WESTMORLAND DALES HIDDEN LANDSCAPE PARTNERSHIP
MONUMENTS AT RISK SURVEY

ARCHAEOLOGICAL SURVEYS OF SMARDALE KILNS AND QUARRY, PENDRAGON CASTLE, RAVENS' GILL BARROWS AND CROSBY LODGE SHIELING

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CONTENTS

LIST OF FIGURES

LIST OF PLATES

20 Smardale quarry, retaining wall at north end of quarry (Site 103), looking W (photo 2/120).
21 Smardale quarry, linear spoil heap (Site 104), looking NE (photo 2/135).
22 Smardale quarry, general view (Site 105), looking NW (photo 2/128).
23 Smardale quarry, jumper in main quarry face (Site 105), looking N (photo 2/141).
24 Smardale quarry, general view of main tramway alignment (Site 106/1), looking S (photo 2/131).
25 Smardale quarry, branch off main tramway (Site 106/3), looking SW (photo 2/143).
26 Smardale quarry, possible tramway branch (Site 106/7), looking W (photo 2/151).
27 Smardale quarry, view down incline (Site 107), looking SW (photo 2/153).
28 Smardale quarry, view up incline (Site 107), with socket stone, looking NE (photo 2/156).
29 Smardale quarry, tramway (Site 108), looking E (photo 2/164).
30 Pendragon Castle, general view of castle mound (Site 201), looking N (photo 7/451).
31 Pendragon Castle, north ditch (Site 200/1), looking NW (photo 7/433).
32 Pendragon Castle, possible bridge site to north ditch (Site 200/3), looking NW (photo 7/460).
33 Pendragon Castle, west end of north ditch (Site 200/1), looking E (photo 7/462).
34 Pendragon Castle, depression (Site 200/6) in east end of south-east ditch (Site 200/7), looking S (photo 7/434).
35 Pendragon Castle, west end of south-east ditch (Site 200/7), looking SW (photo 7/438).
36 Bank forming south-east side of south-east ditch (Site 200/7), looking N (photo 7/449).
37 Pendragon Castle, view across eastern causeway (Site 200/4), looking W (photo 7/432).
38 Pendragon Castle, view across western causeway (Site 200/5), looking SE (photo 7/469).
39 Pendragon Castle, west-facing scarp forming possible entrance (Site 203), looking E (photo 7/466).
40 Pendragon Castle, south part of building range (Site 204/2), looking NW (photo 7/473).
41 Pendragon Castle, north part of building range (Site 204/1), looking NW (photo 7/481).
42 Pendragon Castle, south part of building range (Site 204/2), looking NW (photo 7/474).
43 Pendragon Castle, trackway (Site 207), looking NW (photo 9/559).
44 Pendragon Castle, kiln (Site 208/2), looking SE (photo 7/487).
45 Pendragon Castle, seen from possible viewing mount, west side of River Eden, looking E (photo 7/499).
46 Pendragon Castle, west side of north external elevation of castle, looking SW (photo 9/572).
47 Pendragon Castle, propped masonry at north-west corner of castle, looking SW (photo 9/574).
48 Pendragon Castle, east external elevation, looking W (photo 7/512).
49 Pendragon Castle, south external elevation, looking NE (photo 6/318).
50 Pendragon Castle, south-west garderobe tower, looking NW (photo 7/506).
51 Pendragon Castle, south-west garderobe tower, looking NE (photo 9/582).
52 Pendragon Castle, west external elevation, looking E (photo 6/314).
53 Pendragon Castle, entrance passage, door to east newel stair, looking NE (photo 9/542).
54 Pendragon Castle, entrance passage, door to west newel stair, looking SW (photo 9/536).
55 Pendragon Castle, west internal wall, looking W (photo 9/549).
56 Pendragon Castle, cross wall to south side of interior, looking E (photo 9/554).
57 Pendragon Castle, interior of north-east chamber, looking E (photo 9/603).
58 Pendragon Castle, interior of south-east chamber, looking W (photo 9/600).
59 Pendragon Castle, interior of north-west chamber showing angled wall, looking E (photo 9/584).
60 Pendragon Castle, interior of south-east chamber, garderobe doorway, looking W (photo 9/593).
61 Pendragon Castle, interior of south-west chamber, garderobe, looking S (photo 9/591).

62 Pendragon Castle, interior, looking SW (photo 9/550).
63 Pendragon Castle, interior, looking NE (photo 9/558).
64 Pendragon Castle barn, south and west elevations, looking NE (photo 3/205).
65 Pendragon Castle barn, south gable, looking N (photo 3/187).
66 Pendragon Castle barn, west elevation, looking E (photo 3/197).
67 Pendragon Castle, wall to south of barn (Site 204/2), looking S (photo 3/207).
68 Pendragon Castle barn, north gable, looking S (photo 3/193).
69 Pendragon Castle barn, east elevation, looking W (photo 3/191).
70 Pendragon Castle barn, interior showing east wall and stored stonework, looking NE (photo 4/228).
71 Pendragon Castle, sheep tracks on north slope of north ditch (200/1) (Area 16), looking N (December 2017) (photo 6/312).
72 Pendragon Castle, sheep tracks on north slope of north ditch (200/1) (Area 16), looking N (June 2018) (photo 10/158).
73 Pendragon Castle, slumping scar (Area 7), on south side of castle mound (Site 201), looking NW (photo 10/132).
74 Pendragon Castle, grassed over ground slips/sheep tracks (Area 9), on south side of castle mound (201), looking NE (photo 10/138).
75 Pendragon Castle, slumping scar and slippage below (Areas 7 and 9) on south side of castle mound (201), looking NW (photo 10/174).
76 Pendragon Castle, slumping/sheep tracks (Area 4) on south side of castle mound (201), looking W (photo 10/124).
77 Pendragon Castle, slumping scars (Areas 1 and 2) on south-east side of castle mound (201), looking NW (photo 10/114).
78 Pendragon Castle, slumping scar with exposed stone (Area 11) on south-west side of castle mound (201), looking NW (photo 10/143).
79 Pendragon Castle, ground slip/sheep tracks (Area 12) on west side of castle mound (201), looking NW (photo 10/146).
80 Pendragon Castle, entrance passage, modern wooden steps, looking S (photo 9/546).
81 Pendragon Castle, interior, entrance to north-west chamber, looking S (photo 10/183).
82 Pendragon Castle, interior, fallen voussoirs to west window of south wall, looking SW (photo 10/179).
83 Pendragon Castle, interior, repaired roof of SE chamber, looking SE (photo 9/555).
84 Pendragon Castle, west end of south internal wall, looking S (photo 9/553).
85 Pendragon Castle, interior, rubble in south window of west wall, looking W (photo 10/180).
86 Ravens' Gill barrows, general view with barrow (Site 302) in foreground, looking S (photo 5/239).
87 Ravens' Gill barrows, barrow (Site 302), looking SW (photo 5/245).
88 Ravens' Gill barrows, disturbance to top of barrow (Site 302), looking E (photo 5/246).
89 Ravens' Gill barrows, scooped platform (Site 303), looking S (photo 5/278).
90 Ravens' Gill barrows boulder and boundary (304/2), looking S (photo 10/208).
91 Ravens' Gill barrows boundary (304/2), looking S (photo 10/201).
92 Ravens' Gill barrows erosion on west side of barrow (308), looking S (photo 10/205).
93 Ravens' Gill barrows, barrow (Site 305), showing rabbit disturbance, looking SW (photo 5/256).
94 Ravens' Gill barrows, barrow (Site 305), rabbit and stock erosion, looking NE (photo 5/259).
95 Ravens' Gill barrows, barrow (Site 306), looking S (photo 5/262).
96 Ravens' Gill barrows, erosion scar in barrow (Site 306), looking E (photo 5/263).
97 Ravens' Gill barrows, southern part of barrow (Site 307), looking N (photo 5/270).
98 Ravens' Gill barrows, barrow (Site 308), looking S (photo 5/267).
99 Crosby Lodge shieling (Site 400/1), looking SW (February 2018) (photo 8/519).

100 Crosby Lodge shieling (Site 400/1), general area in dense bracken (July 2018), looking SW (photo 11/216).
101 Crosby Lodge shieling (Site 400/2), looking N (February 2018) (photo 8/526).
102 Crosby Lodge shieling (Site 400/2), looking SW July 2018) (photo 11/211).

EXECUTIVE SUMMARY

In October 2017, Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by Mr Miles Johnson, Senior Historic Environment Officer of the Yorkshire Dales National Park Authority (YDNPA), to undertake archaeological surveys of four Scheduled Monuments in Cumbria as part of the Heritage Lottery funded Westmorland Dales Hidden Landscapes Project, led by the Friends of the Lake District. Three of the four monuments were deemed to be 'at risk', the other (Pendragon Castle) being 'vulnerable', and the work was required to provide a pre-intervention level of survey prior to preparing repair and/or management schemes. The work involved the collation of existing documentary material, detailed measured earthwork and building survey, and a small amount of walk-over survey, all brought together in a single archive report.

The four scheduled sites subject to the archaeological survey work were the Smardale lime kilns and quarry in Crosby Garrett parish (NHLE 1021107/1145018), Pendragon Castle in Mallerstang (NHLE 1007156/1144890), and Ravens' Gill barrows (NHLE 1007602/1007603/1007604) and Crosby Lodge shieling in Crosby Ravensworth parish (NHLE 1007596). Other related work included the production of a condition report and specification for the consolidation of the Smardale lime kilns. The fieldwork was undertaken between October 2017 and February 2018.

The industrial-scale Smardale kilns are likely to be mid 19th century in date but it is not possible with the limited research undertaken for this report to state who actually owned, built or operated them. They may well have been built by the South Durham and Lancashire Union Railway, whose line passed adjacent to them, to provide material for the construction of the railway infrastructure (for example the nearby Smardalegill Viaduct). Although the north kiln was built before the south kiln, both were in operation by 1862. Both are of the 'draw kiln' type, with limestone and fuel loaded into the tops of the kilns, and the resulting quicklime shovelled out of the draw holes at the base directly into trucks on a railway siding. Limestone was sourced from the adjacent large quarry, and a number of tramways brought the quarried stone to the tops of the kilns. Later on, an incline, powered by an engine on top of the kilns and supported on massive revetment walls, was used to bring fuel from a separate railway siding and platform to the top of the kilns. The kilns appear to have ceased production by 1898, although small-scale quarrying may have continued until at least 1915. The accompanying structural condition report and specification makes recommendations for large-scale conservation and consolidation works.

