate appropriate mitigation on a site by site basis when threats arise and when determining future planning policy.

Enriching the List

This project has also provided the opportunity to signpost useful and information images that either show the more recent historical assets when they were still in use, or assets that have now been destroyed or concealed. This signposting is a core element of the mapping and records: every single feature that has been mapped has a reference to the source image.

Additional information for some of the existing Scheduled Monuments has also been submitted to Enriching the List, namely: NHLE1016974 West Backworth medieval settlement, NHLE 017224 Gibside Hall, NHLE1016975 Ravensworth quadrangular castle, NHLE1002364 Causey Arch, Tanfield, NHLE1016976 Woodhorn Colliery, NHLE1006563 Newminster Abbey, NHLE1006493 Roman camp near Mitford Steads, NHLE1018224 Colliery engine house at Washington F Pit, and NHLE 1015522 Derwentcote steel cementation furnace.

Future reconnaissance targets

Reconnaissance undertaken by Norman McCord and later Tim Gates, specifically for archaeological purposes, has made a significant contribution to the record of late Iron Age sites. Similarly, Historic England (and its predecessors) has produced an extensive record for the declining coal industry and the Scheduled Monuments. There have, however, been fewer discoveries arising from recent reconnaissance. It is not clear if this is because flights have produced fewer results or there have simply been fewer flights into this region. The presence of large areas of remediated surface mining does make this a challenging area to survey from the air. The list below identifies targets that may be fruitful to plan for in the future.

No. on Figure 31	Location	Reason for reconnaissance
1	North of the R.Wansbeck	To investigate the apparent dearth of the typical late Iron Age enclosures and check for the presence of other possible Pegswood-type settlements
2	East of Morpeth, south of R.Wansbeck	To further record the cropmarks appearing on this patch of light soils, including palisaded enclosures and pit alignments.
3	Stannington Station	To trace possible field boundaries and trackway extending from this group of later Iron Age enclosures.
4	North of New Hartley	To trace possible field boundaries and trackways extending between a dispersed group of later Iron Age enclosures.
5	Weetslades TWHER792, West of Dudley	To monitor and record the possible remains of Weetslades medieval/early post medieval settlement.
6	Ravensworth Castle and park	There is considerable potential for further features (pre-medieval, coal mining and garden design) to be revealed in the ploughed zones of this landscape.
7	West of A19 Offerton to South Hetton	The cultivated ground west of the A19 and along the edge of the limestone should be monitored for further prehistoric features extending from the cursus complex at Hasting Hill and in the environs of barrows and cists on Warden Law.

Further Research

This dataset presents a wide range of sites and landscapes that offering interesting opportunities for further research and investigation, from prehistoric monuments to remains of the recent coal industry and its infrastructure. If such opportunities do arise, perhaps through community groups or academic engagement, then the following might be considered.

No. on Figure 31	Monument	Comment
8	Ulgham NHER31842	Cropmarked site of possible Neolithic enclosure, but currently lacking the firm evidence that field walking, geophysical survey or excavation could yield.

9	Hepscott NHER11704	Cropmarked site of possible Neolithic enclosure, but currently lacking the firm evidence that field walking, geophysical survey or excavation could yield.
5	Weetslades TWHER792	Cropmarked and soilmark site of possible medieval or early post medieval settlement but currently lacking the firm evidence that field walking, geophysical survey or excavation could yield.
10	Coldwell NHER28689 and Dovecote Farm NHER13568	Complex settlement earthworks at two locations and possible grange earthworks, truncated by plough furrows, may benefit from detailed topographic survey. Also interesting for presence late Iron Age enclosures.
6	Ravensworth Castle and park	This project has recorded a hitherto unrecorded earthworks and cropmarks. These require a more detailed assessment both from a historical perspective as the remains of one of the regions foremost and innovative coal-producing estate and in terms of the management of these assets.

There is also considerable potential for the substantial GIS dataset generated by this project to test and contribute to landscape-wide analyses such as the orientation analysis used by Astbury to investigate long-term landscape development (2020).

Local Lists

At present only Gateshead and Newcastle local authorities hold a Local List of heritage assets. These are buildings, structures, parks and gardens (including cemeteries and open spaces) that have special architectural or historic interest which is an important part of each boroughs' heritage. The Local List is not a statutory designation and it is not supported by any legislation, it specifically excludes Scheduled Monuments and Listed Buildings.

