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Richmond Castle and Environs: Aerial Investigation & Mapping Report

Matthew Oakey

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RICHMOND CASTLE AND ENVIRONS

AERIAL INVESTIGATION & MAPPING REPORT

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SUMMARY

This report summarises the results of a landscape analysis of Richmond Castle and its wider setting from aerial photographs held in the Historic England Archive. The work was undertaken in support of an English Heritage Trust project to develop the interpretation at Richmond Castle.

The Historic England Archive collection of aerial photographs provides a unique record of the Richmond landscape over nine decades. As well as charting large-scale landscape change, such as the gradual expansion of Richmond town, the photographs also record more ephemeral details of everyday life, including the growth of the motor car and heritage tourism. The results of the project have revealed features ranging from Iron Age/Roman settlement to post-war prefab housing. They also include buried remains within Richmond Castle and Temple Grounds that were identified during the dry summer of 2018.

CONTRIBUTORS

The project was carried out by Matthew Oakey.

ACKNOWLEDGEMENTS

The photo loan was managed and delivered by Luke Griffin at the Historic England Archive.

ARCHIVE LOCATION

The Historic England Archive, Swindon.

DATE OF RESEARCH

Sept-Dec 2018

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INTRODUCTION

Project background

The aerial investigation and mapping described in this report is part of work for the English Heritage Trust (EH) to enhance the interpretation of Richmond Castle, North Yorkshire. The aerial investigation also looked at an area around the castle, as far as Easby Abbey, as the aim is to inform visitors about the wider landscape context. The project was undertaken as part of the Shared Services Agreement between Historic England and EH.

The work described in this report was carried out by the Aerial Investigation & Mapping team. This identified and accurately mapped features of historical and archaeological interest. Key illustrative aerial photographs were identified in the Historic England Archive and areas were highlighted for further research.

Methods, scope and sources

The project covered an area of 5.5sq km (Fig 1), encompassing Richmond Castle and Easby Abbey. All archaeological features visible on aerial photographs or lidar as cropmarks, soilmarks, earthworks or structures were mapped and recorded. These included features that were visible as extant earthworks on historic photographs, but which have since been levelled. The chronological scope ranged from the Neolithic to the 20th century but most features mapped relate to the medieval period or later.

Aerial photographs were consulted from the Historic England Archive alongside images supplied to Historic England through the Aerial Photography for Great Britain (APGB) agreement by Next Perspectives and imagery hosted on Google Earth. Lidar (airborne laser scanning data) flown for the Environment Agency was also consulted. Most of the survey area was covered by lidar at 1m resolution and there was a small area at 2m resolution. A 450m wide corridor following the course of the River Swale was also covered by 50cm resolution lidar.

Aerial photographs were rectified and georeferenced using Aerial 5.36 software. Lidar data were processed using the Relief Visualization Toolbox 1.1 to create 2D GeoTIFF images (Kokalj *et al* 2011; Zakšek *et al* 2011). Georeferenced imagery was loaded into ArcGIS 10.3.1 where features were digitised. Accompanying textual records were made in the National Record of the Historic Environment (NRHE) database AMIE. These are accessible via the PastScape website (www.pastscape.org.uk).

Full details of the methods, scope and sources can be found in **APPENDIX 1**.

The Richmond landscape

The project area falls entirely within Natural England's National Character Area 22: Pennine Dales Fringe (Natural England 2013). It is an undulating landscape,

bisected by the River Swale which flows from west to east. There are steep escarpments to the north and south of the river. The land use in the area is mainly agricultural with most fields in pasture and some areas of arable fields in the east which coincide with freely draining sandy soils to the north of the river. The steeper slopes along the course of the Swale are wooded in places with further areas of woodland elsewhere, including tree belts associated with the designed landscape of Easby House. The largest area of woodland is West Wood which lies in the south-west.

The market town of Richmond is sited in the north-western corner of the project area. The small hamlets of Sandbeck and Sleegill represent the only other nucleated settlement which elsewhere is characterised by dispersed farmsteads. The field patterns vary and include smaller fields with curved boundaries relating to early post medieval piecemeal enclosure around Sleegill and larger fields with straighter boundaries linked to 20th-century enclosure in the east.

Bedrock predominantly comprises Richmond Chert, but narrow bands of limestone, sandstone, mudstone and siltstone are present in the southern half of the project area. Along the course of the Swale the bedrock is overlain by river terrace deposits. To the south of the river superficial deposits comprise Devensian tills while to the north they are largely glaciofluvial deposits of sands and gravels.

This geology has influenced past land use and continues to do so. The heavier, slowly permeable soils over the tills to the south of the river are currently used as pasture. This has resulted in good survival of archaeological earthworks. To the north of the river, the soils overlying the sands and gravels are lighter and often under arable agriculture. Consequently the degree of earthwork survival is lesser, resulting in a more fragmentary picture of past settlement.

Archaeological features were primarily identified as earthworks with only one example of buried remains, a settlement, revealed as a cropmark. Buried remains are undoubtedly more extensive than are currently recorded from aerial photographs. Extant ridge and furrow may be masking older features but continued aerial reconnaissance in areas under arable may yield further results.

Previous survey

The project area was surveyed using aerial photographs as part the Yorkshire Dales Mapping Project (RCHME 1995). This project used hand-transcription to a 1:10,560 scale base map with a more limited range of sources than available now. Therefore, digital re-mapping of the project area to modern standards was considered necessary. This meant using computer-aided digital mapping and larger scale maps to provide better positional accuracy of mapped features. More sources, most significantly lidar data, were also available.

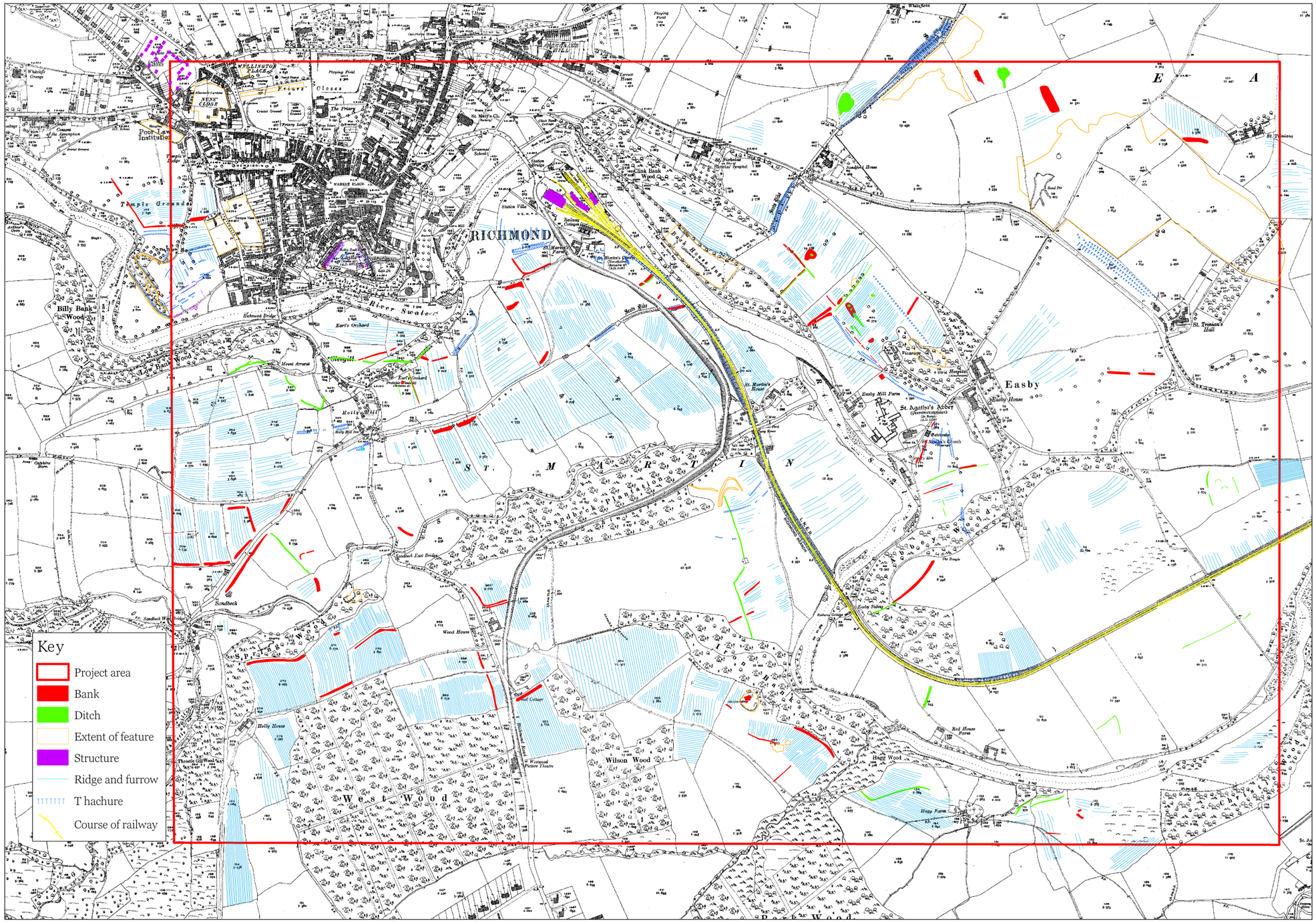

Fig 1: Project area and results of the aerial mapping. Ordnance Survey 1:2,500 published 1928 © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2018) Licence numbers 000394 and TP0024.

THE AERIAL PHOTOGRAPHS

Sources of aerial photographs

For the purposes of the current project, aerial photographs held by the North Yorkshire Historic Environment Record were not consulted but additional photographs may be available in that collection. The Cambridge University Collection of Aerial Photography (CUCAP) holds a number of images for the project area but is currently closed and therefore inaccessible. Google Earth has seamless vertical coverage for multiple years. This provides good illustrative material but no additional archaeological features were identified from this source.

The Historic England Collection

For the area covered by the project the Historic England Archive currently holds 264 vertical and 326 oblique aerial photographs ranging in date from 1927 to 2018. The collection provides a unique record of the Richmond landscape over nine decades. As well as charting large-scale landscape change, such as the gradual expansion of Richmond town, the photographs also record more ephemeral details of everyday life.

Oblique photographs

The oblique photographs held in the collection are distributed throughout the project area but most concentrate on Richmond Castle and the town. Unlike vertical survey, which provides blanket coverage over large areas, oblique photography is observer-led and targeted. Most of the images have been derived from Historic England's aerial reconnaissance programme (or those of its predecessor bodies) but there are also valuable historic photographs from the Aerofilms collection. The earliest images date from October 1927 and the latest from the summer of 2018.