The large stone tower or keep of Pendragon Castle is generally dated to c.1170-80, although it is possible that its earthwork mound might be an earlier post-Conquest feature. Although now ruined, the castle was originally of three storeys, with main central spaces surrounded by small mural chambers in the four corners. It does not appear to have had a curtain wall, forebuilding or gatehouse, or any associated bailey. Alterations were made in the early 14th century, including the construction of a garderobe tower at the south-west corner and a strengthening of the defences; the latter may also have involved the creation of a formal approach and a bridge across the north ditch, evidence for which can be seen in the surviving earthworks. A designed landscape, perhaps incorporating Cocklake Pond, may also have been created, and the oft-quoted association with the Arthurian legends seems to originate from this period. Major restoration works were carried out in the 17th century by Lady Anne Clifford, involving the creation of new chambers inside the castle, the insertion of larger windows and more fireplaces, the construction of a stable/coach house/brew house/bake house range, and the building of a curtain wall with gates around the precinct - the remains of many of these features can be seen in the surviving fabric and earthworks. After her death in 1676, the castle fell into disrepair, and materials were taken for use in the surrounding area. Some repairs were undertaken in 1964, but more significant consolidation work was done in the 1990s, together with some recording of both the castle and its environs. This has been updated by the current EDAS survey, and recommendations are also made concerning the repair of erosion on the castle mound and health and safety issues for visitors to the interior of the castle.

The Ravens' Gill barrow cemetery comprises five bowl barrows or funerary monuments dating to 2400-1500BC, placed on elevated ground on the east side of the gill and presumably associated with the settlements to the east. Several of the barrows are suffering from minor but active erosion, and they may have been disturbed in the past. Recommendations for low-key repair works are made.

A shieling is typically a small hut constructed with low rubble walls and a turved roof to serve as a temporary shelter for herdsmen involved in the movement of stock to summer pastures - they are traditionally ascribed to the medieval period and are often associated with field systems or enclosures. Several have been identified near Crosby Lodge, and two adjacent to each other were surveyed as part of this project. Both are subject to severe bracken infestation, and a number of potential remedial solutions are suggested.

1 INTRODUCTION

Reasons and Circumstances of the Project

1.1 In October 2017, Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by Mr Miles Johnson, Senior Historic Environment Officer of the Yorkshire Dales National Park Authority (YDNPA) to undertake archaeological surveys of four Scheduled Monuments in Cumbria as part of the Westmorland Dales Hidden Landscapes Project, led by the Friends of the Lake District. Three of the four monuments were deemed to be 'at risk', the other (Pendragon Castle) being 'vulnerable', and the work is required to provide a pre-intervention level of survey prior to preparing repair and/or management schemes.

1.2 The work involved the collation of existing documentary material, coupled with detailed measured earthwork and building survey and a small amount of walk-over survey. The results were used to prepare an appropriate report. The extent of the project was defined by a brief produced by the Yorkshire Dales National Park Authority (YDNPA), in response to which a detailed methods statement was prepared by EDAS (see Appendices 2 and 3). The project was funded by the Heritage Lottery Fund, with oversight by the Friends of the Lake District and the YDNPA.

Site Locations and Summary Descriptions

1.3 As noted above, four Scheduled Monuments were covered by the project, and these are described in summary below.

Smardale Lime Kilns (NGR NY 724 065 centred)

1.4 The Smardale lime kilns are located within Smardale Gill, close to Smardale Viaduct and c.2.40km south-west of the hamlet of Smardale itself (see figure 1). The kilns are a Scheduled Monument (NHLE 1021107) as well as a Grade II Listed Building (NHLE 1145018). They are in the ownership of the Cumbria Wildlife Trust, and fall within the Smardale Gill National Nature Reserve. The kilns form one part of a significantly larger Scheduled Monument that covers an extensive prehistoric and Romano-British earthwork settlement and field system complex in the area above, although these features were not required to be surveyed. The kilns date to the mid 19th century and represent a major commercial lime producing operation. They are of two phases of construction, the kiln to the north being original and the kiln to the south being later, and they comprise two large co-joined limestone structures up to 10m high. Limestone was brought from the adjacent quarry workings along tramways, and there was also an incline to the south of the kilns; wagons were hauled by a stationary engine located in an engine house, the ruins of which lie on the top of the kilns.

1.5 The archaeological survey area measured c.1.6ha, and encompasses the kilns, the adjacent quarry and the railway track bed. A 1:50 scale Level 3 analytical survey, as defined by Historic England (2016, 26), was required of the kilns, while the adjacent quarry, railway track bed and other earthworks were to be a Level 2 descriptive survey at 1:1250 scale (English Heritage 2007, 23).

1.6 Structural issues have been identified with some parts of the kilns, and there is some risk to the structural remains through intrusive vegetation, slumping and water erosion. A report by a conservation architect was used to prepare a detailed methodology for stabilisation and repair of the fabric of the kilns, and to identify

areas of problematic intrusive vegetation. This report is presented as a separate document from the archaeological survey report (Pace 2018).

Pendragon Castle (NGR NY 7818 0263 centred)

1.7 Pendragon Castle is a well known 12th century tower or keep, situated on the west side of the Eden Valley, some 1.10km north of the hamlet of Outhgill, 10km north of Garsdale Head and 6km south of Kirkby Stephen (see figure 2). The ruins are a Scheduled Monument (NHLE 1007156) and a Grade 1 Listed Building (NHLE 1144890). The castle is believed to date originally to the late 12th century, with modifications to both the building and landscape setting being undertaken in the very early 14th century, after which it appears to have acquired the name 'Pendragon'. It may have been burnt by the Scots in both 1341 and 1541, although the evidence for both of these events rests solely on Lady Anne Clifford, who restored the castle and surrounding area in the later 17th century.

1.8 Several areas of the monument were required to be surveyed for the purposes of improving archaeological understanding, in order to inform future conservation and access enhancements to the monument:

- A detailed topographical earthwork survey was to be undertaken of the interior of the tower, now showing a combination of collapse of the former structure and surviving internal cross walls etc (c.0.03ha in extent); the area of survey was subsequently expanded to cover the ground floor footprint of the whole castle, not just the interior. There are some issues caused by existing public access over the uneven ground within the tower and some areas of related erosion and damage to the stonework have arisen. Broad recommendations were therefore required about ways of mitigating both erosion and health and safety issues in relation to the interior of the castle;

- The surrounding earthworks of the castle mound and ditch, together with the remains of a range of 17th century buildings and other features, which have been the subject of previous survey, warranted more detailed survey following episodes of slumping over recent winters. During the project, the area of survey was enlarged to cover the castle field and that to the north, which also contained related earthworks;

- An adjacent field barn (NGR NY 7813 0270), close to the north-western limit of the Scheduled Monument), was required to be surveyed prior to the drawing up of a specification for future repair and possible reuse;

- A probable early lime kiln, sometimes erroneously interpreted as a corn drying kiln or a well, was required to be surveyed in detail.

1.9 All the survey work at Pendragon corresponds to a Level 3 analytical survey (Historic England 2016, 26; English Heritage 2007, 23-24), and the work was undertaken at a combination of 1:500 and 1:50 scales. The results of the surveys will be used as part of a wider conservation management plan being developed by the owner, Mr J Bucknall of the Pendragon Estate.

Ravens' Gill Barrows (NGR NY 627 119 centred)

1.10 The Ravens' Gill barrows are a group of five closely spaced bowl barrows on the eastern edge of the small, steep-sided valley of Ravens' Gill. The survey area covered less than 0.5ha, and was located c.120m to the north-east of Gilts Farm,

on the opposite side of the gill, and some 3km south-east and 3.45km north respectively of the settlements of Crosby Ravensworth and Orton (see figure 3). The barrows are all Scheduled Monuments (NHLE 1007602, NHLE 1007603 and NHLE 1007604).

1.11 A Level 3 analytical survey, as defined by Historic England (English Heritage 2007, 23-24), was required of the group of barrows, and this was done at a scale of 1:200. The resulting survey report and plans identify areas of erosion, and propose an appropriate methodology for reinstating damaged areas of the monuments.

Crosby Lodge Shieling (NGR NY 6139 1187 centred)

1.12 The shieling is a single earthwork building, located c.640m to the south-west of Crosby Lodge farm, some 3km south-east and 3.45km north respectively of the settlements of Crosby Ravensworth and Orton (see figure 3). It is a Scheduled Monument (NHLE 1007596). The shieling forms part of a complex, multi-phase, historical and archaeological landscape in the area, including cairns, field systems, settlements, four other shielings and a park boundary, although these were not required to be surveyed. The shieling and surrounding area are badly affected by bracken encroachment.

1.13 A Level 3 analytical survey, as defined by Historic England (2016, 26) was required of the monument, involving volunteers from the local archaeological society where practicable; the survey was completed at a scale of 1:50. The resulting survey report and plan identified areas of erosion, and proposed a detailed and appropriate methodology for reinstating damaged areas of the monument.

Aims of the Project

The aims of the project were:

- to identify and gather sufficient information to establish the extent, nature, character, condition, quality, date and significance of the surviving archaeological and historical features within each survey area;

- to provide a detailed structural assessment of the Smardale kilns, and a detailed specification for their repair, taking into account the needs of any protected species that may be present within the site;

- to examine and document any evidence for damage to the four complexes that relates to either natural erosion, structural decay or current land management, drawing up a list of recommendations towards the 'ideal management' of each site;

- to provide an accessible version of the report, suitable for publication in an appropriate academic publication.

Survey Methodologies

1.14 A total of five separate elements of work were required to be undertaken as part of the project, namely documentary research and collation, topographical survey, building recording, structural assessment, and the production of consolidation recommendations. In many cases, there were cross references and links between

the various project elements, with some elements informing and determining the scope and scale of subsequent elements.

Documentary Research and Collation

1.15 The YDNPA project brief did not require any new documentary research to be undertaken, although existing readily-available material held both by the YDNPA and available on-line was collected and collated. Information relating to Pendragon Castle included previous surveys and other reports (e.g. Fiorato 1990; RCHME 1993; LUAU 1996; Andrew Faulkner Associates 2017), as well as material held in Historic England Archives.

1.16 Once the bulk of the survey report had been completed, it was decided to try and obtain some further information from the historical records relating to the Smardale kilns and quarry, to try and establish more accurately when they were constructed and who they were owned and operated by. In the event, however, any relevant material was held in Kendal Record Office, and this was closed during the timescale of the project.

Topographical Survey Work: EDM Total Station Survey

1.17 Detailed Level 3 divorced archaeological surveys of the larger survey areas defined by the YDNPA survey brief were carried out using EDM total station equipment to record the position and form of all features considered to be of archaeological and/or historic interest. The survey areas comprised the five barrows at Ravens' Gill (c.0.5ha) and the surroundings of Pendragon Castle (c.1.2ha); the barrow survey was undertaken at a scale of 1:200, and the castle setting survey at a scale of 1:500.

1.18 Sufficient information was gathered to allow the survey areas to be readily located through the use of surviving structures, fences, walls, water courses, trackways and other topographical features; surrounding walls were also surveyed where they fell within the survey areas. The surveys recorded the position at ground level of all structures, wall remnants and revetments, earthworks, water courses, leats, paths, stone and rubble scatters, ironwork, fences, walls and other boundary features, and any other features considered to be of archaeological or historic interest. At Pendragon, the survey also included the external footprint of the castle, and the external footprint of the field barn, to provide an accurate base for the building surveys (see below). The surveys also recorded any differences in the exposed surface detritus, such as sorted stone and/or rubble scatters, as well as differences in coarse vegetation; these features may aid the functional differentiation and interpretation of the site. The surveys also recorded any areas of erosion (both natural, animal and man-made) or other damage.