The following assets have been submitted for consideration for inclusion on these Local Lists.

Sites nominated in Gateshead

No. on Figure 31	Monument	Description
11	Possible late Iron Age enclosure 1627942	Archaeological Sites, Finds, and Spaces: Earthworks of a small ditched enclosure and associated linear features on the bank of the Mitcheson's Gill. If threatened this site should be considered for Scheduling as a rare earthwork survival of its type in this region.
12	A section of The Trench 1629642 (TWHER4121)	Archaeological Sites, Finds, and Spaces: Earthwork ditch running through the north part of Ravensworth Park via Coxclose Wood, Coxclose Dene and north of Trench House. It was built by Sir Thomas Liddell in the 1670s to power the coalmill which forms part of the Scheduled Monument NHLE 1015922 (900m to the south-east).

13	Wagonway and coal pits in Robin's Wood, Ravensworth 1627510 & 1627933 (TWHER3749)	Archaeological Sites, Finds, and Spaces: Earthwork remains of a wagonway and coal pits. Associated with the Team Colliery Wagonway, which was built by Sir Thomas Liddell in the late 1600s.
14	Coal pits in Longacre Wood 1628797	Archaeological Sites, Finds, and Spaces: Earthwork remains of a line of coal pits running against the contours along the southern boundary of the wood. A well-preserved example of the surface remains of this type of early coal mining.

Sites nominated in Newcastle

No. on Figure 31	Monument	Description
15	late Iron Age enclosure at Morley Hill 623385 (TWHER1330)	Archaeological Sites, Finds, and Spaces: Earthworks of a double ditched enclosure. This was one of three closely spaced enclosures, the other two have now been built over (Headland Archaeology 2019). It is located close to housing and has potential as a conduit for community engagement with the prehistoric background of this area.
16	Seven Mile House Farm late Iron Age enclosure TWHER1323	Archaeological Sites, Finds, and Spaces: Earthworks of a multi-ditched enclosure with medieval or post medieval ploughing within and around the enclosure. These earthworks are adjacent to the Listed Building GINGANG ON WEST SIDE OF FARMBUILDINGS AT SEVEN MILE FARM (NHLE1237367)

National Heritage List for England

Scheduled Monuments

The only observation arising from this project in regards to an existing Scheduled Monument concerns NHLE1006493 Roman camp near Mitford Steads. It is possible that this enclosure is of late Iron Age date rather than the implied Roman military function. This type of enclosure is found in considerable numbers across this project's area. A close comparison to this enclosure is the example excavated by Jobey at Hartburn in 1973. There are late Iron Age enclosures that, from the lidar imagery at least, appear to survive better than this particular example.

At the time of writing Designation applications could only being considered if the site in question was under active threat. There is currently no active threat to the monuments listed below but these are either rare examples or well-preserved exemplars of their type and may warrant consideration for Scheduling at some future date or if a threat arises. Further details for each site are supplied in Appendix 2.

No. on Figure 31	Brief description
17	Two curvilinear enclosure of possible Neolithic date at Picktree (876885)
18	Two well-preserved examples of likely late Iron Age enclosures near Mitford Castle. (NHER11119 & NHER11115)

19	A well-preserved near-square enclosure with trackway, in a commanding position of the south bank of the River Blyth (NHER27767)
20	A pair of typical late Iron Age enclosures near Hartford Bridge (NHER11714 & NHER27771)
21	A well-preserved near-square enclosure on the banks of the R. Blyth, near the river's mouth (NHER27766).
22	Large well-defined enclosure of likely Iron Age date in Blackdean Wood (1629503)

Listed Buildings

An engine shed built before 1947 survives on the site of the former Hetton Colliery (661844). Sunderland planning authority have received an application for the demolition of this building. There is an existing application for Listing associated with this building (Application no. 1475204) (Fig. 21 no. 23)

At the time of writing Designation applications could only being considered if the site in question was under active threat. There are currently no active threats to the buildings and structures listed below but as rare survivors of the coal industry they may warrant consideration for Listing at some future date or if a threat arises. Further details for each site are supplied in Appendix 2

No. on Figure 31	Brief description
24	1946 Winding house at East Holywell Colliery (TWHER1048)
25	A range of buildings at the site of Seghill Colliery (NHER11524)
26	A single-storey, brick-built building at Ashington Colliery (NHER11697)
27	A square of houses and workshops associated with Seaton Delaval colliery (NHER19273)

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Geology of Britain Viewer https://mapapps.bgs.ac.uk/geologyofbritain/home.html? (this website was retired in August 2022)

Ordnance Survey Six Inch Maps (multiple dates) https://maps.nls.uk/series/

Soilscapes http://www.landis.org.uk/soilscapes/

APPENDIX 1 – SPATIAL DATA

The features mapped by this project have the following attribute or object data.