Historic England

There is extensive photography of Richmond town and castle taken by Historic England and its predecessors (the Royal Commission on the Historical Monuments of England (RCHME) and English Heritage) from 1991 to 2018; Easby Abbey is also well documented. From around 2005 photographs were captured digitally but routinely printed for the archive. Those images from 2012 onwards are only available as digital images.

A variety of landscape and detailed photographs are available, many of which are appropriate for visitor interpretation material. The more recent digital images will also be of high enough resolution to be enlarged and cropped. Some provide similar views to historic oblique photographs from the Aerofilms collection so could be used to illustrate landscape change (*see* Figs 5 and 6). The parchmarks of the barrack block and other features within the castle enclosure are visible on several images but these were clearest in the summer of 2018.

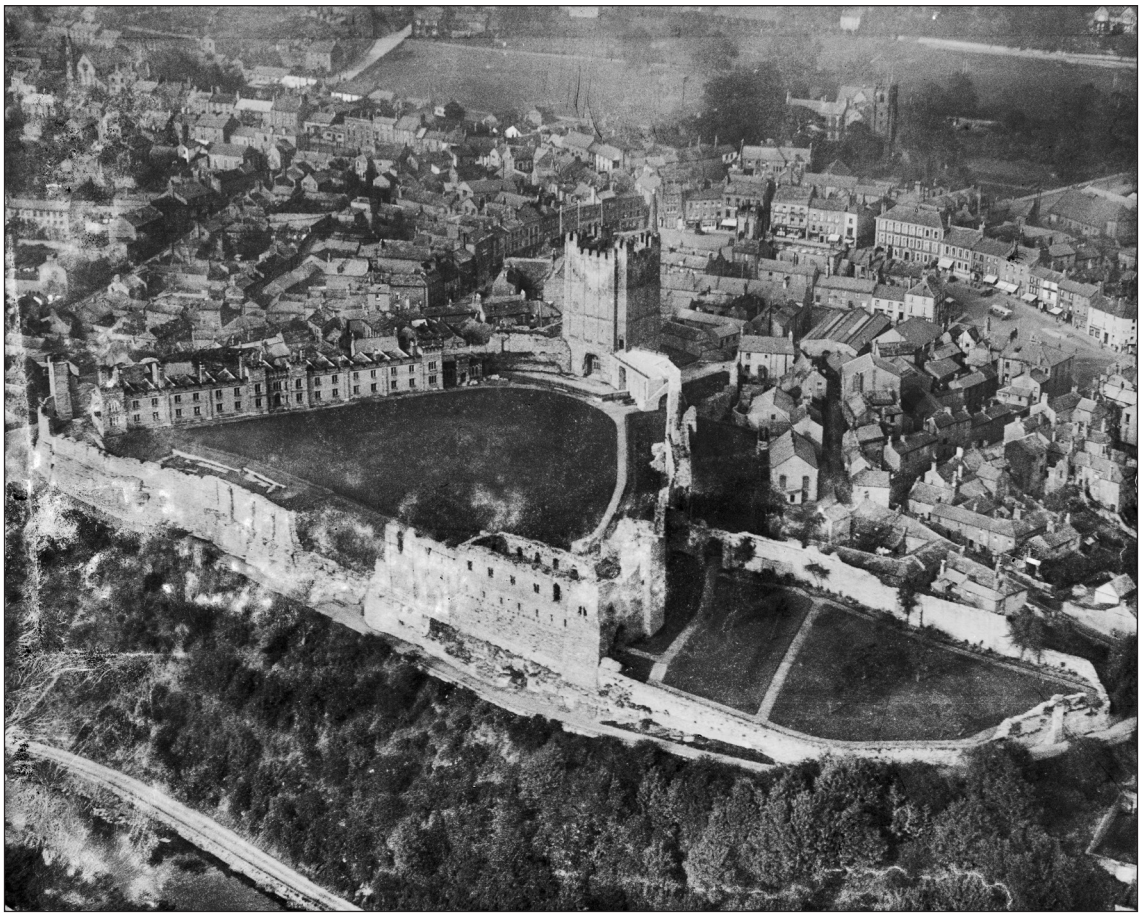

Fig 2: An Aerofilms Ltd photograph from October 1927 showing Richmond Castle and the extant Victorian barrack block. © Historic England Archive. Aerofilms Collection EPW019863.

The Aerofilms collection

Some of the most interesting and engaging oblique photographs were taken by Aerofilms Ltd during the first half of the 20th century. Other than one photograph of Easby Abbey, taken in May 1947, all of the other images concentrate on Richmond town and the castle. In total, 24 photographs are held in the collection, most of which are good quality and could be used for visitor interpretation. The images are available as high-resolution scans from the original negatives.

Seven of the Aerofilms photographs date from October 1927 and represent the earliest aerial images of Richmond in the Historic England Archive collection. Two show the extant Victorian barrack block, four years before its demolition in 1931 (Fig 2) and although both have some photo blemishes they provide a unique aerial view of the castle in this period. Others images include a view along Newbiggin towards Grey Friars' Tower (Fig 3), and Frenchgate (Fig 4). Three illustrate the market place with a small number of motor vehicles, including two charabancs (Fig 5).

Fig 3: An Aerofilms Ltd photograph from October 1927 looking north-east along Newbiggin towards Grey Friars' Tower. © Historic England Archive. Aerofilms Collection EPW019864.

Fig 4: An Aerofilms Ltd photograph from October 1927 of Frenchgate with St Mary's church in the foreground. © Historic England Archive. Aerofilms Collection EPW019867.

Fig 5: An Aerofilms Ltd photograph from October 1927 showing the market place. The toll booth is visible in the south-west corner. © Historic England Archive. Aerofilms Collection EPW019862.

Fig 6: The market place in 2014. 28592_015 25-JUL-2014 © Historic England Archive.

Fig 7: A view of Richmond looking north to Aske Hall. © Historic England Archive. Aerofilms Collection EAW005576 17-MAY-1947.

Richmond was revisited by Aerofilms in August 1947 and May 1949. Images include broad landscape views of the town (Fig 7) and frames focussing on the castle (Fig 8). Interesting details include lost buildings such as the toll booth that once stood in the south-west of the market place and was demolished in 1948 (Hatcher 2000, 142). They also illustrate changing aspects of social history such as the rise in car ownership and tourism.

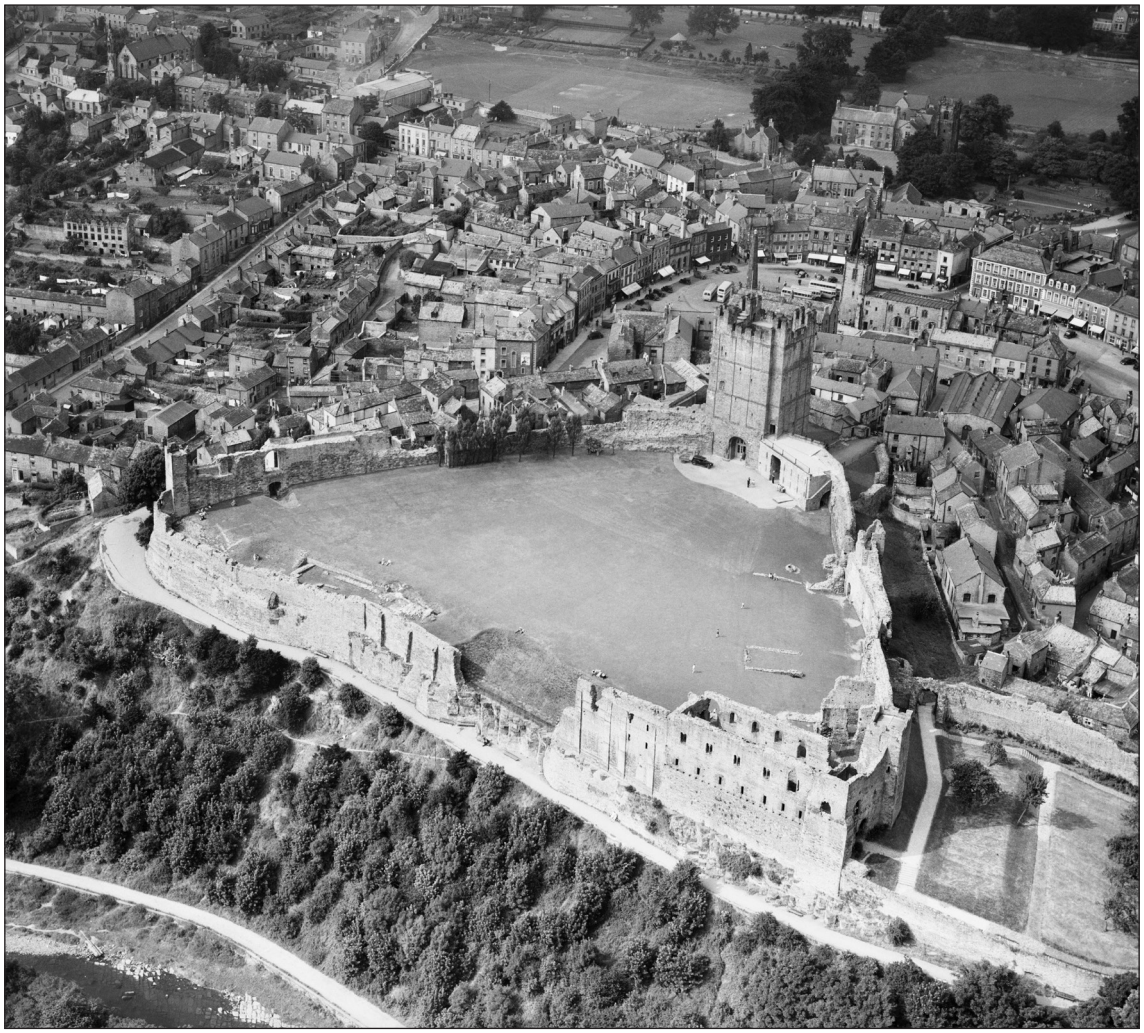

Fig 8: A detailed view of Richmond Castle in 1947. The site is busy with visitors and a car and trailer are parked in front of the keep. © Historic England Archive. Aerofilms Collection EAW009259 11-AUG-1947.

Vertical photographs

Most vertical photographs held in the collection were taken by the RAF and Ordnance Survey. They range in date from the 1920s to 1995 and provide an extensive record of landscape change at intervals over almost 70 years. Unlike oblique photographs, verticals provide blanket coverage of large areas.