1.19 The site surveys were integrated into the Ordnance Survey (OS) national grid by resection to points of known co-ordinates. Heights AOD were obtained by reference to the nearest OS benchmark where this was possible, although it was accepted that the isolated nature of the some of the sites mean that no benchmarks would be available. Survey points were taken from fixed survey stations on a closed traverse around and through the site. The locations, descriptions and values of the benchmarks and control points are stated in the final survey data. On completion of the total station survey, the field data was plotted and re-checked on site in a separate operation; any amendments or additions were surveyed by hand measurement.

1.20 The resulting site surveys were produced at a scale of 1:200/1:500 as appropriate, and presented as interpretative hachure plans using conventions analogous to those used by Historic England/English Heritage (1999; 2002, 14; 2007, 31-35). The final product arising from the site survey was a series of hand-drawn wet ink hachure plans.

Topographical Survey Work: Hand-Measured Survey

1.21 A detailed Level 3 1:50 scale plan of the Crosby Lodge shieling was produced using hand-measurement techniques (tape and offset survey).

1.22 A detailed Level 3 1:50 scale plan of the lime kiln close to Pendragon castle was produced, using the same hand measurement techniques.

Walkover Survey Work

1.23 The wider landscape of the Smardale kilns, comprising the quarry, railway track bed, inclined planes etc, were subject to a descriptive Level 2 survey. Identified site elements, earthworks, quarry faces, lengths of walling, spoil heaps etc were sketch-plotted onto an Ordnance Survey 1:2500 map base, enlarged to 1:1250 scale, using a hand-held GPS for accurate location where required.

Building Recording Survey Work

1.24 Building recording survey work was carried out at Smardale kilns, the interior and footprint of Pendragon Castle, and the nearby field barn.

1.25 Detailed plans and phased elevation drawings of the Smardale kilns were produced at a scale of 1:50 using a combination of hand measurement and reflectorless EDM total station survey. In addition to the ground floor plan, an upper level plan included the ruined engine house on the top of the kilns as well as the infilled pot mouths and any other features of interest. In addition to the three external elevations of the kilns, a representative elevation was also produced of the interior of each draw arch.

1.26 Using the 1:500 scale footprint survey as a base, a detailed 1:50 scale ground floor plan of the Pendragon field barn was produced, as well as the external elevations at 1:50 scale, using hand measurement techniques; the internal elevations of the barn were recorded photographically. Again using the 1:500 scale footprint survey as a base, a detailed 1:50 scale ground floor plan of the interior of Pendragon castle was also produced by hand measurement; where areas of the interior were no longer accessible, information was taken from earlier surveys (e.g. LUAU 1996). This survey recorded the earthworks of the interior, surviving internal cross walls, areas of collapse and rubble, areas of bare or eroding ground etc.

1.27 The resulting 1:50 scale drawings show all significant detail such as openings (blocked or unblocked), inserted doorways, fittings, sockets etc. The elevations depict all significant architectural and structural features such as construction detail, modifications and differences in fabric, and the stones (“quoins”) or dressings around openings and at corners; stone-by-stone drawings were not required. The elevation drawings were marked with a common datum reduced to levels tied into a temporary site bench mark. All drawings were produced according to the guidelines established by Historic England (2016). For the Smardale kilns, the resulting 1:50 scale plans and elevations were used as a base

for the structural assessment and the production of appropriate recommendations for consolidation (see below).

Photographic Surveys

1.28 A detailed photographic record was made of all four surveyed sites, to include both earthwork and structural elements. External and internal elevations of the structural elements were taken both parallel to the elevation (within the constraints of the site) as well as from other vantage points to include oblique general views of the structures and showing them in their settings. Close-up photographs were also taken of significant detail, as appropriate. The photographs were used to show not only the structures' present appearance but also to record the evidence on which the analysis of their historic development is based. Other photographs were taken to illustrate specific well-preserved site elements, details of specific sites and/or areas of erosion etc. More general photographs were also taken showing the landscape context of the survey areas and of specific sites within them.

1.29 The colour photographs were produced using a digital camera with 12 mega-pixel resolution. Historic England photographic guidelines were followed (Historic England 2016) and each photograph was provided with a scale (subject to access). All photographs were clearly numbered and labelled with the subject, orientation, date taken and photographer's name, and were cross-referenced to digital files etc in a photographic catalogue.

Written Accounts

1.30 Each identified individual site or component identified by the archaeological topographical surveys within each survey area was given a unique identifier number, and a detailed written description provided based on notes taken in the field. Pro-forma record sheets compiled from an Access database were used. The description included a preliminary interpretation of extant remains (e.g. dimensions, plan, form, function, date, sequence of development), locational information (including ten figure grid references obtained from the topographical survey, OS map bases or hand-held GPS systems), and mention of relevant documentary, cartographic or other evidence, and management details such as an assessment of current condition and threats.

Structural Assessment

1.31 A detailed structural assessment of the Smardale kilns, and any surrounding revetment and enclosure walls, was made. This was a visual assessment only. Subject to safe access, the assessment examined all of the load-bearing elements of each structure. The inspection was both internal and external, and included surviving floors, walls, lintels, timberwork, charge holes and draw arches etc. It also included the immediate surroundings in case there were any adjacent factors which could indicate a risk to the foundations. Survey drawings at 1:50 scale produced by the archaeological survey (see above) were utilised for this work, although additional survey drawings were produced as appropriate. Any recommendations made by the structural assessment were incorporated into the recommendations for consolidation as appropriate.

Survey Products

1.32 A number of separate products were required to be produced as part of the project, as follows.

Archaeological Survey Report

1.33 A single EDAS archive archaeological survey report for the surveyed sites was produced, based on the results of the documentary research, the topographical and building surveys. The report is a standard A4 typed and bound document, which assembles and summarises the available evidence for each survey area in an ordered form, synthesises the data, comments on the quality and reliability of the evidence, and how it might need to be supplemented by further site work or desk-based research. The survey report also contains various appendices, including photographic registers and catalogues, and a copy of the Methods Statement, together with the details of any departures from that design. It was originally planned to include a pro-forma gazetteer of the identified sites in each of the four survey areas, but it was subsequently decided that there was sufficient information within the body of the report and this element was dropped.

1.34 One draft copy of the report was made available for discussion with the YDNPA and other interested parties prior to completion. Six copies of the final approved survey report were provided in hard copy format (comb bound reports), for the YDNPA, the Friends of the Lake District and the four relevant landowners. A CD containing an electronic copy of the report (as pdf files) and digital copies of the photographs was also provided.

1.35 If required, a summary of the results of the archaeological surveys would be prepared for publication in an appropriate journal or monograph as agreed with the YDNPA. A presentation at a day school on the historic environment of the Yorkshire Dales may also be required.

1.36 On completion of the project, EDAS would allow the YDNPA and the Friends of the Lake District unrestricted use of all survey material, drawings, photographs and other products resulting from the survey work. Information and plans etc resulting from the project (suitably acknowledged) may be used by these organisations in research reports, or any similar publications, and in any interpretative or publicity material, as well as being made available through the YDNPA HER and its derivatives. Nevertheless, the originators will retain the right to be identified as authors of all project documentation and reports as specified in the Copyright design and Patents Act 1988 (chapter IV, section 79).

Structural Assessment Report and Costed Repair Strategy for the Smardale Kilns

1.37 This stand-alone standard A4 typed and bound document reports on the results of the structural assessment of the Smardale kilns, and describes the structural condition and adequacy of all the load-bearing elements inspected (Pace 2018). It identifies any structural problems or concerns, their probable cause, current active status, continuing threat and level of urgency. The report also includes a complete photographic record of the structural defects as well as appropriate drawings (reduced to A4 or A3) and illustrations.

1.38 The report also recommends appropriate measures to rectify any structural problem(s). Where repairs/remedial works, or further investigations are recommended, these recommendations will, where appropriate, include a range of alternative options with a “best” option based upon good conservation principles and sound practicality. The report also considered the results of the separately-produced wildlife survey report (provided by the YDNPA), so that any recommendations made by the survey could be incorporated as appropriate.

1.39 The results of the above meant that a costed strategy for repair and consolidation, in the form of a specification, for the Smardale kilns could be prepared. This identifies all the work necessary within the site to protect, secure and consolidate the monument and enable surviving features to withstand natural erosion and a low level of agricultural and visitor activity. The concept of 'consolidate as found' was followed wherever possible, rather than restoration and rebuilding. However, it is accepted that some limited rebuilding may be required to secure the structural integrity of the structures and if so, appropriate justification will be made. It is anticipated that the recommendations will require the use of traditional methods of building using traditional materials and should normally be reversible. No demolition will be required.

1.40 In general, the recommendations provided for the protection of the site and its structures involve rubble clearance, the repointing, replacement, resetting and/or rebuilding of the existing fabric, the design and installation of any safety barriers etc if required, the treatment of any metal or timber work, vegetation management, the removal of modern spoil and rubbish dumps, appropriate archaeological and other monitoring, and site reinstatement. The consolidation specification also considered the results of the separately-produced wildlife survey report, so that any recommendations made by this survey (e.g. for the retention of any bat roosts etc) can be incorporated as appropriate.

Archaeological Survey Archive

1.41 A properly ordered and indexed project archive (paper, magnetic and plastic media) was deposited with the YDNPA at the end of the project.

Conventions used in this Report

1.42 The four detailed survey areas are described in the following report in a logical sequence, based on the information gathered in the field; each survey area is the subject of a separate chapter, comprising site location, site designations, historical/archaeological background, accounts of previous surveys or investigations (where appropriate), a detailed account of the results of the surveys, and discussions and conclusions. Where necessary, survey areas have been divided into a number of components parts or areas, each one of which has been given a unique identifier number; in some cases, they have also been broken down into sub-components. This has been done purely for the purposes of description, and does not infer any phasing or chronological relationship. The unique identifiers are indicated in the text in bold type e.g. **201**. Reference should also be made to the survey plans, and the colour digital photographic catalogue which appears as Appendix 1.

1.43 Throughout the following chapters, the digital photographs are referenced in the text using square brackets and italic type, the number before the stroke representing the film number and the number after indicating the frame e.g. [*2/1*]. Appendix 1 provides a catalogue of all the photographs taken during the project, and a selection of the photographs has been used to illustrate this report. Finally, in the following report, 'modern' is taken to mean dating to after c.1945.

2 SMARDALE LIME KILNS AND QUARRY

Site Location

2.1 The Smardale lime kilns and associated quarry are located within Smardale Gill, c.2.40km south-west of the hamlet of Smardale itself (NGR NY 7243 0653) (see figures 1 and 4). The gill has steeply sloping sides, and the kilns stand on its west side, on the line of the abandoned route of the North Eastern Railway. There is an abandoned quarry above and to the south-west of the kilns, whilst the former railway line crosses the gill on the Smardalegill Viaduct, c.420m to the north-east. Vehicular access is possible along the track bed from Smardale, and with the prior permission of the Cumbria Wildlife Trust.