Field Name	Type	Description	Sample data
LAYER	Text (50)	The form of the archaeological feature (AI&M Layer Name)	BANK
PERIOD	Text (254)	Date of feature (Periods List). Single or dual indexed terms.	MEDIEVAL or MEDIEVAL/POST MEDIEVAL
NARROW-TYPE	Text (254)	Monument Type (from Monument Types Thesaurus). Specific monument type for individual features. Avoid dual indexing.	TOFT
BROAD_ TYPE	Text (254)	Monument Type (from Monument Types Thesaurus). Broader monument type to enable grouping of individual features. This field may not be useful in all cases, if not simply repeat the narrow type field. Avoid dual indexing.	SETTLEMENT
EVIDENCE_1	Text (254)	Form of remains (Evidence Thesaurus) as seen on SOURCE_1	EARTHWORK
SOURCE_1	Text (254)	Source feature was mapped from aerial photograph or lidar (HEA Photo References, some example are provided below)	HISTORIC ENGLAND ARCHIVE OS/67307 V 0065 20-AUG-1967
EVIDENCE_2	Text (254)	Latest form of remains (Evidence Thesaurus) as seen on SOURCE_2. If EVIDENCE_1 is CROPMARK, simply repeat CROPMARK (unless now quarried away then this would be DESTROYED MONUMENT).	LEVELLED EARTH-WORK
SOURCE_2	Text (254)	Latest available source aerial photograph or lidar (HEA Photo References) to give indication of current state of preservation. Not applicable for cropmark sites. Some professional discretion may be required if an earthwork shows well on lidar, but is not visible on slightly later orthophotography.	LIDAR English Heritage Trust DSM 03 & 14-MAR-2016
HE_UID	Long Integer	Historic England monument record number	23092
HER_NO	Text (254)	HER number for those monuments recorded in the HER or concorded with existing HER records.	10928 or HER5683

The monument polygons generated by this project, that outline the areas covered by each monument record, have following attribute or object data.

HE_UID	Long Integer	Historic England monument record number	23092
HER_NO	Text (254)	HER number for those monuments recorded in the HER or concorded with existing HER records	10928 or HER5683

APPENDIX 2 – SUGGESTED DESIGNATION CANDIDATES

At the time of writing Designation applications could only being considered if the site in question was under active threat. The following are details of archaeological monument and historical buildings that may warrant consideration for designation in the future of is a threat arises.

Two curvilinear enclosures of possible Neolithic date at Picktree

[See Fig. 4]

Historic England monument record 876885

Central NGR 428058, 553341

Local Authority: County Durham

Two circular enclosures sit above pronounced loop in the River Wear, on sands and gravels overlying the coal measures. The larger of the two enclosures has slightly flattened sides, opposing entrances that are aligned north-north-west to south-south-east and is 65m in diameter. The smaller lies to the immediate west, may have had opposing entrances and appears to have at least three inner circuits of pits. This enclosure measures 28m in diameter (internal to the ditch). The larger enclosure is crossed by a post medieval wagonway.

Similar to enclosures at Bootle, Cumbria (1599019). The pit circuits within the smaller Picktree enclosure, like those observed inside the small henge know as Akeld Steads in the Milfield Basin, may have held timber posts. The flattened sides of the larger Picktree example recalls the inner ditches of some of the Yorkshire henges: Ferrybridge, Cana Barn and Newton Kyme in particular.

Described as a 'somewhat henge-like enclosure' by Frodsham (2019) and of 'probable earlier Neolithic date' by Vyner (2007, 70).

GEOJSON:

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References

Vyner, B. 2007 'A Great North Route in Neolithic and Bronze Age Yorkshire: The Evidence of Landscape and Monuments', Landscapes, 8(1), pp. 69–84. doi: 10.1179/lan.2007.8.1.69.

Frodsham, P. 2019 Neolithic and Early Bronze Age, North East Research Framework.