The Crawford collection

The earliest vertical images are two frames from the Crawford Collection showing the castle and market place (Fig 9). Although the exact date is unknown, the extant barrack block within the castle indicates that they pre-date 1931. Other images from the Crawford Collection date from 1937 and show Richmond and Easby Abbey (Fig 10). Like the early Aerofilms images noted above, these photographs could provide good illustrative material.

Fig 9: A vertical photograph of the market place and castle taken pre-1931. North is to the left of the frame. CCC 9201/6117 date unknown. © Historic England Archive (Crawford Collection).

Fig 10: A vertical photograph from 1937 showing the town and surrounding area. CCC 5218/02495 05-MAY-1937. © Historic England Archive (Crawford Collection).

The Royal Air Force

RAF photography ranges in date from 1940 to 1959. The earliest photographs are a series of small-scale images taken in 1940 and 1945 (Fig 11). From 1945 onwards there is regular repeat photography of the project area. The RAF collection provides a useful record of the wider landscape, particularly those areas that are not targeted by early oblique images. Although the Richmond landscape has not undergone the kind of changes seen elsewhere in the country in the post-war period, the images are nonetheless useful. They show, for example, the railway and station while still in use and ephemeral aspects such as allotment gardens and temporary housing (*see* Figs 13, 14 and 30).

Fig 11: An RAF vertical photograph from 1947.RAF/106G/LA/286 FP 1063 12-MAY-1945 Historic England Archive RAF Photography.

Ordnance Survey and Meridian Airmaps Ltd

Vertical photographs taken by the OS and Meridian Airmaps Ltd date from 1965 to 1995. The primary interest of these images is that they chart the closure of the railway station and branch line and its development from 1970 onwards. Although the images are of generally good quality, they are likely to have limited use for visitor material compared to other aerial photographs.

The town

Their time-depth and quality mean that the aerial photographs in the Historic England Archive provide a vivid record of the changing character of Richmond and the castle since the early part of the 20th century.

The mid-1920s marked the beginning of the rise popular motoring including the use of the motor car for exploring the British countryside or 'touring'. Heritage was intrinsically linked to this pastime, with contemporary motoring literature popularising the concept of understanding the history of places en route (Morrison and Minnis 2013, 278–280).

Fig 12: Detail from a 1949 Aerofilms Ltd image showing the market place busy with cars and coaches. The toll booth visible in Fig 5 had been demolished the previous year. © Historic England Archive. Aerofilms Collection EAW023519 28-MAY-1949 (detail).

The impact of the motor vehicle is vividly illustrated on aerial photographs. In 1927 a small number of vehicles can be seen in the market place but by 1949 it is bustling with cars, vans and coaches (Fig 12). By 1937 there was a new bus depot next to the railway station, a sign of the rise of motor busses for excursions and everyday travel (*see* Fig 30). In a 1924 'Diary of a Yorkshireman' column in the Yorkshire Evening Post the correspondent notes that 'Richmond, as the railhead town for

Swaledale, has long been the starting point for road traffic up the valley, but much of the traffic now comes through the town by road, instead of starting there' (*Yorkshire Evening Post* August 6 1924).

Fig 13: Detail from a 1945 RAF vertical photograph showing allotment gardens. RAF/106G/UK/394 RS 4049 17-JUN-1945 Historic England Archive RAF photography (detail).

Within the historic core of the town, Richmond's street pattern has remained relatively unchanged since the first half of the 20th century but the aerial photographs chart the gradual expansion of housing in the following decades. Large allotment gardens are recorded on 1945 photography at Nun's Close and Temple View (Fig 13), both of which were also noted on OS maps of the late 1800s. The site of the Nun's Close allotments is now a car park while Temple View has been developed into housing. Smaller areas of allotments can also be seen behind the site of Richmond Workhouse and along the northern edge of the cricket ground. It is possible that these related the temporary allocation of land to food production during the Second World War. Photographs from 1947 and 1952 also show that site of the former cattle market had been developed into a temporary prefab housing estate (Fig 14). The design of the prefabs indicates that they were of a type manufactured by Tarran of Hull.

Fig 14: A prefab housing estate seen in the background of a 1947 Aerofilms Ltd photograph. It was constructed on the site of the cattle market around 1945 but had been demolished by 1956. © Historic England Archive. Aerofilms Collection EAW005578 17-MAY-1947 (detail).

Fig 15: The town gasworks seen in 1947. Church Corn Mill can be seen in the bottom right hand corner of the image. © Historic England Archive. Aerofilms Collection EAW005578 17-MAY-1947 (detail).

Richmond had become one of the first towns in Europe to be lit by gas after the construction of the gasworks on the banks of the Swale in 1820 (Hatcher 2000, 167). The gasworks and associated gasometers are visible on aerial photographs until the early 1980s, but are most vividly illustrated on Aerofilms images from 1947 (Fig 15). Other industrial buildings include Church Corn Mill which was demolished in 1969 (Hatcher 2000, 227).

The castle

The earliest dated photographs of the castle are three Aerofilms images from October 1927, although two undated vertical photographs are likely to have been taken at a similar time (*see* Figs 2 and 9). The images show the extant Victorian barrack block. Although the War Office's lease of the castle had ceased in 1913 (Grenville *et al* 2001, 56) it appears that the barracks were being reused in 1927 to provide married quarters for the Green Howards during their deployment as part of the Shanghai Defence Force (*The Yorkshire Post* January 25 1927). There was a broad track running between the cells and Scolland's hall. This appears to have been removed by 1937 – the poor quality of the photography makes it difficult to be certain – but is clearly gone by the time of the 1945 RAF vertical aerial photographs. The 1927 images also show an area to the south of the keep is fenced off, possibly relating to work being undertaken on the castle by the Office of Works.

Richmond castle came into state guardianship in 1910 and was opened to the general public soon after. Aerofilms images from 1947 show visitors within the castle and some of the early work undertaken by the Ministry of Works, including the excavation of a well and wall foundations in the east of the courtyard (see Fig 8). The custodian's cottage first appears on photography in 1937, placing the date of its construction at some point in the preceding decade. It is last visible in May 1966 and has been demolished by September 1970.

Fig 16: Parchmarks revealed within the castle courtyard during the drought of 2018. Features revealed include the buried remains of the Victorian barrack block. 34050_027 19-JUL-2018 © Historic England Archive.

Parchmarks of the Victorian barrack block had been observed from the castle and photographed from the air on several occasions but the long hot summer of 2018 provided optimal conditions for the formation of parchmarks within the courtyard (Fig 16). The castle was photographed on two occasions in 2018 and the images revealed the clearest details of surviving sub-surface deposits to date.

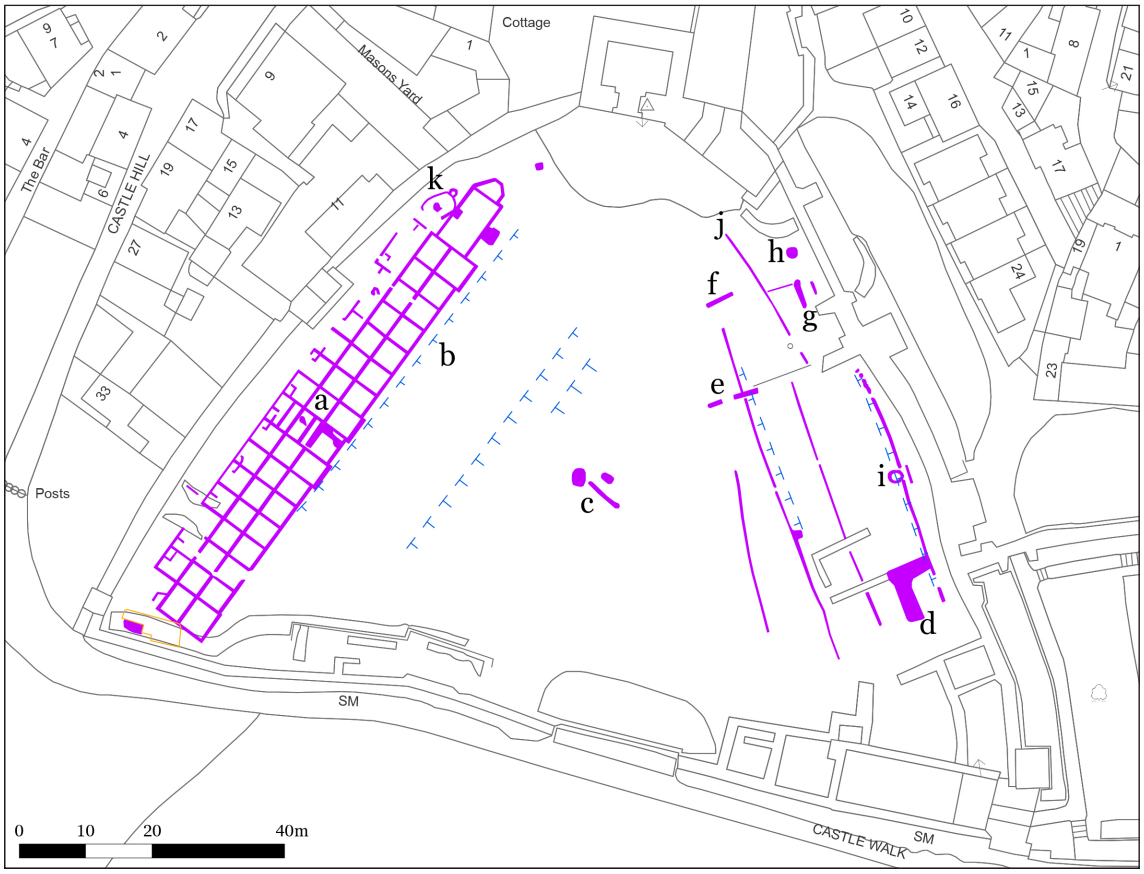

Fig 17: Mapping of the parchmarks (in purple) seen in Fig 16. The t-hachures indicate earthwork slopes visible on lidar. © Crown Copyright and database right 2018. All rights reserved. Ordnance Survey Licence number 100024900.

The plan of the buried remains of the barrack block (Fig 17, a) is clearly discernible including traces of solid floors in the entrance hall. Photographs taken in low sun in 2001 also show where the buried remains still have a surface expression as earthworks (Fig 18). Lidar also revealed an earthwork scarp running parallel to the front of the barrack block with two further scarps to the south-east possibly relating to a parade ground (Fig 17, b). Further parchmarks are visible in the centre of the courtyard (Fig 17, c). Although they are of uncertain date or function, the parchmarks indicate the presence of a solid or compacted surface under the turf.

In the eastern part of the courtyard several other features were identified as parchmarks on the 2018 photography. A broad L-shaped area of parching (Fig 17, d) seems likely to represent the footings of the north and west walls of the Chapel Chamber. Other wall footings include an extension of the wall running from Robin

Hood Tower (Fig 17, e) and further probable remains to the north (Fig 17, f-g). Two circular features (Fig 17, h-i) are of similar size to the excavated well so may be the remains of further wells.