2.2 The kilns are in the ownership of Cumbria Wildlife Trust, and fall within the Smardale Gill National Nature Reserve. The kilns form one part of a significantly larger Scheduled Monument that includes railway track, quarry, and an extensive earthwork settlement and field system complex on the higher ground to the west.

Site Designations

2.3 The kilns and adjacent quarry, as well as various prehistoric cairns and three Romano-British settlements and their attendant field systems, are protected as a Scheduled Monument (SM), first scheduled on 21st October 1938 and most recently amended on 3rd September 2004 (National Heritage List for England 1021107; SM35010). The section of the SM description relevant to the kilns and quarry reads:

"Smardale Gill lime kilns, located at NY72430653, are mid-19th century constructions and represent a major commercial lime producing operation. The kilns are of two phases of construction, with the one to the right being the original, and consist of a large bank of two dressed limestone kilns up to 10m high. Both kilns have draw holes set within semi-circular draw arches which are set about 2m above ground level. Access to the draw holes was by steps cut into the face of the wall. A railway siding enabled trucks to be shunted into position and burned lime could then be shovelled directly into the trucks. The two charge holes above the kilns are largely infilled but the original one displays evidence of having been lined with firebricks. The kilns are draw hole type lime kilns which were used to burn limestone. Typically the limestone was tipped into the kilns from above via the charge holes then burned using wood, coal or coke as a fuel. The resultant quicklime, also known as birdlime or slaked lime, was then shovelled out from the draw holes at the bottom of the kilns. Lime has many uses including spreading on lime deficient soils to encourage plant growth, the whitewashing of walls and ceilings of buildings, and concrete and cement production. At Smardale Gill the fuel was brought to the charge holes in trucks along a tramway or inclined plane to the south of the kilns. The trucks were hauled by a stationary engine located in an engine house, the ruins of which still contain the engine beds located above the kiln adjacent to the charge holes. To the rear is an extensive quarry containing numerous spoil heaps which is believed to have been exploited for building stone as well as lime for burning".

2.4 The lime kilns are also a Grade II Listed Building, first listed on 24th September 1985 (NHLE 1145018). The Listed Building description reads: *"Limekilns; c.1860, of 2 builds. Built for work on Smardalegill Viaduct. Limestone blocks with quoins. Tapered and battered, c.30 ft high. 2 double hearths in semicircular openings set*

c.7 ft above ground level on east face; right-hand hearths original, left-hand added slightly later. Disused".

2.5 The quarry and lime kilns are also listed on the YDNPA Historic Environment Record (sites MYD62780 and MYD62781 respectively), and the kilns are listed on the National Record of the Historic Environment (Pastscape 1464986; NMR NY 70 NW 52). They were assessed as part of English Heritage's Monuments Protection Programme for the Lime, Cement and Plaster Industries, as a result of which they were graded '++', denoting "Sites of clear national importance, for which statutory protection will normally be appropriate". In terms of defined components, the site was assessed as containing a bridge, engine house, housing, an incline, lime kiln - draw, quarry, and railway (sidings) (Richardson & Trueman 1997a, 24; 1; 7, 9-11, 16 & 18).

2.6 The Smardale kilns are on the current 'Heritage at Risk' register, listed as being in a very bad condition, priority category D meaning 'slow decay, solution agreed but not yet implemented' (Historic England 2017, 1).

Historical Background

2.7 The railway line passing the kilns is named as the South Durham and Lancashire Union Branch of the North Eastern Railway (Darlington Section) on the various 1st edition Ordnance Survey maps of 1862. It joined with the Eden Valley branch at Kirkby Stephen, providing a link to Penrith.

2.8 The South Durham and Lancashire Union Railway (SD&LUR) was a courageous transport initiative of the 1850s, running between Barnard Castle and Tebay. It was conceived as a vital transport link to supply coke to the new iron furnaces in Barrow-in-Furness, and bring iron ore back to Cleveland; it was planned to cross the Northern Pennines at Stainmore Pass and it was also known as the Stainmore Line. It was supported by the industrialists of Barrow and Teesside, and by the Lancaster and Carlisle Railway, and Royal Assent was obtained for its Act of Parliament in July 1857. Six contracts for construction of the line were let in 1859 and 1860. The total cost amounted to £214,523 for 46 miles of the single line railway; the 9½ mile section from Tebay to Smardale (and including the Smardalegill viaduct) was due for completion in April 1860 at a cost of £44,216, and a small navvy camp was established at Smardale Townhead. From Tebay the mineral traffic was to be worked south on the Lancaster and Carlisle Railway as far as Carnforth, the Furness Railway then taking over haulage on the recently completed Ulverston and Lancaster line to Barrow (Hoole 1973; Nicholson 1914, 112-118). An account of the opening of the line notes that the Smardalegill viaduct contained 14 arches, each 30ft in span, and was 473ft long and 92ft high; it was built by Henry Wigg, a contractor from Preston, from the design of Thomas Bonch, under the supervision of James Affleck, the resident engineer on the western section of the railway (*Illustrated London News* 24th August 1861).

2.9 The line opened to mineral traffic on 4th July 1861, and for passenger services on 8th August 1861, with two trains a day in each direction worked by the Stockton and Darlington Railway. From the end of June 1862, the SD&LUR was absorbed into the Stockton and Darlington Railway, this in turn merging into the North Eastern Railway from 13th July in the following year. Traffic was soon putting heavy demands on the route, as the Barrow-in-Furness iron and steel industry expanded. Between 1870 and 1889 the eastern part of the line between Kirkby Stephen and Barnard Castle, as well as the western section from Ravenstonedale to Tebay, was doubled, but the central section past the Smardale kilns and over

the Smardalegill viaduct always remained a single track. Five passenger trains a day were provided by the North Eastern Railway, and it was also utilised by seasonal and excursion through trains between the North East and the Lancashire resorts of Blackpool and Morecambe. However, the line was heavily dependant on the industries it served, and new methods of producing steel and the construction of new coke-making plants around Workington saw a decline in the West Cumberland coke traffic from about 1910, and it ceased altogether by the mid 1920s. The North Eastern Railway became part of the London and North Eastern Railway (LNER) in 1923. Under British Railways, local passenger trains were withdrawn between Kirkby Stephen and Tebay in December 1952. Other coke traffic was diverted to run via Carlisle from 1960, and the Barrow iron and steel works closed soon after. With very sparse passenger traffic and an expensive route, in terms of maintenance and operation, closure was inevitable, and this occurred in January 1962. Smardale station was one of the first to be closed, in December 1952 (Hoole 1978, 134-137; Hoole 1973; *http://www.nvt.org.uk/sd-history.htm*).

2.10 On the Ordnance Survey 1862 6" map (sheet 30), the site is marked as 'Smardale Quarry' (see figure 5A). Both lime kilns are shown, with a roofed structure, comprising two conjoined squares, present to the west of the northern pot mouth. The quarry extends to the north and south of the kilns, although the area to the south does not extend as far west as the existing quarry. As well as the main line running south-west/north-east in front of the quarry, tramways or light railways are shown within the southern part of the quarry. A short branch runs west from the west side of the southern pot mouth, and then curves sharply to the south where it bifurcates. The south-west route is short, running straight to the quarry face, but the longer east route runs south-east, where it joins another tramway linking the kilns to the south end of the quarrying area. At the base of the kilns, a siding leaves the main line at the south-west end of the quarry and curves gently around north to the front of the kilns

2.11 Newspaper accounts of December 1870 report a fatal accident which occurred at the Smardale Gill Quarries, when John Batesill (aged 59) was run over and decapitated by a pilot railway engine; apparently he was rather deaf and so presumably did not hear it coming. He lived at Smardale Gill and was employed "quarrying stones for the Settle and Carlisle Railway in a quarry by the side of the South Durham Railway, between Smardale and Newbiggin" (*Penrith Observer*, 20th December 1870; *Penrith Evening Gazette* 20th December 1870). Another man, Alexander McIntosh, a mason working at the Smardale Gill Quarries, was killed in June 1871 when he was hit by a stone swinging from a crane lowering stones from the quarry bed to the dressing bank (*Penrith Observer*, 27th June 1871). At the inquest, the quarry foreman John Bell, said that he twice shouted a warning but was ignored by McIntosh (*Penrith Observer*, 4th July 1871). A slightly later newspaper account of July 1894 notes that, when reporting the death of a two year old child on the railway at Smardale Gill Cottages, the quarry had closed "a few years ago" (i.e. in the early 1890s) (*North Eastern Daily Gazette*, 10th July 1894).

2.12 By the time the 1898 25" edition was published, the site had become disused, and is marked as 'Old Quarry' (sheet 30/1) (see figure 5B). Both lime kilns are still shown, although the structure marked in 1862 to the west of the north pot mouth is now depicted in a different location, as a square roofed building to the west of the south pot. What may have been a tramway (or possibly a retaining wall) runs south from the south pot as in 1862, and then bifurcates. One branch continues south for a short distance, with the east branch running south-east towards an

unroofed structure adjacent to the railway line. The other tramway branches shown in 1862 had been removed, whilst the quarry face had been pushed further back to the north-west by 1898; a large spoil bank is marked to the east side of the quarry. At the base of the kilns, the railway siding shown in 1862 had been taken up, although the main line of the North Eastern Railway remained. There appear to have been retaining walls extending to the north and south of the kilns, parallel to the railway line.

2.13 The site is similarly depicted on the 1915 25" edition, although with a few significant differences (sheet 30/1) (see figure 5C). Although the quarry is still marked as 'Old Quarry', there appear to have been some changes to the overall form since 1898 that suggest it was still being worked to some extent. The area to the immediate north of the kilns has a new face cut parallel with the kilns' north wall, whilst the rear face has been pushed closer to the drystone boundary wall. In the southern part of the quarry, there is a small area of disturbance next to the unroofed structure adjacent to the railway line, with further quarrying along the south-east side of the large spoil bank. The structure shown as roofed in 1898 on the top of the kilns is shown as apparently open in 1915. However, it should be noted that, rather than depicting actual changes, some of these differences are due to the differing conventions used on different editions of the 25" to 1 mile Ordnance Survey mapping.

Description of the Smardale Kilns

2.14 The detailed survey area, undertaken at a scale of 1:50, comprises the lime kilns and a small surrounding area, including the engine house to the west and part of the main track bed to the east (Site 100). The survey area measures a maximum of 26m north-south by 22m east-west. A plan of the lime kilns was made at both the lower (track bed) level, and the upper (engine house) level. In addition, the three main elevations of the lime kilns were drawn at a scale of 1:50, together with the south-facing internal elevation of each draw arch. The field survey was undertaken in October 2017.