Large well-defined enclosure of likely Iron Age date in Blackdean Wood

[See Fig. 8]

Historic England monument record 1629503

Central NGR 421000, 591180

Local Authority: Northumberland

A large well-defined rectilinear enclosure of late Iron Age date in Blackdean Wood, Cockle Park. Concealed by trees on conventional aerial photographs lidar imagery has revealed this well-preserved enclosure. Although largely in woodland a small section has been lost to surface mining. The enclosure measures 106m by 64m and covers 0.83ha.

The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) record 229 possible late Iron Age enclosures and this was the largest and one of the best preserved. It may be an example of one of the occasional meeting places posited in the NERF Framework (Heslop et al. n.d.). There is a much sparser distribution of late Iron Age enclosure north of the River Wansbeck. This enclosure bears comparison to the Scheduled enclosure at Houghton (NHLE1014076).

GEOJSON:

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1.670726439641857,55.21368789202508]]]}

References

Heslop et al. n.d. *Late Bronze Age and Iron Age, North East Research Framework*

Two well-preserved examples of a likely late Iron Age enclosures near Mitford Castle

[See Fig. 11a]

Northumberland HER 11119 & 11115

Central NGR 417315, 585638

Local Authority: Northumberland

Two well-preserved examples of a likely late Iron Age enclosures. Both average size, one with secondary outer ditch. Both overlain by medieval and post medieval ridge and furrow. A commanding position overlook the River Wansbeck. These earthworks are of considerable landscape value, particular when in taking in context with other Scheduled Monuments in the close and near proximity Mitford Castle (NHLE1017318), a pillbox (NHLE1003239) and Newminster Abbey (NHLE1006563).

The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 203 possible late Iron Age enclosures between the Rivers Tyne and Wansbeck, but analysis of the lidar imagery suggests that very few of these survive as earthworks of any height. This makes this pair and their surroundings relatively unusual.

GEOJSON:

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{"type":"Polygon","coordinates":[[[-1.727763093391174,55.163315082586273],
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A well-preserved near-square enclosure with trackway, in a commanding position of the south bank of the River Blyth

[See Fig. 11b]

Northumberland HER 27767

Central NGR 423524, 579501

Local Authority: Northumberland

A small well-preserved enclosure on the south bank of the River Blyth. The northern corner is particular well-preserved. Unusually this enclosure has an extended entranceway. The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 203 possible late Iron Age enclosures between the Rivers Tyne and Wansbeck, but analysis of the lidar imagery suggests that very few of these survive as earthworks of any height. This makes this example relatively rare.

GEOJSON:

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[-1.633511117223714,55.109600580927406],[-
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A pair of typical late Iron Age enclosures near Hartford Bridge

[See Fig. 11d]

Northumberland HER 11714 & 27771

Central NGR 423524, 579501

Local Authority: Northumberland

A pair of typical late Iron Age enclosures, traversed by medieval and post medieval ridge and furrow. These survive as low earthworks, N11714 with traces of internal and external banks, which could be significant for the understand of this monument type and for sealing and preserving earlier occupation. The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) observed that enclosures of this type were frequently arranged in strings across the landscape but rarely have the spaces between these settlements been studied so the interrelationships between them are poorly understood.

GEOJSON:

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A well-preserved near-square enclosure on the banks of the R. Blyth, near the river's mouth

[See Fig. 11e]

Northumberland HER 27766

Central NGR 428960, 582520

Local Authority: Northumberland

A small well-preserved enclosure close to the mouth of the River Blyth. The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 203 possible late Iron Age enclosures between the Rivers Tyne and Wansbeck, but analysis of the lidar imagery suggests that very few of these survive as earthworks of any height. This makes this example relatively rare. Its estuarine/coastal location is also of interest.

GEOJSON:

{"type":"Polygon","coordinates":[[[-1.547694628548111,55.136505053254602],[-1.546517188086619,55.136536982686792],[-1.546312118627446,55.136320370176954],[-1.546372876196416,55.135803887732457],[-1.547554578259803,55.135781590823257], [-1.547694628548111,55.136505053254602]]]}

Smithy and other buildings at the site of Seghill Colliery

Northumberland HER 11524

Local Authority: Northumberland County Council

Postcode NE23 7DT and/or NE23 7DR

At the site of Seghill Colliery (NHER11524) a range of buildings that coincide with the smithy and other building shown on the OS map of 1865 survive at the corner of Middle Farm and Front Street. A colliery and buildings are shown at this location on Greenwood's map of 1828. The 'smithy' building lower half stone, upper half brick. The west wall has four infilled doors or large windows with stone or concrete lintels. The low buildings attached to the north side of the 'smithy' are rendered but appear to be thick-walled, the north gable end is partly exposed (above a later extension) and appears to be stone-built.