There are several linear parchmarks in this location, some of which are also identifiable as earthworks on lidar and 2001 photography. One (Fig 17, j) is likely to represent the remains of a track visible on 1920s photography (*see* Fig 9) but the others cannot be so clearly attributed. It is possible that some or all of these linear features are of relatively recent origin but they may alternatively relate to earlier phases of the castle's history.

To the west of the barrack block there is a potential curvilinear feature which may represent a structure pre-dating the Victorian barrack block (Fig 17, k). A small circular structure appears to abut the north-eastern side and this is similar in size to the excavated well in the east of the courtyard. There is an area of trees at this location recorded on 1940s oblique photography (*see* Fig 8). Therefore the curved feature may relate to this. Further work, such as geophysical survey or excavation, may provide additional details.

Fig 18: Low sun reveals slight earthworks within the castle courtyard. some relate to features identified as parchmarks in 2018, including the Victorian barrack block. 17520/20 08-JAN-2001 © Historic England Archive.

THE WIDER RICHMOND LANDSCAPE

The pre-medieval landscape

Evidence of prehistoric and Roman land use and settlement within the project area is currently very limited. A Roman coin hoard and silver spoon were unearthed to the south of the castle in 1722 along with a further coin in the 1950s (Tyler 1976, 17) and in 1964 the discovery of a 'Roman' sword was reported (note in *Yorkshire Archaeological Journal* **41** (1965): 329). The only material evidence for pre-Roman occupation within the survey is Neolithic pottery which was recovered during a watching brief to the north of Easby Abbey in 2007 (MNY25540).

In 2005 a potential Iron Age and/or Roman settlement was photographed as a cropmark to the south of St Trinian's Hall at NZ 193 001 (Fig 19). Although the cropmarks are fragmentary, they appear to indicate the buried remains of a large ditched enclosure containing two arcs of ditch. The arcs probably represent parts of the drip gulley that once surrounded two round houses of about 14m in diameter. To the south, traces of ditches are also visible as cropmarks and these could relate to fragments of field boundaries associated with the settlement.

Fig 19: The cropmarks of a probable Iron Age/Roman settlement. 20391/28 27-JUL-2005 © Historic England Archive.

Scots Dyke

Scots Dyke, a Scheduled Monument thought to be an early medieval or earlier boundary, runs for a distance of around 14km from the River Swale in the south to the River Tees in the north. Some sections are now plough levelled, sometimes identified as cropmarks, but others survive as earthworks. Earthwork remains of the dyke are visible in several locations within the project area (Fig 20). The most substantial run north-east from Sandford House where traces of the ditch flanked by a broad bank can be seen on lidar. To the south-west of Sandford House the course of the dyke survives as a broad ditch running downslope towards the River Swale. On the opposite side of the river are more denuded traces of the ditch but early edition OS mapping indicates that more of the monument survived at this location until Theakston Lane was extended in the middle of the 20th century (Fig 21).

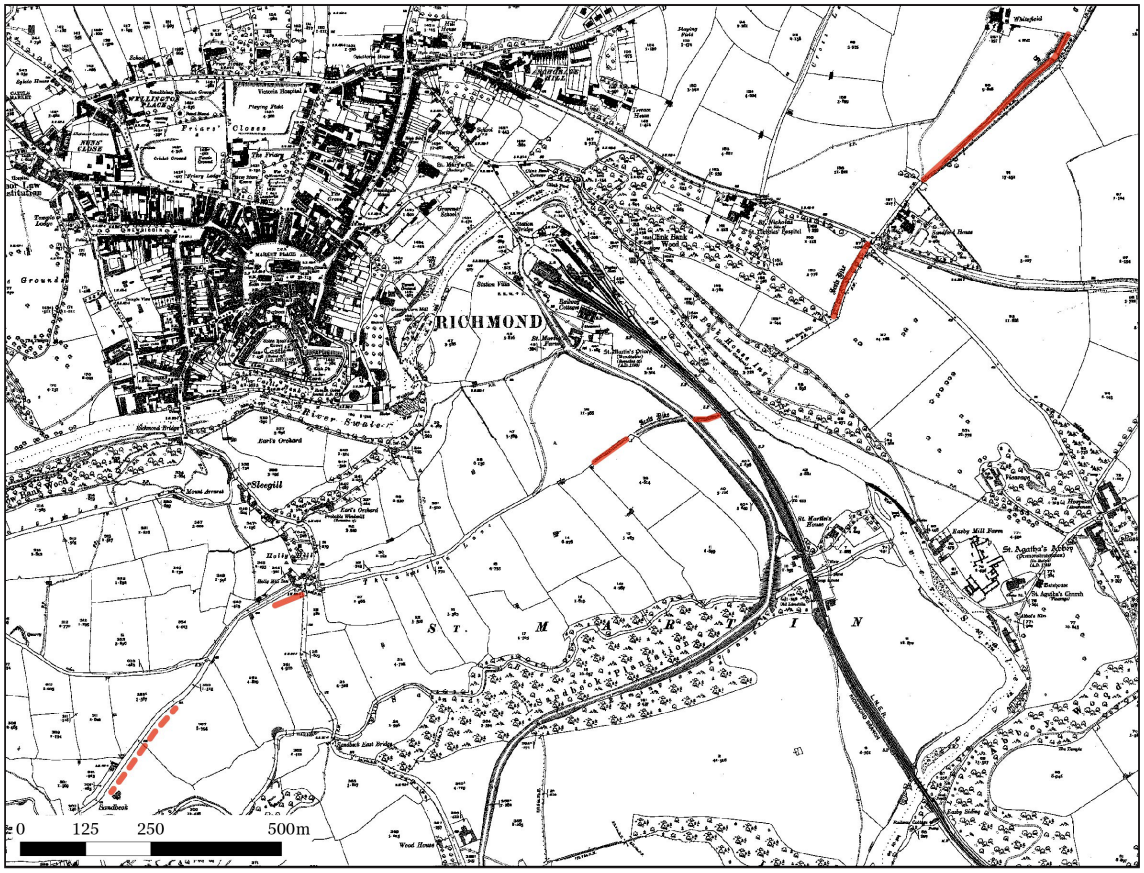

Fig 20: Elements of Scots Dyke identified on lidar and aerial photographs indicated with a red line. The dashed section to the west may represent a later plough headland. Ordnance Survey 1:2,500 published 1928 © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2018) Licence numbers 000394 and TP0024.

From this point Theakston Lane is presumed to follow the course of Scots Dyke at least as far as Holly Hill. Between Holly Hill and Sandbeck early edition OS mapping (six inch published 1857) depicts several stretches of earthwork banks and ditches (Fig 22). It has been assumed that these are further remains of Scots Dyke

(NRHE 579788), but unlike other sections, which are noted as an antiquity (either as 'Scots Dyke' or 'Intrenchment'), no such annotation is present at this location. Furthermore these earthworks are omitted from subsequent editions, suggesting that they were reinterpreted by later surveyors.

Fig 21: 1857 OS six-inch mapping showing Scots Dyke as 'Intrenchment'. Reproduced with the permission of the National Library of Scotland.

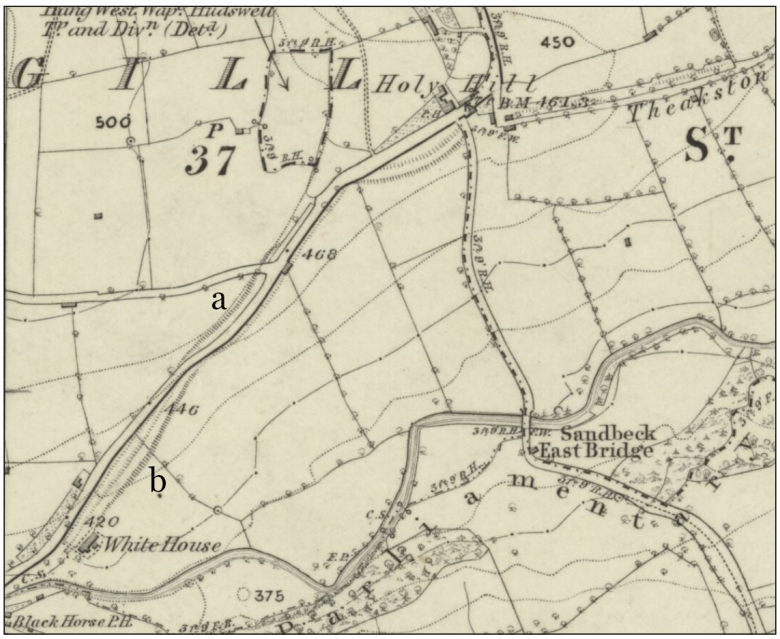

Fig 22: 1857 OS six-inch mapping showing earthworks between White House and Holy Hill. Reproduced with the permission of the National Library of Scotland.

Some of these have been identified on aerial photographs and lidar. To the south of Holly Hill Inn traces of a broad ditch were seen on a 1975 vertical photograph (Fig 23) but these have since been levelled by modern development. A bank situated in a fork in the road (Fig 22 a) appears to be a plough headland associated with extant medieval ridge and furrow. To the south of the lane another bank depicted by the OS (Fig 22 b) is visible on lidar. It is possible that this earthwork represents

a surviving section of Scots Dyke, but it may be a substantial plough headland, left after the associated ridge and furrow was ploughed level. The possibility that the bank of the dyke may have been utilised as a headland in later periods must also be considered. The 1857 OS map depicts another section of linear earthwork running southwards in Spring Wood, also interpreted as a possible continuation of the dyke (NRHE 563003). This is again omitted from subsequent editions.