External Elevations (see figure 6)

2.15 All three external elevations of the lime kilns are built of roughly coursed and squared limestone, set with a lime mortar. The masonry below the draw arches is generally better coursed and squared than that above, whilst the quoins to the south-east corner are more prominent than those to the north-east; the joints in the upper parts of the elevations are generally more open and eroded, and there is some vegetation disturbance. All three elevations have a pronounced batter from base to top - the east elevation slopes inwards by a maximum of 0.45m, whereas the north and south elevations slope inwards by a maximum of 0.30m; this batter is a design feature to provide greater structural stability.

2.16 The east elevation forms the main front of the lime kilns, facing the railway track bed. It is a maximum of 18.75m long across the base, tapering to 18.00m across the top, and stands a maximum of 10.00m in height. It is split into two parts by a vertical straight joint, set to the south of centre; the north part, forming the north kiln, is 10.50m wide, and the south part, forming the south kiln, 8.20m wide [*1/001-1/003, 1/005, 1/998*] (see plate 1). The north kiln was clearly built first, although the southern one was probably added soon after, and map evidence indicates that both were present by 1862. Both kilns were built against, and on top of, the outcropping limestone, and this is visible to the south of the kilns [*1/999*] and along the base of the north end of the east elevation.

2.17 The main feature to the south kiln's east elevation is the draw arch, the base of which is set 1.80m above the ground level here. It has a semi-circular head of rubble voussoirs; the maximum height from the base to the centre of the head is 2.40m. A square-section iron bolt with a cone-shaped end and a short length of attached chain projects from just above the centre of the head [*1/009*] (see plate 5). Below the draw arch, there are three sockets which were presumably used to access the interior [*1/008*] (see plate 2). There are also three other sockets visible in the south kiln's east elevation. The lowest is set at approximately the same level as the top of the draw arch, against the straight joint with the north kiln. The upper pair are both placed at c.6.40m above ground level, above the level of the draw arch, again with one against the straight joint with the north kiln.

2.18 As with the south kiln, the main feature to the north kiln's front (east) elevation is the draw arch. The base of the draw arch is set 2.00m above the ground level here, although it is still lower overall than that of the south kiln. It has a semi-circular head of rubble voussoirs; the maximum height from the base to the centre of the head is 2.35m. Below the draw arch, there are two sockets which were presumably used to access the interior [*1/007*].

2.19 The north elevation of the north kiln is a maximum of 8.30m in height and extends 9.50m back (west) from the front of the structure, where it meets a limestone outcrop [*1/012, 1/056-1/060*] (see plate 3). This face exhibits a certain amount of bulging as well as open fractures through the joints, indicating a lateral thrust from behind. There are also two small pieces of projecting ironwork. The lower is a corroded bolt with a square nut [*1/015*], and the upper is a square-section rod or spike, angled downwards at its outer end [*1/014*]. There are four possible sockets towards the western end of the elevation, but they are not as clearly constructed as those seen on the east (front) elevation, and so may simply mark where facing stones have fallen away [*1/011, 1/013*].

2.20 The south elevation of the south kiln is a maximum of 9.20m in height, and at an upper level runs west for c.6.00m [*1/010*] (see plate 4). There is then a break of c.1.50m, and the line of the elevation is carried on in plan for a further 1.30m (see plate 1). This south elevation contains no sockets, recesses, ironwork or other features. There is considerable erosion on the south-east corner, where many joints are open, and several stones are split due to water penetration with frost damage [*1/053*]. Some movement is also evident higher up with a bulge indicating some thrust from behind.

Lower or Base Level (see figure 7)

2.21 The centre of the track bed for the railway main line shown in 1862 lies 5.50m to the east of the lime kilns, with the impressions left by the former wooden sleepers still clearly visible. The track bed is formed by a slightly raised linear earthwork with an average width of 4.00m, flanked by shallow gullies to either side [*1/004, 1/006*] (see plate 1). As shown in 1862, there was a siding to the immediate east of the lime kilns (see figure 5A). The form of the surviving earthworks to the east of the main line track bed suggests that there may have been another siding here, although there is no contemporary map evidence for this.

2.22 The draw arch of the south kiln is 3.40m wide by 3.15m deep. The front part of the draw arch's interior is paved with large flagstones, with a pair of small diameter circular holes to the outer side of two of the flagstones [*1/036*]. The remainder of the floor was covered with soil at the time of the survey. The south interior wall of the draw arch is blank [*1/032, 1/033*] but the north wall has a 0.50m wide recess

set at a low level towards the west end [*1/034, 1/035*]. There are two draw openings in the west wall, each with a segmental arched head of rubble voussoirs. To the interior of the draw openings, a section of north-south aligned rail (assumed to be either wrought- or cast-iron), measuring 120mm wide by 65mm deep in section supports shorter sections of similar rails running east-west. The rails do not appear to conform to the profile or dimensions of any 'normal' railway rail (Richard Lamb, *pers. comm.*), and so are probably not re-used here from the adjacent railway main line or siding, for example. Together, these support the base of the pot or charge hole over the draw opening; there are firebricks above the rails to the south draw opening. Below the rails, each opening is also fitted with a cast-iron grate of composite form. A north-south aligned bar, 0.07m deep, has a ledge cast into the rear face. The grate pieces rest on this bar, containing closely spaced gaps set at 30mm centres; the grate extends back at least 0.95m from the face of the draw openings. To the north draw opening, the grate must have begun to deform or collapse during use, and so a firebrick wall was built beneath to support the south side. Above the arched heads of the draw openings, the face of the west wall is corbelled out slightly [*1/027-1/031*] (see plate 6).

2.23 The draw arch of the north kiln is 3.30m wide by 3.20m deep. The front part of the draw arch's interior is paved with large flagstones [*1/026*]. The remainder of the floor was covered with soil at the time of the survey. The south interior wall of the draw arch is blank [*1/023*] but the north wall has a 0.30m wide recess set at a low level towards the west end [*1/024, 1/025*]. There are two draw openings in the west wall, each with a segmental arched head of rubble voussoirs. The arches are somewhat flatter than those to the south kiln's draw openings, but they are otherwise of similar construction. The interior of the draw openings appears to be as described for those to the south kiln. Above the arched heads of the draw openings, the face of the west wall is corbelled out slightly. Each draw opening has a poking hole placed above it, which is at least 0.50m deep. Above the poking holes, there are four much smaller holes, three square and one circular, each at least 0.15m deep. Finally, at the very top of the west wall, there is slightly projecting section of rail, measuring 120mm wide by 65mm deep in section, assumed to be either wrought- or cast-iron [*1/016-1/022*] (see plate 7).

Upper Level (see figure 8)

2.24 At the time of the EDAS survey, the only access to the upper level of the lime kilns was by climbing the limestone outcrop at the west end of the north elevation [*2/168-2/171*] (see plate 8). This leads up onto a flattened area to the north of the northern charge hole or bowl [*1/037, 1/038*], with evidence for at least one modern campfire. Although a structure is shown in this position in 1862, there are no clear traces remaining (see figure 5A); it is therefore possible that the 1862 structure was demolished and replaced by the engine house to the south before 1898, or that the structure shown in 1862 *is* supposed to represent the engine house.

2.25 The engine house is as depicted in 1898, as a sub-rectangular building with a small projection at the north-west corner (see figure 5B); there is no evidence for the more northerly structure shown in 1862. The building has maximum external dimensions of 7.00m north-south by 6.70m east-west [*1/039, 1/044-1/046*] (see plate 9). In addition to the north-west projection, which is open internally, there is a second smaller projection at the east end of the north wall which appears to be formed by a solid block of masonry, perhaps some sort of buttress [*1/042*] (see plate 10). The walls of the building have an average width of 0.60m and stand to a maximum height of 1.50m, although they are generally much lower. They are built of thinly coursed limestone rubble set with a lime mortar, although around the

original openings (see below) and to the north wall projection, there are much larger squared blocks [*1/055*]. There appear to have been two original openings in the walls. There was a 1.20m wide doorway at the south end of the east wall, which gave access to the engine, and possibly another opening in the west wall of the projection at the north-west corner, although at only 0.60m wide, it seems too narrow to have acted as a doorway.

2.26 The interior of the engine house appears to have been divided into two distinct spaces. The small projection at the north-west corner appears to have formed a separate internal space [*1/047*], whilst the engine stood in the main part of the interior, and was reached via the doorway in the east wall. Two large rectangular limestone blocks, forming part of the engine bed, survive to the interior of the building; they are both partly obscured by fallen rubble, and it is likely that clearance and perhaps limited excavation would reveal further details of the engine and driving arrangement. The block nearest the door once must have had a bearing mounted on the centre of the south side, secured by two threaded bolts which remain visible. There was evidently once a plate bolted to the upper surface of the south end of the block, with another fitting of unknown purpose adjacent to it [*1/049-1/052*] (see plate 11). The second block is of similar size, and has two threaded bolts to the north end [*1/048*].

2.27 The mouths of the charge bowls are both badly collapsed. The northern bowl is now formed by a sub-circular depression, c.6.00m across and up to 1.70m deep. The fragmentary remains of burnt stone lining are visible to the north side only, but these are now so distorted that it is difficult to estimate its original diameter [*1/040, 1/041*] (see plate 12). The top of the southern bowl is also formed by a sub-circular depression, c.6.50m across and up to 1.50m deep. There is a tree growing out of the north-west side, and some undercutting on the east side, close to the top. The fragmentary remains of its firebrick lining are visible to the north-west quadrant. These suggest that the bowl was originally between 4.00m-4.50m in diameter towards the top, and that the draw openings in the draw arch were placed beneath the approximate centre of the bowl [*1/043, 1/054*] (see plate 13). To the south of the southern charge bowl, there is large *in situ* stone with a circular hole cut into the south-west corner.

Description of Walkover Survey Area (see figure 9)

2.28 The walkover survey area (a Level 2 survey, as defined by English Heritage 2007), undertaken at a scale of 1:1250, covers the former limestone quarry serving the lime kilns, together with a small strip of rough pasture immediately above (to the north-west) of the quarry face. The fieldwork for this element of the project was undertaken in early November 2017.

2.29 The survey area measured a maximum of 250m north-east/south-west by 70m north-west/south-east, covering c.1.6 ha (see figure 4). It is set at a general height of c.244m AOD. The survey area slopes steeply down from north-west to south-east in a series of very steep, sometimes near vertical, steps; the drop in height from north-west to south-east is c.25m-30m. The survey area is bounded to the south-west and north-west by drystone walls, to the south-east by the former railway track bed, and to the north-east by the edge of the quarry itself [*2/181-2/183, 2/185, 2/186*] (see plate 14).

2.30 The drystone wall forming the south boundary of the survey area stands up to 1.80m high, with an average width of 0.80m across the base, tapering to 0.60m across the top. It is built of roughly coursed and squared stone rubble, with slant

coping. As the wall climbs the slope to the west, a single course of through stones becomes visible, set c.1.00m above ground level. Further to the west, there are two courses of through stones, one at 0.50m and one at 1.10m above ground level. The drystone wall forming the west boundary of the survey area is similar. It becomes lower as it moves north, with the throughstone courses becoming less prominent [*2/167*].