The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 88 late 19th and early 20th-century collieries within

its 481sq km project area. It established that by 2022, there were no more than five locations at which there were tangible standing remains of the coal industry (excluding existing Designated sites). This range of buildings is one of these rare survivors.

GEOJSON:

{"type":"Polygon","coordinates":[[[-1.551897481239149,55.067108629406285],[-1.551653786208135,55.06711249520901],[-1.551639000726514,55.06695032727535],[-1.551896402662857,55.066952892239932],[-1.551897481239149,55.067108629406285]]]}

A single storey building associated with Ashington Colliery

Northumberland HER 11697

POSTCODE NE63 8QQ

Local Authority: Northumberland County Council

At Ashington colliery a long, single-storey, brick-built building, with bricked-up arch and stone or brick quoins survives on the footprint of a building depicted on the OS map if 1897. It is not certain that this is the original structure but this building was associated with operations at the colliery.

The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 88 late 19th and early 20th-century collieries within its 481sq km project area. It established that by 2022, there were no more than five locations at which there were tangible standing remains of the coal industry (excluding existing Designated sites). This building is one of these rare survivors.

GEOJSON:

{"type":"Polygon","coordinates":[[[-1.585558827941535,55.18564412086895],[-1.586175856872898,55.1856774877539],[-1.586189452154496,55.185593153963907],[-1.585572570369705,55.18556086598263],[-1.585558827941535,55.18564412086895]]]}

A square of houses and workshops associated with Seaton Delaval colliery

Northumberland HER 19273

POSTCODE NE25 0QT

Local Authority: Northumberland County Council

At Seaton Delaval Colliery substantial parts of the square depicted on the OS map of 1865 survives and are in use. Much is concealed by modern facades, roofs and additional structures. This square was probably mixed use with some colliery workshops and worker's houses. The three entrances into the square are still legible, the north-east entrance has surviving gate piers. Along the north-east side of the square there are occupied houses to the south, stoned built, sash windows and facing out from the square. The northern half is a long range with many inserted doors and windows, but possible not original for dwellings.

The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 88 late 19th and early 20th-century collieries within its 481sq km project area. It established that by 2022, there were no more than five locations at which there were tangible standing remains of the coal industry (excluding existing Designated sites). As being a rare survivor it is good example of a form that characterised the early centralisation of the machinery and labour required for coal extraction. Examples of similar squares: Benton Square, Earsdon Square, Holywell Square, and High Downs and Low Downs near Hetton Le Hole were all destroyed by the mid-20th-century. Brown suggested that the origins of these square lay in the arrangement of agricultural farmsteads of Northumberland and the Borders (1988, 592).

GEOJSON:

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59547241]]]}

References:

Brown, H. D. 1988 The Colliery Cottage. 1830-1915. The Great Northern
Coalfield. Univer

A structure at East Holywell Colliery

Tyne and Wear HER 1048

POSTCODE NE27 0JW

Local Authority: North Tyneside

At East Holywell Colliery a single structure is still standing, surrounded by the concrete footprints of many others that survived until at least 2015 (TWHER1048). This is likely to be the winding house, which the HER indicates was built in 1946, replacing the original. The colliery site is the subject of the North Tyneside planning application 08/01094/FUL but it is not clear if and how the surviving building is impacted by the proposed work.

The South-East Northumberland Air Photo and Lidar Mapping Project (Oasis alisonde1-410218) identified 88 late 19th and early 20th-century collieries within its 481sq km project area. It established that by 2022, there were no more than five locations at which there were tangible standing remains of the coal industry (excluding existing Designated sites).

GEOJSON:

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[-1.513116463318489,55.050514346231402], [-1.513063596867738,55.0504208 56213229]]]}

References:

North Tyneside planning application 08/01094/FUL

Pre-construct Archaeology Ltd. 2007. An Archaeological Desk-Based Assessment: A Proposed Reclamation Scheme at Fenwick Pit, East Holywell Colliery, North Tyneside, Tyne and Wear. Unpublished report.

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