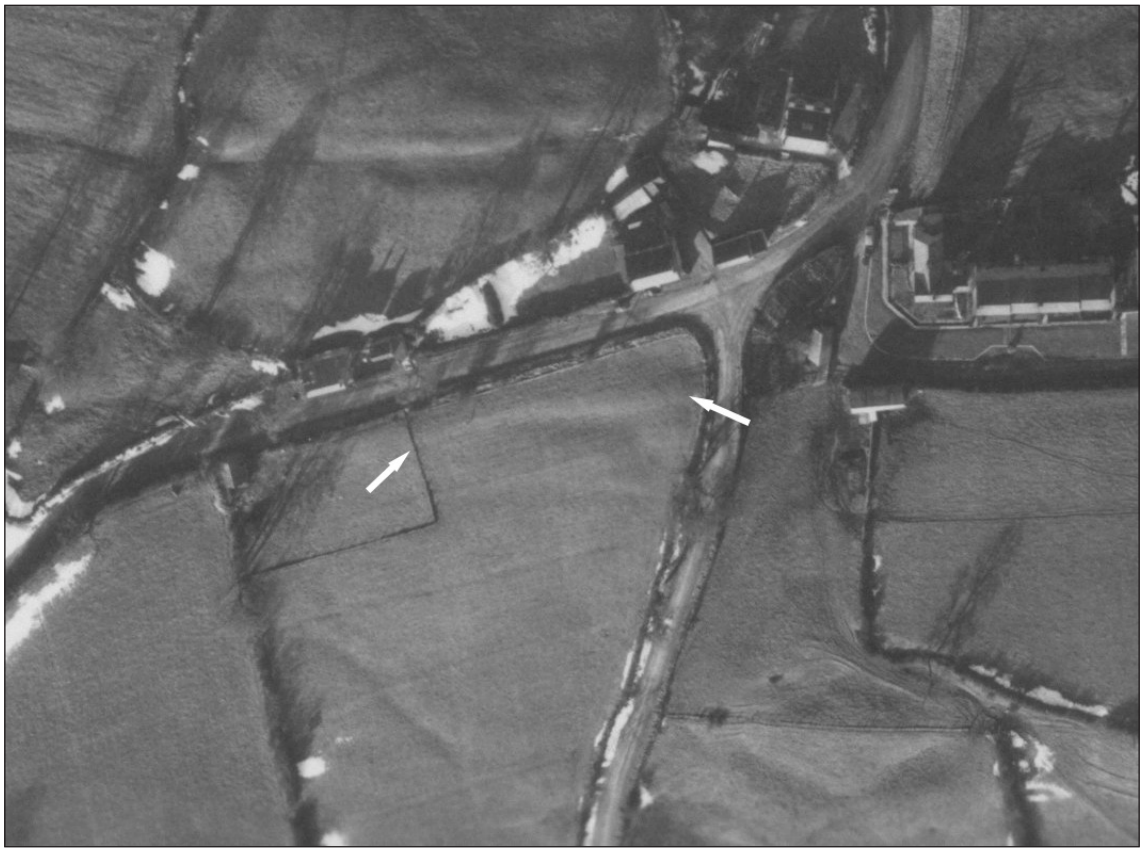

Fig 23: The possible remains of Scots Dyke (indicated by arrows) west of Holy Hill. MAL/65100 V 67 10-DEC-1965 (detail). Reproduced by permission of Historic England Archive

It has generally been suggested that Scots Dyke dates to the 6th and 7th centuries AD and may have been associated with an attempt to prevent westward expansion of the Anglo-Saxon kingdom of Deira (Wilson 2003, 67). However, recent excavations along the course of the A66 near Scotch Corner, around 5km NNE of the project area, have provided dating evidence which places its origins – in that location at least – as far back as the early-middle Iron Age (Zant and Howard-Davis 2013, 41). Analysis of the sediments forming the ditch fill indicated that it was completely filled by at least the mid-14th century but possibly even as early as the 6th century (*ibid* 98–99).

If Iron Age origins can reasonably be extrapolated to the entire length of the monument then it suggests that the construction of Scots Dyke was broadly contemporary with other linear boundary systems in the region such as Grims

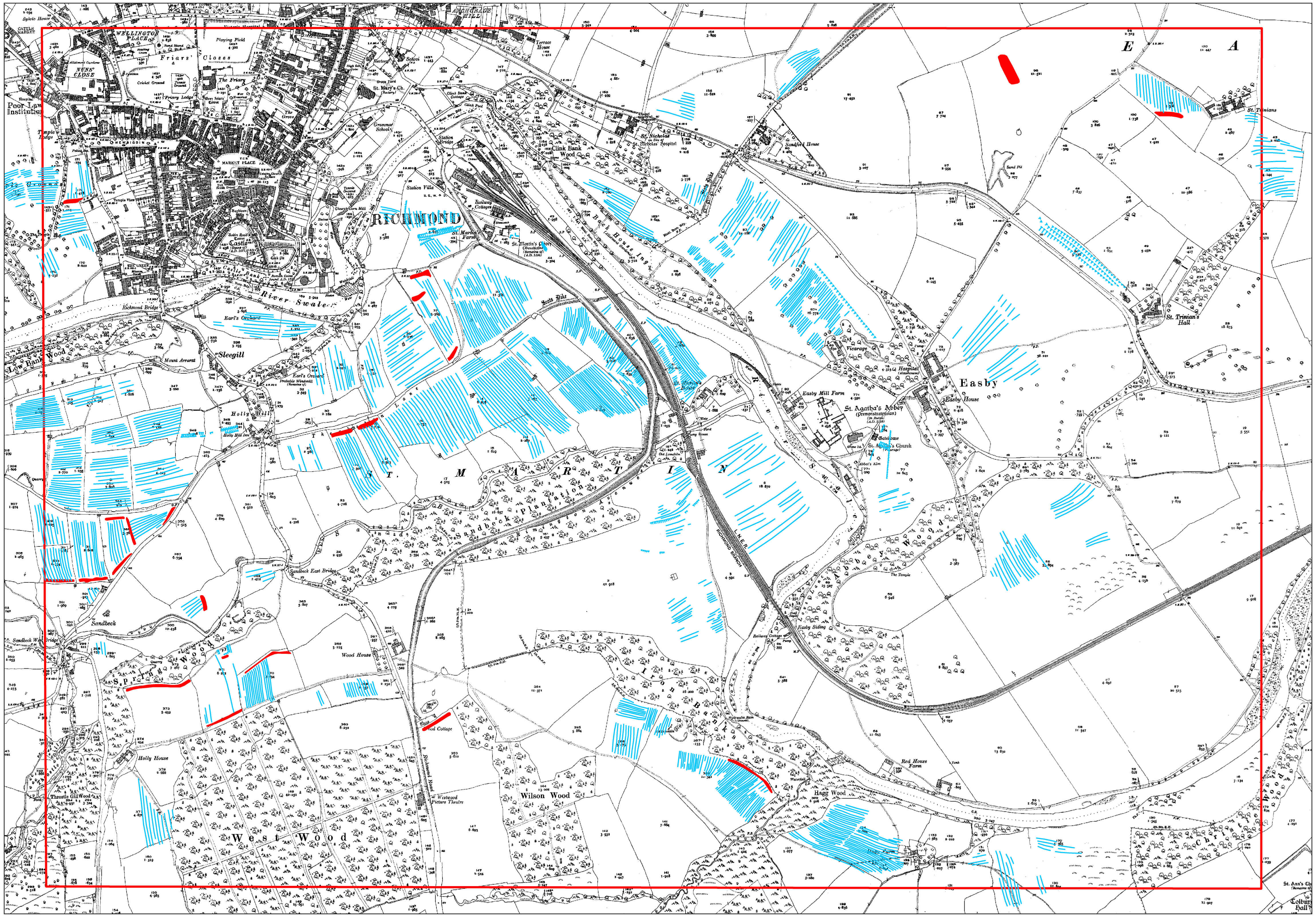

Fig 24: Distribution of medieval ridge and furrow (blue) and associated plough headlands (red). Some appears to have medieval origins but has been sub-divided in the post medieval period. Ordnance Survey 1:2,500 published 1928 © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2018) Licence numbers 000394 and TP0024.

Ditch and the Aberford Dykes, which have also recently been dated through excavation to the Iron Age (Roberts *et al* 2001, 123–148). Although a later prehistoric date would discount the hypothesis that Scots Dyke was constructed in reaction to political pressures in the early medieval period, it may well have still functioned as a territorial boundary. This persists to the present day as it forms the current boundary between Easby and Richmond parishes.

The medieval landscape

Richmond's medieval open fields largely lie outside the current project area to the north and west of the town (Tyler 1976, 15; fig 10) but remnants of ridge and furrow survive within the designed landscape of Temple Grounds. Extensive remains of medieval ridge and furrow cultivation and associated plough headlands were identified on lidar and historic aerial photographs elsewhere within the project area (Fig 24). Much of this survives to the present day but some has been levelled or severely denuded by land improvement in the later 20th century. In places the ridges are broad (around 9m wide) but elsewhere they are narrower, suggesting splitting of the ridges in the post medieval period.

Some of the best preserved fields lie within the modern parish of St Martin's where remains of broad ridge and furrow cultivation are widespread (Fig 25). Their proximity to the hamlet of Sleegill indicates that they represent the open fields associated with the settlement. To the west of St Martin's Farm are a series of substantial and well-preserved lynchets. The extensive survival of ridge and furrow in this location correlates with the pattern of early post medieval enclosure.

To the east survival of medieval ridge and furrow cultivation is far more fragmentary. This is likely to be the result of land improvement and arable cultivation of the more freely draining soils in this area in the post medieval and modern periods. To the north-west of St Trinian's Hall are the remains of well preserved terraces. These are assumed to be medieval lynchets but the crispness of the earthworks may indicate that they represent later landscaping.

To the south of the castle, on the opposite side of the river, is an area of land named 'Earl's Orchard' on historic OS mapping. Although this has been heavily improved for use as a sports field, faint traces of furrows survive as earthworks. It is possible that these may have acted as drainage for an orchard.

Easby Abbey

There are several earthworks to the south-east of the abbey, but their function and date are uncertain. A narrow bank running between the tithe barn and gatehouse (Fig 26, a) had previously been identified on the ground as potential remains of the precinct boundary.