*Site **101**: Retaining walls, north-west side of the track bed, south-west of the kilns*

2.31 There are a number of intermittently surviving sections of retaining wall to the north-west side of the main railway track bed, to the south-west of the lime kilns [*2/110, 2/111*] (see plate 15). It is probably these walls which are shown on the Ordnance Survey map of 1898 (see figure 5B). The walls are all of drystone construction, with a distinct batter from top to bottom. They are generally built of thinly coursed and squared rubble, although there are occasional bands of deeper coursing with squared stone. The walls are organised into two distinct levels.

2.32 The upper level has four main surviving sections (**101**/**1**). Described from north to south, the section nearest the kilns (shown on figure 8) is the largest, measuring 3.80m long and standing up to 3.50m high. At its north end, it returns to the west for c.4.00m to run parallel to the south wall of the kilns; there is a gap of c.1.30m between the kilns and the retaining wall [*2/107, 2/108*] (see plate 16). Moving south, the next sections of upper level wall are c.1.50m long by 1.40m high, then c.2.10m long by 0.50m high, and finally c.1.20m long by 1.50m high [*2/109*]. All these sections are suffering from active erosion resulting from water runoff and rabbit activity. The wall can then be traced intermittently in plan south almost as far as the remnants of the open structure shown in 1898 (Site 102), although in this part it generally stands no more than a few courses in height. The surviving sections of the upper level of walling drop relatively steeply but evenly from north to south.

2.33 There is only a single substantial standing section of the lower level of walling surviving (**101**/**2**); this is c.2.50m long and stands up to 2.00m high [*2/112*] (see plate 15). The continuation of its line can be traced in a very fragmentary manner to the north and south. This lower level of walling was set several metres to the east and downslope from the upper level.

*Site **102**: Former structure, north-west of the track bed, south-west of the kilns*

2.34 There is a structure to the north-west side of the main railway track bed, apparently not present in 1862 but shown in 1898 as being unroofed (see figures 5A and 5B). A small area of disturbance or quarrying may have taken place to the immediate south of the structure between 1898 and 1915.

2.35 The remains of the structure are set c.60m to the south-west of the kilns. It is formed by a drystone wall, c.24.00m long (including one major collapsed section) and standing up to c.2.80m in height [*2/113, 2/115, 2/116*] (see plate 17). It is set c.2.00m to the north-west of the track bed, with a slight depression between the two. The wall is in two parts. The lower (earlier?) part stands up to 1.75m high and is 1.00m wide at the base. The front face has a very slightly battered profile, and the wall is built of neatly coursed and squared limestone. It is butted at its northern end by a crude rubble wall, which runs c.2.50m to the west, back up the slope [*2/114*]. The upper part of the wall is set back slightly from the lower part. It is 0.70m wide at the base, and built of coursed and roughly squared limestone, including some large blocks. There are throughstone courses at 0.30m and 1.00m

above the base of the wall, and some surviving sections of vertical coping [*2/117*] (see plate 18).

*Site **103**: Quarrying and former sidings, south-west part of the survey area*

2.36 There is an area of quarrying, together with earthworks relating to a former siding of the main railway (see Site 111) in the south-west part of the walkover survey area. Some quarrying is shown in 1862, and further quarrying may have taken place in this area between 1898 and 1915, even though the main workings were disused by this date (see figure 5); however, this could also be the result of differing conventions used on different editions of the Ordnance Survey 25" to 1 mile maps.

2.37 The quarry is aligned north-east/south-west, and is set into the base of the linear spoil heap (Site 104) to the immediate west. The quarry face is c.70m long and stands up to c.5m in height [*2/119*] (see plate 19). It has been worked in a series of benches; the bedding planes within the working face slope gently downwards from south to north, and are on average c.1m in height to the lower half of the working face. At the north-eastern end of the quarry face, there are some fragmentary sections of a retaining wall, probably of two different phases and separated by a small heap of stone rubble, probably slipped down from the far larger spoil heap above (see Site 104). The northern retaining wall is rather thinly coursed [*2/120*] (see plate 20), whereas the southern part is built from slightly deeper squared stones; an apparent 'opening' at the base is the result of collapse [*2/118*]. The northern retaining wall may once have been continuous with another ruined wall associated with an incline (see Site 107).

*Site **104**: Linear spoil heap, south-west part of the survey area*

2.38 There is a prominent linear spoil heap in the south-western part of the survey area. This is shown in 1898, and the base of the south-eastern side may have been modified by quarrying between 1898 and 1915 (see figures 5B and 5C).

2.39 The spoil heap is aligned north-east/south-west, measuring c.80m long by 15m wide across the base [*2/127, 2/130*]. The south-east face is very steeply scarped, and stands over 6.0m in height; the north-west face is less steep and somewhat lower. The heap is largely vegetated, although there is significantly more exposed limestone rubble to the south-east side. It has a flattened but rather irregular top, sloping downwards from south-west to north-east [*2/134, 2/135*] (see plate 21). The composition of the heap suggests that it was partly created by the initial removal of overburden when the former natural slope of the valley side was cut into to access the limestone. There are several places in the surface of the heap where the collapsed remains of small stone structures might be visible (for example, *2/133*), but they are not convincing, and probably result from differential weathering. There are numerous smaller heaps of bare limestone rubble to the base of the quarry's main working face (Site 105).

*Site **105**: Main quarry working face, north-west side of the survey area*

2.40 The main quarry working face runs virtually the entire length of the north-western side of the walkover survey area. In 1862, the site is marked as 'Smardale Quarry'. The quarry extended to the north and south of the lime kilns, although the area to the south did not extend as far west as the existing quarry does. By 1898, the site had become disused, and is marked as 'Old Quarry'; the quarry face had been pushed further back to the north-west since 1862. Although the quarry is still

marked as an 'Old Quarry' in 1915, there appear to have been some changes to the overall form since 1898 that suggest it was still being worked to some extent. The area to the immediate north of the kilns had a new face cut parallel with their north wall, whilst the rear face has been pushed slightly closer to the drystone boundary wall. However, it may be that, rather than depicting actual changes, some of these differences are due to the differing conventions used on different editions of the 25" to 1 mile Ordnance Survey mapping (see figures 5B and 5C).

2.41 The form of the quarry is of the 'hillside type', as defined by the English Heritage Step 3 MPP report for the quarrying industry, with the vertical scale being benched (Richardson & Trueman 1997b, 8-9). The working face is aligned north-east/south-west, and has a total length of over 210m; the depth, from front to back, is c.20m, and the face stands on average up to c.10m in height, although it is higher to the north-east of the kilns [*2/126, 2/128*] (see plate 22). It is clear from modern colour vertical aerial photography that the face was worked in a series of at least six right-angled cuts into the limestone. However, there are several places, particularly towards the south-west end of the face, where the top is either less regular or small areas appear to have become isolated at a high level, and these may represent some of the earlier workings. The working face is near vertical in some places, but along much of its length it has a stepped profile, stepping backwards from the base to the top in a series of benches, sometimes coinciding with the bedding planes. The benches were not only created for ease of working, but also to avoid dangerous overhangs (Hartley 1939, 121). The bedding planes slope steeply downwards from east to west; they are up to 2m deep at a lower level, but the upper parts of the face are more 'flaggy' [*2/132*]. There may be evidence for tool marks along bedding planes in some places, and so it is assumed that the limestone was extracted using hand tools; no drilling holes or other evidence for mechanised working was seen, nor any clear evidence for blasting. It may be that the working face was too close to the railway to allow explosives to be used (Miles Johnson, YDNPA, *pers. comm.*). There are numerous smaller heaps of bare limestone rubble at the base of the quarry's main working face, as well as larger vegetated ones. These smaller heaps are divided by the former tramway routes accessing the working face (see Site 106 below). To the north of the lime kilns, the working face is near vertical, and stands c.20m in height [*2/152*]. It displays the same pattern to the bedding planes as described above to the south-west of the kilns. There are a pair of concentric, steep-sided, semi-circular depressions at the base of the working face, each c.2m deep, giving a total depth of over 4m [*2/176*].

2.42 There is what appears to be a jumper, set approximately one third of the way up the south-western part of the main quarry working face. A jumper is essentially a very long chisel used to split the rock, which was driven either vertically or horizontally using a sledgehammer (Hartley 1939, 117-119). The jumper is formed by a square-section iron bar projecting from the upper surface of a limestone bench; it is assumed that it was hammered in here, but then could not be removed and so was left behind. The bar is 25mm square, and projects 0.54m from the top of the bench. It is slightly bent [*2/141*] (see plate 23).

*Site **106**: Main tramway and associated branches through the quarry, south-west of the kilns*

2.43 In 1862, what appear to be tramways or light railways are shown within the southern part of the quarry (see figure 5A). A short branch runs south from the southern charge hole of the kilns, and then splits into three. The western branches (106/5 and 106/6) are short, running straight to the quarry face, but the longer

branch runs south-west (106/1), where it joins another tramway linking the lime kilns to the southern end of the quarrying area. No tramways are shown in 1898.

2.44 The line of the main tramway (**106**/**1**), broadly as shown in 1862 (see figure 5A), first becomes apparent to the immediate south of the kilns, as a flattened strip of ground, between 2.0m-3.0m wide [*2/131*] (see plate 24). It runs south into the main area of quarrying, sloping very gently downwards as it does so. In some places, there is evidence for crushed or compacted limestone having been laid as a track bed [*2/145, 2/146*]. There is evidence for at least five shorter branches running off the west side of the main tramway between spoil heaps towards the main quarry face (Site 105) [*2/172*]; this arrangement of a series of tramways branching off a main line was a common one (Searle 1935, 44-45). At a point some 15m south of the kilns, the main tramway has a junction with an incline (Site 107). At this point, it increases to c.6.5m wide, and on the southern side, there are the remnants of a wall built of large flagstones, c.3.0m long and 0.6m wide [*2/165, 2/166*]; it runs into an area of spoil to the north, where it is lost, and it also fades to the south. Beyond this point, the tramway reduces gradually to an average width of c.3.0m. Towards the southern end of the quarry, the tramway curves around to the south-west.

2.45 The southernmost tramway branch (**106**/**2**) continues the line of the main tramway, curving towards the quarry working face (Site 105), and running between several spoil heaps. One of these, on the east side measures c.10.0m long, 2.5m wide and 0.75m high, and is composed of angular pieces of limestone rubble of similar size [*2/138*]. The branch continues south-west along the southern side of a spoil heap for c.15m. It is represented by a flattened strip of ground, c.2.0m wide [*2/159*]. A short section of wall footings are visible to the north side in plan only. Towards the quarry face, the tramway is flanked by rough rubble revetments [*2/139, 2/140*].

2.46 The next tramway branch (**106**/**3**) runs off the western side of the main tramway, travelling south-west between spoil heaps for a distance of c.25m. It is represented by a flattened strip of ground, c.1.5m wide, flanked by spreads of limestone rubble to either side [*2/143*] (see plate 25). Approximately half way along its length, the alignment appears to be blocked by a sub-oval structure, c.2.5m long by 1.5m wide, open to the north-east end. This could be the remains of an old shelter, but is most probably a modern feature [*2/144*].

2.47 The tramway branch (**106**/**4**) to the north-east might be that which is shown in 1862 (see figure 5A). It branches off the west side of the main tramway, and runs south-west between spoil heaps for c.15m. It is formed by a flattened strip of ground, c.2.0m wide, set on top of a c.1.0m high, partly revetted embankment. There are traces of a low stone wall to the upper (northern) side [*2/146-2/148*]. A further short tramway (**106**/**5**) branches off the western side of the main tramway near the kilns, running between spoil heaps towards a subsidiary quarry face (Site 105).

2.48 The northernmost tramway branch (**106**/**6**) branches off the western side of the main tramway adjacent to the kilns, and runs south through a narrow gap between two spoil heaps for c.15m. It is represented by a shallow gully with a flattened base, c.1.2m wide [*2/149*]. To the north of the tramway, a small semi-circular cut has been made into the limestone, and has the remains of a rudimentary seat-type structure to the base; it is almost certainly modern [*2/150*].

2.49 Finally, there is another possible tramway branch (**106**/**7**) leading off the main tramway towards the quarry working face (Site 105), north-west of the lime kilns.

Its alignment is represented by a flattened area to the north-west of the top of the lime kilns, between them and the quarry working face, where a tramway may have run [*2/151*] (see plate 26).

*Site **107**: Incline, south of the kilns*

2.50 An incline, linking the main tramway (Site 106/1) to a former structure (Site 102), lies to the south of the lime kilns. This incline leaves the east side of the main tramway at a point c.15m south of the kilns. It is initially visible as a flattened strip, only c.1.0m wide, terraced into the slope here and sloping relatively steeply down from north-east to south-west [*2/153*]. However, it was once c.2.0m-3.0m wide, and was supported on the upper level of high retaining wall (Site 101/1), visible above the SD&LUR track bed (see plate 27).

2.51 The incline descends to a flattened area or platform set directly behind (west) a ruined structure (Site 102). The west side of the incline retains traces of a stone retaining wall [*2/158*], which may once have been continuous with those visible at the north-east end of an area of quarrying (Site 103). Within the flattened area, there is a large stone with a socket to the upper surface, possibly *ex situ*; the stone measures a maximum of 0.60m square, whilst the socket is 0.20m square and 0.05m deep [*2/156, 2/157*] (see plate 28). Towards the south end of the incline, on its west side, is what appears to be a largely collapsed structure, c.2.0m square, although the walls are now virtually ruinous, standing only 0.5m high [*2/154, 2/155*]. It might have been associated with an adjacent tramway (Site 108) or more likely the incline itself.

*Site **108**: Tramway or trackway, south-west of the kilns*

2.52 A tramway, or possibly a trackway, descends from the main tramway (Site 106/1) towards a former structure (Site 102). Where the it leaves the main tramway, it is represented by a slight gully with a flattened base, with an average width of c.2.0m [*2/164*] (see plate 29). It descends evenly to the north-east, along the base of a large spoil heap (Site 104), which retains sections of a thinly coursed retaining wall to prevent collapse into the tramway [*2/163*]. Slightly further to the north, there is a section of retaining wall built from much larger stone blocks [*2/160*], within which there is a vertical rail, measuring 65mm across by 48mm deep, assumed to be either wrought- or cast-iron [*2/162*]. The dimensions and profile of the rail are what might be expected for a flat bottom rail for light duty such as a quarry tramway with flanged wheels (Richard Lamb, *pers. comm.*). The tramway terminates at a scarp, placed above the flattened area of platform at the base of the incline (Site 107).

*Site **109**: Possible settlement/field system earthworks, north-west of the quarry working face*

2.53 There are some possible settlement earthworks above and to the north-west of the quarry's working face. They may be associated with an extensive prehistoric and Romano-British earthwork settlement and field system complex, the core of which lies some 500m west of the walkover survey area. In 1862-63, the settlement and field system complex are not shown, but it is depicted in some detail in 1898, when it was named as a 'British Settlement'. A sinuous bank is shown leaving the eastern side of the core area, and snaking as far as the boundary wall just above the quarry face (Site 105), but apparently not beyond it. It does seem likely that the bank, and potentially other earthworks, would once have continued into the area which was subsequently quarried.

2.54 The area above the main quarry working face was covered in long grass at the time of the walkover survey, making it difficult to clearly identify any denuded or discrete earthwork features. Towards the central part, there are several low, north-east/south-west aligned, south-east facing scarps, but they almost certainly represent geomorphology rather than archaeology. There is a slightly raised, sub-circular, area projecting from beneath the central part of the drystone boundary wall, from which a low, south-east facing scarp runs to the north-east; the scarp has several small sub-circular or sub-oval depressions both above and below it. It could be a continuation of the bank shown in 1862, but is again more likely to be geomorphological in origin.

*Site **110**: Earthworks, north part of the survey area*

2.55 There are some earthworks in the north part of the survey area, east of the northern end of the quarry's working face (Site 105) [*2/152*]. A south-east facing scarp running parallel to the main railway track bed stands up to c.2.0m in height, presumably separating the quarry area from the railway [*2/173*]. At the west of the scarp, there is a c.12m long sub-rectangular depression, open to the north-east end, again running parallel to the track bed. The depression is c.3m wide across the flattened base to the north end, but widens to the south end [*2/174*].

*Site **111**: Former siding, south-west part of the survey area*

2.56 There are the earthworks relating to a former siding of the SD&LUR in the south-west part of the walkover survey area. The siding is shown in 1862, leaving the main line at the south-western end of the survey area at a point where there is a return in an adjacent field boundary (see figure 5A). By 1898, the siding is no longer shown, nor is there any clear indication of where it used to be (see figure 5B).

2.57 A slightly raised linear earthwork, 1.50m wide, with a flattened top, diverges from the west side of the main railway track bed [*2/123*]. It increases in width as it moves south, and a gully on the west side separates it from adjacent quarrying (See Site 103); this gully contains a post and wire fence. This earthwork forms the remains of the siding shown in 1862. To the north-east, the flat-topped earthwork, forming the remains of the siding, reaches a maximum width of c.6.00m, bridging the gully which separates it from the quarrying. The south end of the gully is marked by a retaining wall, built from large flat stone slabs, c.2.5m long and standing up to 1.00m high [*2/121, 2/122*]; this wall may mark the position of the return shown in the field boundary in 1862. This retaining wall may carry a track leading west to the adjacent quarrying.

*Site **112**: Trackway, entering the south-west part of the survey area*

2.58 A trackway is shown in 1862 approaching the southern corner of the survey area from the south (see figure 5A). It leaves the walkover survey area through the drystone wall forming the southern boundary [*2/124*]. There is now a sheep creep in the wall at this point, but there was once a gateway, subsequently blocked [*2/125*]. The trackway is clearly visible beyond the survey area, continuing towards and then past the empty houses to the south-west [*2/137*].

Discussion and Conclusions

2.59 The kilns are likely to be mid 19th century in date but, without further detailed documentary research (which lies beyond the scope of this report), it is not possible to state who actually owned, built or operated the kilns, for example whether it was the railway company or a private entrepreneur. There are other examples of limekilns which were owned by railway companies (for example, those at East Castle, Annfield Plain, County Durham, initially built and owned by the Stanhope and Tyne Railway (*http://www.brocross.com/industrial%20history/durham%20limekilns/east%20castle%20kilns.htm*), and it is quite feasible that the Smardale kilns were originally built by the South Durham and Lancashire Union Railway, to provide material for the adjacent infrastructure such as the Smardalegill viaduct (as stated by the Listed Building description). However, previous research has uncovered no convincing evidence that this is the case (David Johnson, *pers. comm.*). It is also possible that stone from the quarry, and also lime from the kilns, was supplied to the Settle and Carlisle Railway for their own Smardale Viaduct. Nevertheless, even though documentary evidence is currently lacking, the site survey work has allowed an outline history for the kilns and quarry to be suggested, and has also demonstrated that a site that was only in operation for 30 years can still preserve evidence for several phases of development.

2.60 Although structurally similar, the south kiln was clearly built after the north kiln. The form of the north kiln suggests that it was planned as a single structure and, given that its construction must have taken place at the same time as the adjacent railway line, it is tempting to associate it with the building of the railway's infrastructure; the nearby Smardalegill viaduct, for example, would have required large quantities of lime for use in mortar. The constructional history of the railway line appears to suggest that construction took place from Tebay towards Smardale (Hoole 1973, 38-39), and so the kiln would have been well-placed to have supplied lime for the viaduct and associated trackway retaining walls in the area. However, map evidence shows that both kilns were present by 1862, and therefore the decision to add a second kiln must have been taken very soon after the first was built. Its construction was perhaps stimulated by the anticipated demand for lime from the various industrial concerns linked by the railway. The quarry, and presumably the kilns, were in operation in late 1870 and mid 1871, when there are newspaper accounts of workers being killed.

2.61 The text on the adjacent site information board, noting that the railway supplied the steelworks at Darlington and Barrow but that the quality of the lime was not good enough, is considered to be unlikely for a number of reasons. Darlington only acquired a steelworks in 1884, when Bessemer converters were installed at the Darlington Steel and Iron Company Ltd (*https://www.gracesguide.co.uk/Darlington_Iron_Co*). In addition, with both Darlington and Barrow, there were closer sources of lime that could have been utilised. It may be that the quarry provided limestone for blast furnaces at iron works at either location, but again, one might have expected that there were closer and more convenient sources (David Johnson, *pers. comm.*; Richard Lamb, *pers. comm.*). Although the presence of two adjoining kilns has led some authors to suggest that one was being emptied whilst the other was being filled, to give continuous supply, the design of the Smardale kilns implies they probably both operated continuously.

2.62 Both kilns are large examples of the 'draw kiln' type, where limestone and fuel (probably coal or coke at Smardale) are loaded into the mouth of the pot, and after burning, quicklime is shovelled out from the draw holes located within the draw

arch at the base of the kiln. The limestone was drawn from the quarry to the south-west of the kilns, and the fuel from the adjacent railway. The 1862 Ordnance Survey map (sheet 30) shows that the quarry's working face (Site 105) extended as far as tramway 106/2 by this date, and that the south-westernmost part, served by tramway 106/3, was worked after 1862. Again, the quarry seems to have assumed quite a size by 1862, given that the railway line had only been opened in 1861; it may have either pre-dated the railway, or perhaps more likely, the natural valley side here was cut back to create space for the track, with limestone being quarried for use in the track bed before it was being burnt for lime. The current EDAS survey has uncovered no evidence for the presence of crushing or breaking machinery to mechanically reduce the size of the limestone before it was fed into the kilns.