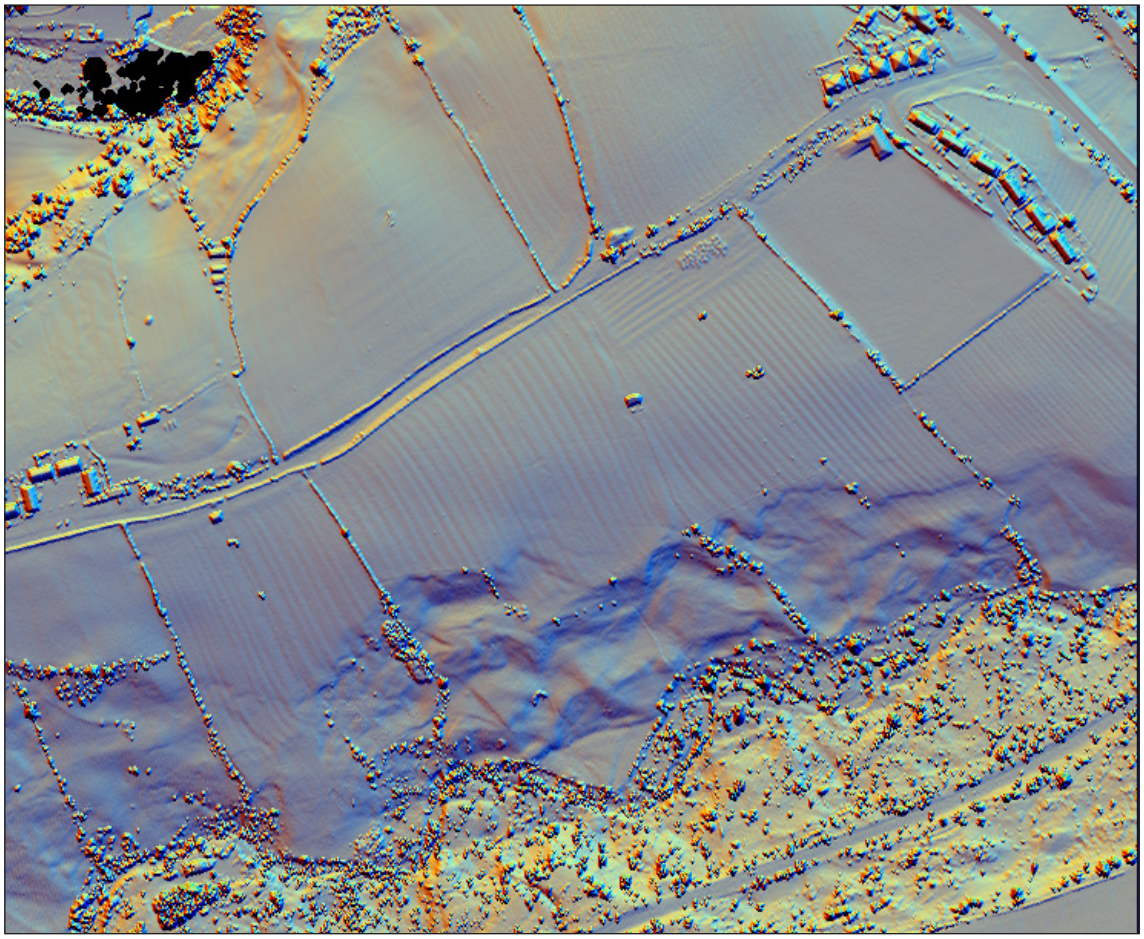

Fig 25: Lidar showing extant medieval ridge and furrow to the east of Sleegill. © Historic England; source Environment Agency.

A broad ditch with a bank flanking its south-western side runs perpendicular to the gatehouse towards its south-east corner (Fig 26, b). This meets a north-south aligned scarp (Fig 26, c). Several other linear banks and ditches are also visible at this location. Some appear to be traces of ridge and furrow ploughing while others may represent boundaries or drainage ditches. The date and function of these features is largely unclear, but some may relate to the abbey or alternatively landscaping as part of the designed landscape associated with Easby House (see below).

To the north-west of the abbey lie two broad parallel banks running between the river and a natural scarp (Fig 26, d). One possible interpretation of these is that they represent a pair of medieval plough headlands, but no clear traces of associated medieval ridge and furrow survive. They may, alternatively, have some association with the abbey.

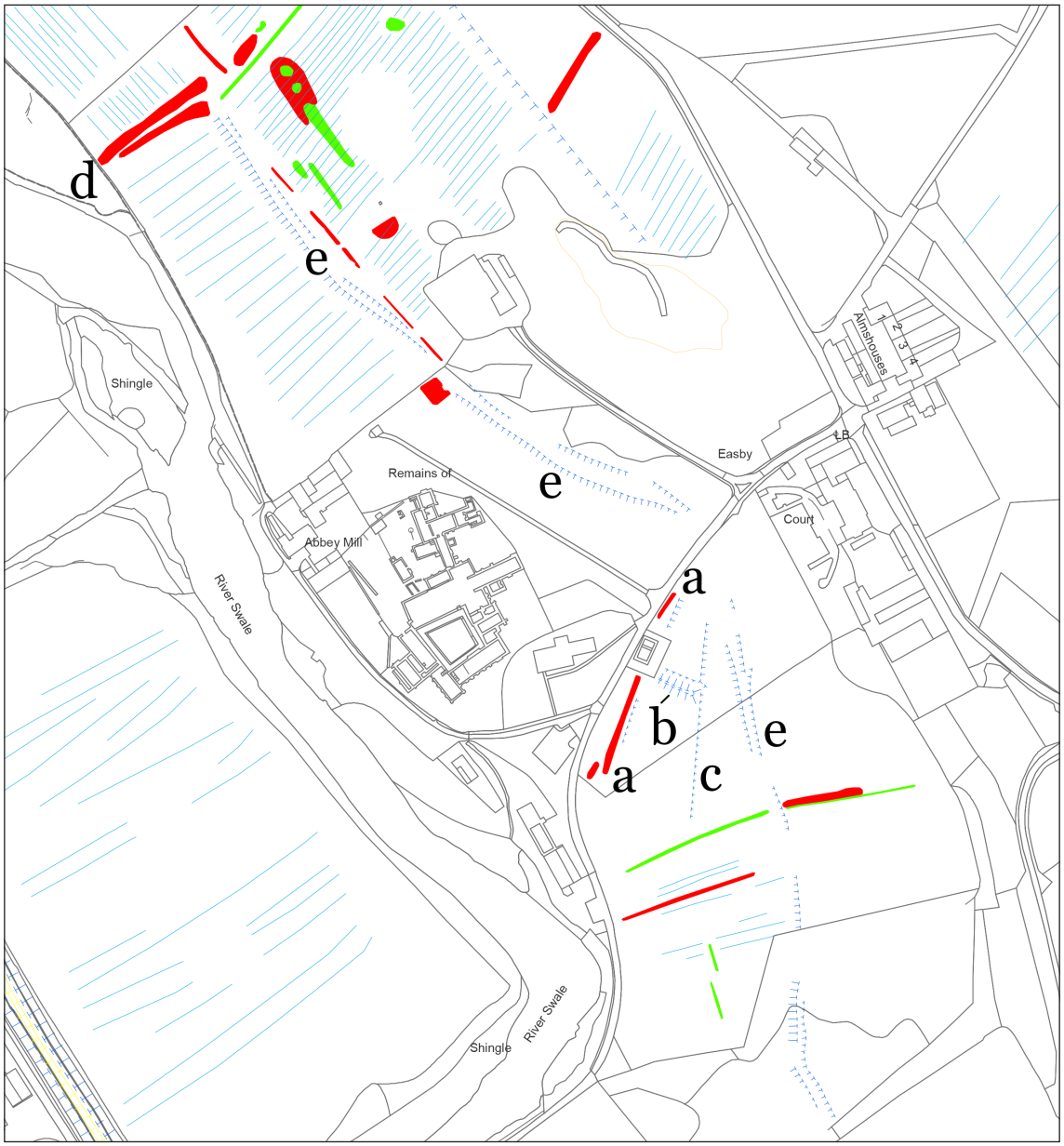

Fig 26: Earthworks around Easby Abbey. © Crown Copyright and database right 2018. All rights reserved. Ordnance Survey Licence number 100024900.

St Martin's Priory

In 1110 a chapel dedicated to St Martin and a parcel of land was given to the Benedictine abbey of St Mary's, York by Wymar, Steward of Stephen Earl of Richmond (Tyler 1976, 13). The priory comprised a cell of nine or ten monks (*ibid*).

The priory is situated on a natural platform with steep slopes to the north and east. Surviving structures include the remains of the church, part of the claustral range and a tower gatehouse connected by medieval walls (NHLE 1012995 scheduling description). On the southern side of the cloister are traces of rectilinear earthwork scarps, including a sub-square feature (Fig 27). These earthworks may represent

the remains of further building ranges but due to the small size of the cell a more likely interpretation may be gardens associated with the priory.

To the east of the priory is a broad bank with a flanking ditch which appears to be truncated by the railway embankment. Another narrower bank defines one side of a rectilinear area of uncertain function. It is possible that these features have some association with the priory.

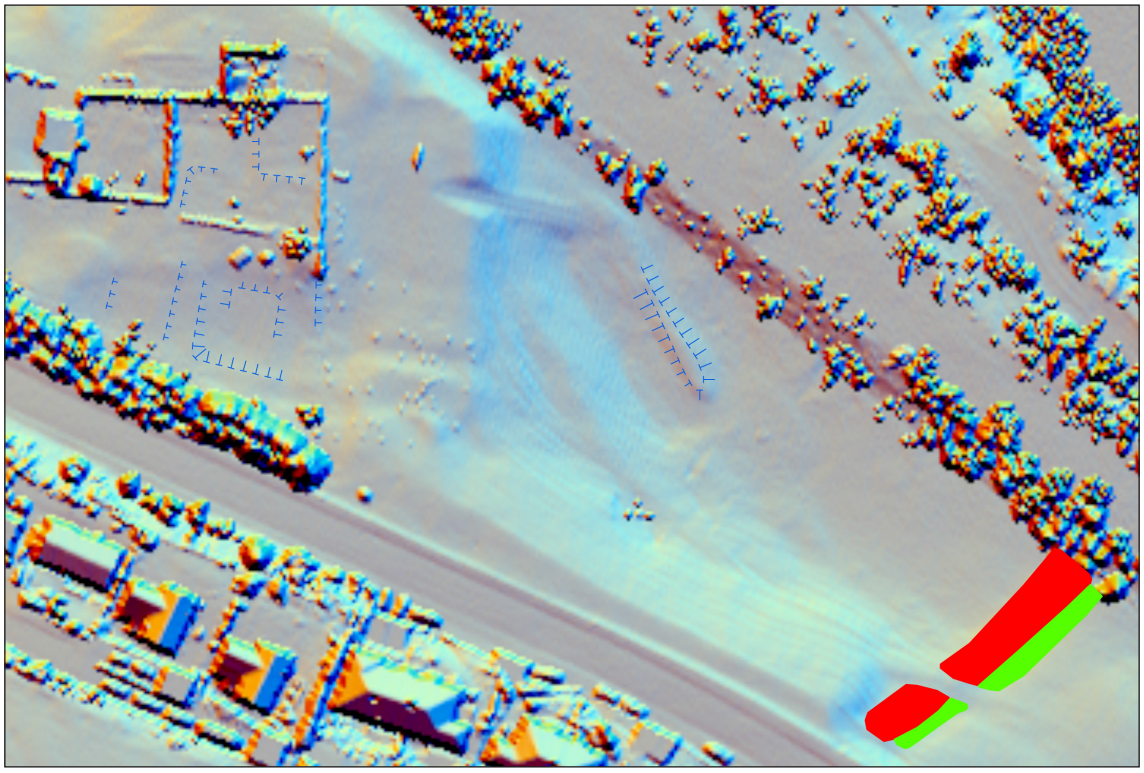

Fig 27: Earthworks around St Martin's Priory. © Historic England; source Environment Agency.

The post medieval landscape

The landscape that we see today around Richmond is largely the result of enclosure from the early post medieval period onwards. Although limited in extent, there is also evidence of industrial activity in the form of quarrying for limestone and aggregates. Although some of the medieval ridge and furrow appears to have been reused in the post medieval period, there is relatively little narrow improvement rig. Reorganisation of field boundaries in the later half of the 20th century has further altered the field patterns.

Enclosure

Patterns of enclosure within the project area were recorded by the North Yorkshire Historic Landscape Characterisation (HLC) project and range in date from the early post medieval period to the 20th century. Some of the earliest enclosure lies to the

south of Richmond around Sandbeck and Sleegill, an area bounded by the River Swale to the north and Sand Beck to the south. This is recorded by the HLC project as early piecemeal enclosure, probably dating to the early post medieval period and representing the division of the medieval open fields. The curving character of the boundaries closely relates to the sinuous form of the ridge and furrow.

South of Sand Beck enclosure is recorded by the HLC as planned enclosure and probably dates from the mid-18th to mid-19th centuries. It is characterised by often larger fields with straighter boundaries. To the east of the Swale enclosure is characteristic of late 18th and early 19th century parliamentary enclosure comprising large fields, often with straight surveyed boundaries. Reorganisation of field boundaries in the 20th century has significantly altered the field pattern since it was first surveyed by the OS.

Field barns were once a prominent component of the fieldscapes around Richmond but many no longer survive. Most date from the 18th and 19th centuries and were used for hay storage and over-wintering of cattle. They are a key feature of the Yorkshire Dales and integral to its landscape character.

Extraction

Narrow bands of limestone are present in the project area and there is evidence for small-scale exploitation of this resource. Two small quarries are located in Spring Wood and a larger quarry, containing the remains of a limekiln, lies to the south of Iron Bank. A second limekiln is noted on early edition OS mapping in the east of Sandbeck plantation, but no trace of this was identified on aerial photographs or lidar (Fig 28). Quick lime produced in kilns such as these was used during the 18th and 19th centuries for land improvement and to make mortar. It is not clear whether the kilns in the project area were producing quick lime for agricultural use or for building.

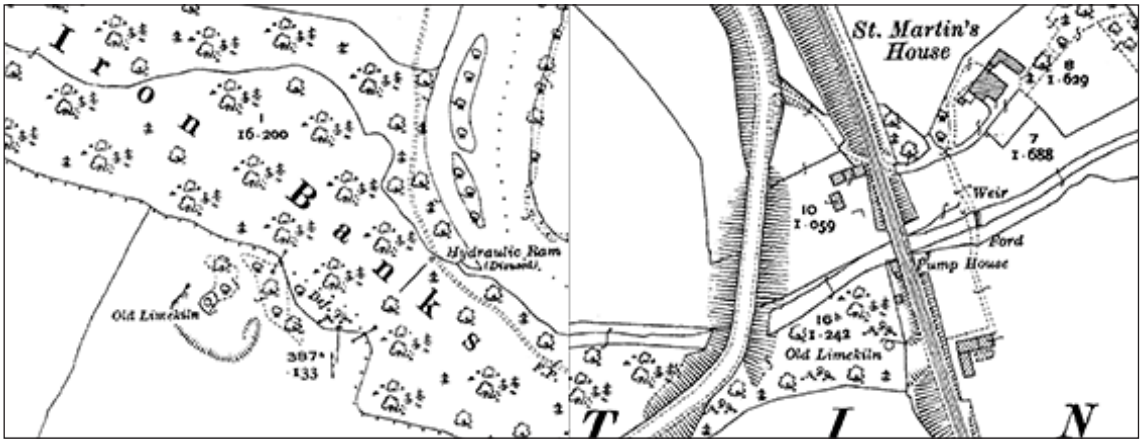

Fig 28: Limestone quarries with associated lime kilns. Ordnance Survey 1:2,500 published 1928 © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2018) Licence numbers 000394 and TP0024.

To the north of the Swale the Richmond Chert bedrock is overlain by superficial deposits of sands and gravels. St Trinian's sand and gravel quarry lay to the north of St Trinian's Hall and appears to have been active into the late 1980s for the supply of aggregates. Another pit lies to the north-west, abutting the eastern side of Scots Dyke.

Further traces of extraction were identified from lidar on the sloping ground to the north of Easby Abbey (Fig 29). What appears to be a large shaft with an associated shaft mound of spoil can be seen at NZ 1830 0072. Aligned with this are further areas of extraction and spoil, including two smaller shafts and a linear ditch. These are overlain by post medieval narrow ridge and furrow and the large shaft cuts traces of probable medieval ridge and furrow. This is likely to place the date of the extraction somewhere before the 18th century.

Morphologically, this form of extraction is often associated with mining for minerals such as lead ore or coal. Copper was being extracted until 1912 just 1.8km to the west in Billy Bank Wood (Hatcher 2000, 205) so it is possible that these features represent further copper mining. A lead smelting mill also existed at Easby, near Brocken Brea Farm, possibly from the late 17th century (Gill 1992, 139–40; 150) but there is no evidence for lead mining in the local area.

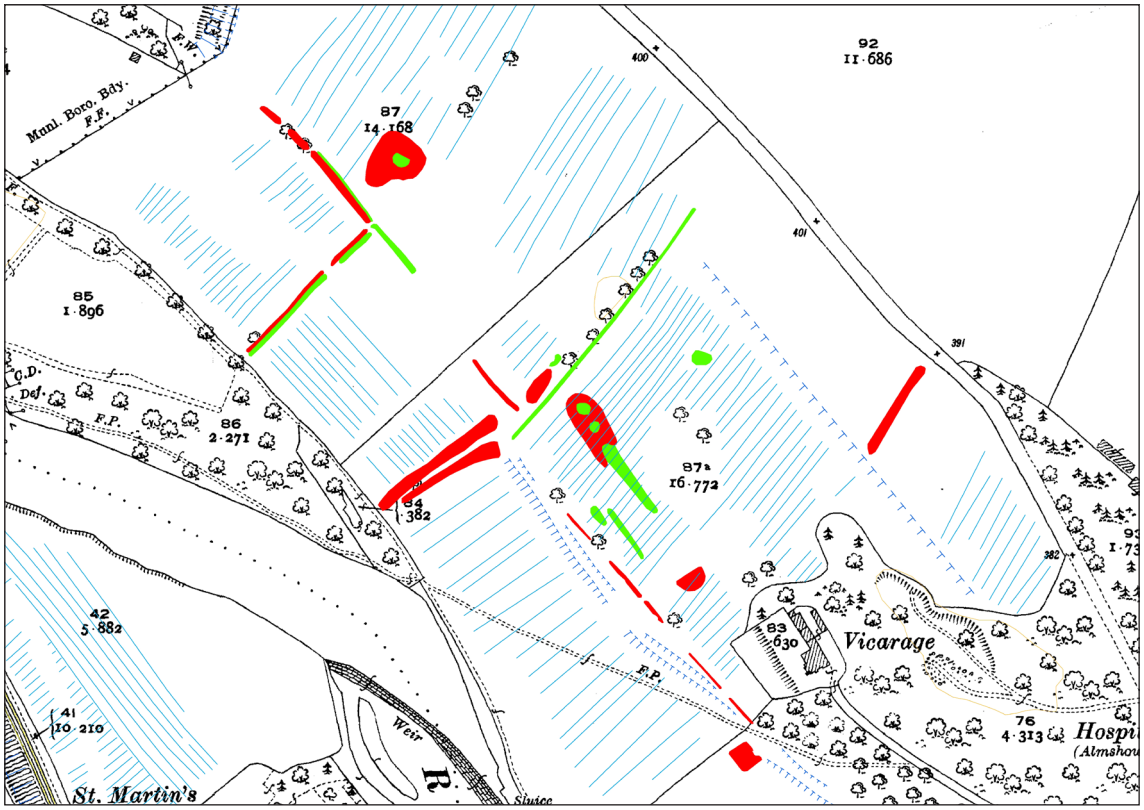

Fig 29: Extraction to the north of Easby Abbey. Ordnance Survey 1:2,500 published 1928 © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2018) Licence numbers 000394 and TP0024.

The railway and station

Richmond was linked to the Victorian railway network by the Eryholme-Richmond branch line which opened in 1846. Richmond railway station, designed by G T Andrews of York, opened the following year (Fawcett 2011, 165). RAF photography from 1940 onwards illustrates the station whilst still in use and records now-demolished structures such as the goods sheds, coal depot and turntable (Fig 30). The railway closed in March 1969 and OS photography from just four months later shows the derelict line. By the 1970 OS photography the track had been lifted. Several sections of the line survive as extant embankments and cuttings and are visible on modern aerial photographs and lidar data.

Fig 30: Richmond station in 1945. The large shed to the south (a) is a bus depot. RAF/106G/UK/394 4049 RS 17-JUN-1945 Historic England Archive RAF photography (detail).

Designed landscapes

Two registered parks and gardens lie within the project area. St Nicholas (NRHE 1001073) is sited on the escarpment above the Swale and dates from the early 20th century whereas Temple Grounds (NRHE 10011317) has its origins in the 17th century. In addition to these is the designed landscape associated with Easby House which, although not registered, still retains elements of the parkland design.

Temple Grounds

Temple Grounds lie on the western side of Richmond between Cravengate and the Swale. It is an area of parkland primarily associated with Yorke House, an early 17th-century mansion that was demolished between 1824 and 1827. Elements of the designed landscape include Mill Bank Wood – a pleasure ground which included terraced walks, grottos and a summerhouse – and the parkland to the west and south of Temple Lodge. On the steep southern slope of the park were a series of terraced gardens associated with Yorke House. These lay between the river and Culloden Tower, a banqueting house built by John Yorke I in 1746.

The gardens are depicted in a 1749 engraving of Richmond by Samuel and Nathaniel Buck (Fig 31). Surviving traces of them had previously been observed as earthworks on the ground but lidar has clearly revealed a series of scarps and terraces (Fig 32). In addition to the earthworks, parchmarks photographed in exceptionally dry the summer of 2018 revealed a series of linear features, most likely representing the buried remains of the retaining walls (Fig 33). Possible building foundations are also visible at the southern extent of the park.

Other elements of the gardens as depicted by the Buck Brothers can also be identified on lidar. These include the Green Walk, leading up the slope towards Culloden Tower, and the terraced paths within the pleasure ground (Fig 32, a).

Fig 31: 'The South West Prospect of Richmond in the County of York'. A 1749 engraving by Nathanial and Samuel Buck showing Yorke House and Temple Grounds in the foreground. BB86/03849 Reproduced by permission of Historic England Archive.

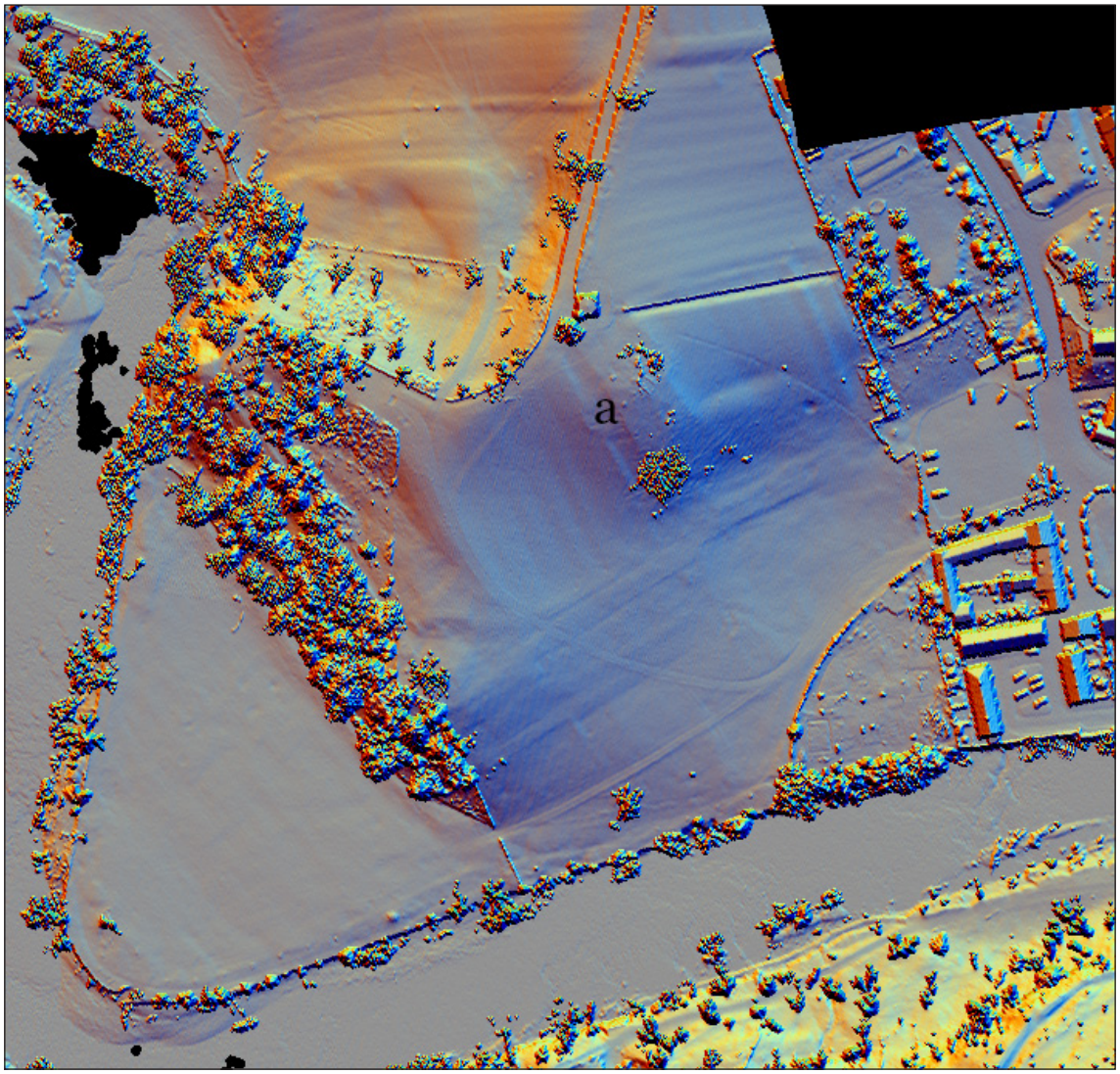

Fig 32: Lidar showing the earthwork remains of garden features associated with Temple Grounds. © Historic England; source Environment Agency.

Fig 33: Parchmarks of buried wall foundations within Temple Grounds revealed as parchmarks in 2018. 34050_030 19-JUL-2018 © Historic England Archive.

Easby Hall

Easby Hall (later Easby House) was constructed around 1730 for Rev William Smith who had acquired the manor of Easby in 1729 (NHLE 1318260). The 1857 OS six inch map depicts parkland to the front and rear of the hall, straddling the original drive (Fig 34). To the SW the parkland incorporated the ruins of Easby Abbey and the field to the south, bounded by Abbey Wood.

Remains of the terraced walks depicted on OS maps survive and include one leading to the Temple (NRHE 563014), an ornamental teahouse that stood on the escarpment giving views across the valley to the abbey ruins. Traces of a terraced trackway were identified on lidar running along the base of river escarpment before climbing up into Abbey Wood (Fig 26, e). The date of this trackway is uncertain but it could relate to one of the phases of landscaping associated with the parkland. A painting of *c*1800 by George Cuitt (Fig 35) shows Easby Hall and the abbey ruins, probably viewed from Abbey Wood and possibly even depicting the vista from the Temple.

Fig 34: Parkland associated with Easby Hall depicted on an OS six-inch map of 1857. Reproduced with the permission of the National Library of Scotland.

Fig 35: 'Easby Hall and Easby Abbey with Richmond, Yorkshire in the Background' c1800 by George Cuitt (1743-1818). Yale Center for British Art, Paul Mellon Collection.

CONCLUSIONS AND FUTURE WORK

The project has demonstrated that modern and historic aerial photographs can provide a unique understanding of Richmond Castle and its wider landscape setting. In particular, historic photography of the castle and town records changes in the built environment and ephemeral aspects of life in the first half of the 20th century. Lidar has been key to identifying archaeological earthworks in the wider landscape and this has revealed a number of previously unidentified monuments.

Use of aerial imagery for public interpretation has significant potential. This is particularly so for illustration of lost or radically altered elements of the landscape such as the loss of the railway.

Future research

A number of themes have emerged during the current project that would merit further research by English Heritage or other organisations.

- Other investigative techniques could help to better understand the character, date and function of features identified as parchmarks within the castle courtyard.
- Documentary research into the medieval land holdings would provide a better understanding of the surviving ridge and furrow.
- The designed landscape of Easby Hall is currently not well understood. Additional research would help to identify the significance of surviving elements of the park.
- Detailed analysis of historic photography of the town, potentially accompanied by archival research, will give a more nuanced understanding of the changes to Richmond in the early to mid-20th century.
- At present, knowledge of St Martin's Priory is limited. Further research into the monument and its relationship to the wider landscape is required.

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APPENDIX 1. METHODS AND SOURCES

Archaeological scope

Cropmarks, parchmarks, soilmarks

All sub-surface archaeological remains visible as cropmarks, parchmarks or soilmarks were mapped and recorded.

Earthworks

All archaeological earthworks visible on aerial photographs were mapped and recorded. This included features visible as earthworks on early photographs, which have since been levelled and archaeological features depicted on OS maps that are within the NMP sphere of interest.

Buildings and structures

Standing roofed or unroofed buildings were not generally mapped. The exceptions to this were buildings associated with Richmond railway station and a prefab estate within Richmond town. The upstanding remains of Richmond Castle and Easby Abbey are already well recorded so were not mapped.

Ridge and furrow

Medieval and post medieval ridge and furrow were mapped and recorded, regardless of preservation. Each furrow was depicted as a single polyline.

Post medieval field boundaries

Post medieval field boundaries (upstanding or levelled) that are depicted on OS first edition or later mapping were not generally mapped. The exception to this was where they formed part of an earlier field system that was not depicted by the OS.

Parkland, landscape parks, gardens and country houses

Vestigial man-made elements of the landscape park and gardens were mapped and recorded. Those elements of the park that are still in use such as formal gardens and tracks were not recorded.

Industrial features and extraction

All extraction, irrespective of size, was mapped and recorded.

Railway lines
The course of the railway line and associated sidings were mapped using a schematic single line depiction. Where this was not clearly visible on photography, the course of the track was digitised from early edition OS mapping.

Natural features
Natural features which are geological or geomorphological in origin were not mapped. If there was risk of confusion in contexts with other archaeological features, then the natural features were mentioned in the text record.

Methods

Sources
The aerial photograph collection of the Historic England Archive was assessed. Digital orthophotographs supplied through APGB and Google Earth were also consulted.

Lidar at 50cm and 1m and 2m resolution was acquired by the Environment Agency and was downloaded from the Government Open Data website in ASCII grid format.

Height data processing
Lidar data were processed using the Relief Visualization Toolbox v1.1 to produce 2D GeoTIFF images.

Evaluation of imagery
All photographs were examined under magnification and in stereo where possible. Born digital images were viewed on screen. The 2D GeoTIFFs produced in the Relief Visualization Toolbox were examined on screen in ArcGIS.

Rectification
Rectification of aerial photographs was undertaken using Aerial 5.36. Control was derived from the OS 1:2,500 scale MasterMap® vector data. Digital terrain models derived from 5m interval DTM data in ASCII grid format provided through APGB were used to improve the accuracy of rectifications.

The accuracy of rectified images is normally to within ±2m of the source used for control but this error may be larger in areas with large topographic variation. Consequently the accuracy of mapped features, relative to their true ground position, will depend on the source used for control. Features mapped directly from orthophotographs and lidar will be sub-metre accurate.

Mapping

Georeferenced imagery was imported into ArcGIS 10.3.1 where features were digitised. All features were mapped as polygons apart from scarps, where a schematic t-hachure was used, ridge and furrow, and the course of the railway line. Attribute data were attached to each feature as defined in Table 1.

Attribute	Description
PERIOD	Date of feature (HE Thesaurus). Single or dual indexed terms
NARROW_TYPE	Monument Type (HE Thesaurus). Specific monument type for individual features
BROAD_TYPE	Monument Type (HE Thesaurus). Broader monument type to enable grouping of individual features
EVIDENCE_1	Form of remains (HE Thesaurus) as seen on PHOTO_1
PHOTO_1	Source feature was mapped from (aerial photograph or lidar)
EVIDENCE_2	Form of remains (HE Thesaurus) as seen on PHOTO_2
PHOTO_2	Latest available source (aerial photograph or lidar) to give indication of current state of preservation. Not applicable for cropmark sites
NRHE No	NRHE Unique Identifier (UID)
HER No	HER number for those features concorded with existing HER records

Table 1. Aerial mapping attribute data.

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