2.63 The remains of the incline (Site 107) are interesting. The lower part of structure (Site 102) must have formed a platform at the base of the incline, alongside which trucks pulled up on the siding serving the lime kilns, so that coal or coke could be unloaded from them. It was placed on smaller trucks on a tramway, and then hauled up the incline to the north-east; the incline was once c.2.0m to 3.0m wide, and supported on the upper level of a retaining wall (Site 101/1) visible above the main track bed. The haulage was provided by an engine, perhaps a small single-cylinder horizontal steam engine, located at the upper level of the lime kilns. The interior of the engine house was divided into two distinct spaces, with the engine to the south-west space, whilst the north-west space may have housed the boiler and coal store. As has already been noted, neither the trackside structure (Site 102) nor the engine house itself are clearly shown in 1862. This may mean that the incline and engine were a later addition to the kilns, although it may equally be due to the small scale of the Ordnance Survey 6" to 1 mile mapping. The flagstone with the circular hole recorded close to the mouth of the south kiln is potentially significant, as it suggests that there may be the buried remains of other structures associated either with loading or the operation of the kilns at the upper level; this fact needs to be taken into account in any restoration or consolidation work on the top of the kilns, and an appropriate level of archaeological monitoring and recording will be required.

2.64 It is assumed that quicklime taken from the draw holes was loaded straight into full sized railway wagons parked on the adjacent siding, as there is no space within the draw arches for temporary storage. At the mid 19th century Bellman Quarry lime kilns at Clitheroe in Lancashire, the quicklime was conveyed down wooden chutes into wagons in a covered railway siding (*http://geolancashire.org.uk/publications-and-interpretation/the-manufacture-of-quicklime-in-lime-kilns*). However, there is no evidence that any such arrangement existed at Smardale, and it may be that the wagons were close enough on the adjacent siding for the quicklime to be shovelled straight in. However, the square-section iron bolt with a cone-shaped end and a short length of attached chain projecting from above the draw arch of the south kiln might conceivably have been associated with loading, possibly to secure some piece of timber equipment that spanned the gap between the arch and the wagons. The layered coating of lime on the face of the kilns may suggest that quicklime was either shovelled manually into the wagons, or using an uncovered shute.

2.65 Map evidence may suggest that, although the kilns had ceased operation by 1898, small-scale quarrying for other purposes could have continued until at least 1915; a contemporary newspaper account notes that the quarry closed in the early 1890s. It is possible that some of the earthworks recorded within the wider survey area were associated with this small scale activity. For example, it is difficult to see

what the purpose of tramway site 108 was, but could the fact that it terminates above the platform of the incline (Site 102) indicate that when the incline had gone out of use, limestone was being tipped onto the platform from the tramway above? If so, it is difficult to see how any limestone was then loaded onto railway wagons, as the adjacent siding had been removed by 1898.

3 PENDRAGON CASTLE

Site Location

3.1 Pendragon Castle is situated on the west side of the Eden Valley, c.1km north of the hamlet of Outhgill, 10km north of Garsdale Head and 6km south of Kirkby Stephen, at NGR NY7818 0263 (see figure 2). The castle is set on an elevated spur of land, set at a height of c.251m AOD [*7/451*] (see plate 30). There are excellent views to the south, down the Eden valley, for some 6km to a point beyond Aisgill, where the valley curves around to the south-west. At the point where the castle is situated, the valley floor is barely 520m wide, but still narrows somewhat to the south; looking south, the valley is bounded by Mallerstang Edge to the east, and by the moorland flanks below Wild Boar Fell and The Nab to the west. Mallerstang Edge rises to c.600m AOD, and effectively forms the boundary between North Yorkshire and Cumbria here, whilst Wild Boar Fell reaches 708m AOD. To the north of the castle, the view is far less extensive; the ground falls away for c.200m and then rises steeply to a flat-topped, south-facing scarp which runs the full width of the valley bottom, effectively blocking the view north from the castle. It is assumed that this is a glacial deposit, although those in this part of the Eden valley are not described in detail by Daykns (1891, 186-192).

3.2 In the more immediate setting, the ground falls very steeply to the west, from the spur on which the castle sits towards the river Eden, which flows from south to north through the castle's landscape. In 1998, it was suggested that an earthwork above the west bank of the river may be a prospect mound, associated with the castle (RCHME 1993). To the south, the ground drops by almost 10m over a short distance to low-lying marshy ground, formerly the river flood plain but now lying over a metre above the normal river level. To the north, the ground falls away a similar amount, but over a distance of 135m. Again, there is an area of low-lying, marshy ground here, possibly associated with the castle (see below). To the east, the B6259 road forks, with the lesser left fork (known as the Tommy Road) passing through a number of changes of angle before it crosses the Eden on a stone bridge, situated 180m north-west of the castle (see figure 2). East of the B6259, there are two long, east-west aligned fields between the road and the hamlet of Castlethwaite, the core of which is set 310m away from the castle. In 1993, it was stated that these fields had been intensively ploughed and contained no earthworks (RCHME 1993).

Site Designations

3.3 Pendragon Castle is protected as a Scheduled Monument (SM), first scheduled on 30th August 1922 (National Heritage List for England 1007156; SM CU357). The SM description reads:

"*The monument includes the remains of a fortified tower house and its earthwork defences, situated on a knoll overlooking the River Eden. The knoll on which the tower stands has been scarped and raised and is contained on the north and east sides by a 3m deep ditch with two causewayed entrances. The tower measures about 20m by 20m with walls 2.5m thick and is preserved as upstanding masonry and buried remains. It has a staircase in its north-west angle, a garderobe tower projecting from its south west angle, small rooms in its south west and south east angles and an entrance on its north side leading into a vaulted basement. Partial excavation has revealed intact architectural features as well as deposits relating to the 18th century collapse of parts of the structure.*

The original tower on the site was founded in 1180 by Sir Hugh de Marville in order to protect the Mallerstang Valley. It was enlarged in about 1309 by Robert de Clifford, burnt by the Scots in 1341, rebuilt 1360-1370 and destroyed again by the Scots in 1541. In 1600 a curtain wall and outbuildings were rebuilt by Lady Anne Clifford who occupied the gatehouse from 1663-1674. The tower was finally dismantled in 1685 by the Earl of Thanet. Pendragon is a listed building Grade 1".

3.4 The castle is also a Grade 1 Listed building, first Listed on 12th September 1957 (NHLE 1144890). The Listed Building description reads:

"*Fortified tower-house dating from C12 with later additions and alterations; extensively restored 1660 for Lady Anne Clifford c.1685. See description and plan in R.C.H.M., pp.163-164. Since publication some of the fallen masonry has been cleared away, uncovering north entrance with spiral stair to either side of passage which was closed by portcullis (slot visible in masonry)*".

3.5 The castle is also listed on the YDNPA Historic Environment Record, site MYD62634, while the adjacent field barn is site MYD67272. The castle is also included on the National Record of the Historic Environment (Pastscape 14749; NMR NY 70 SE2). It is listed as being 'vulnerable' on the current 'Heritage at Risk' register.

Historical and Archaeological Background

Early History

3.6 Westmorland lay outside of the area covered by the 1086 Domesday Survey, and so the nature of pre- and immediate post-Conquest landholding in the Eden valley is uncertain (Fiorato 1990, 10). Two quern stone fragments were recovered from the castle during clearance works in 1994-95 (LUAU 1996, 29), a Roman coin was found in the castle moat during the 1830s, and a Roman coin of Trajan (104-110) and a Roman ring were found at the castle in the 1920s (YDNPA HER MYD63193). Dr Edward Frankland also theorised that Pendragon Castle may have been the site of a Roman signal station, as it lay within signalling distance of Brough, but there is no independent evidence to support this theory (Fiorato 1990, 34). Fiorato (1990, 34) speculates that the castle mound might be an 11th century, post-Conquest, construction, originally crowned by a timber palisade.

Medieval Period

3.7 Fiorato (1990, 10-11) further suggests that Pendragon is one of the earliest Norman castles in Cumbria and that it was built between c.1150-70 by order of Henry II (1154-89) as one of several castles to hold this area of England following his reclamation of Westmorland from the Scots. The castle was certainly in existence by 1170, as Sir Hugh de Marville, Baron of Westmorland and Justice for Cumbria and Westmorland, played a leading role in the murder of Thomas a Becket. His estates, including Pendragon, were confiscated by Henry II. Elsewhere, it is generally stated that a fortification of some kind was present here by c.1180. Davis (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*) argues that in its earliest phase, Pendragon was a ringwork castle with timber buildings, set in a location which commanded a minor and secondary route through the Pennine hills; at some point in the late 12th century, a masonry tower was built, but the curtain walls and other buildings may have remained as timber structures. Writing earlier in 1973, Renn (1973, 275) also suggested that Pendragon may have originated as a ringwork.

3.8 From an early date, the castle appears to have fallen within the northern end of a land unit known as the Forest or Chase of Mallerstang. Winchester (2000, 15) includes a reconstruction of the boundaries of the various forests, chases and major monastic holdings in Bowland, Craven and the Yorkshire Dales. Although the reconstruction is small scale, the boundaries for the forest of Mallerstang appear to follow a sub-division of the township of Kirkby Stephen named as Mallerstang on mid 19th century Ordnance Survey mapping; Nicholls (1883, 49) states that Mallerstang is a township or chapelry of Kirkby Stephen, but it is distinct as a manor. The boundaries of Mallerstang, as defined on 19th century mapping, were broadly as follows. Starting at the southernmost point and working in a clockwise direction, the boundary ran north-west along Swarth Fell as far as Standard Brow, and then turned north, running west of Mallerstang Common across Wild Boar Fell. It was once defined by an 'Old Dike' to the north of Wild Boar Fell, and then followed the edge of the valley slope past the Friths. It was largely coincident with Fothergill Sike, before meeting the river Eden, and then running north-east to its northernmost point close to Ridding House. Afterwards, the boundary ran south-east for some distance along Kitchen Gill, meeting North Yorkshire to the east of Fells End Bottom. The eastern boundary of Mallerstang then followed the Cumbria/North Yorkshire boundary southwards along Mallerstang Edge, through High Pike Hill, High Seat, Hugh Seat, along the Hell Gill Beck and finally south-westwards to Swarth Fell Pike. The boundary is also defined by Nicholls (1883, 72-74), who described the riding of the boundaries of the manor of Mallerstang in some detail in 1865.

3.9 The status of Mallerstang as a forest or chase was shared by much upland in this region, and in theory it formed the hunting ground of a major landowner. With the exception of a small number of royal forests and ecclesiastical liberties, most were in lay ownership in the 13th century. The principal development within these areas during the 13th and 14th centuries was that their landlords sought to generate income from grazing and also regarded them as reservoirs of land which could be granted out to monastic houses or settled by tenants. By the 14th century, where exploitation by large landowners was paramount, demesne stock farms (often termed 'vaccaries') were created or tracts of land were granted to religious houses resulting in the establishment of monastic granges. Elsewhere, landowners took income from peasant communities, either by selling summer grazing rights on the fells or allowing peasant settlement in upland 'forest' areas (Winchester 2000, 10-11). The former took place within Mallerstang; Winchester (2000, 15) shows the valley to be densely populated with vaccaries, six to the west of the Eden and five to the east. Work elsewhere in upland areas of the Yorkshire Dales suggests that the sites of many (but not all) of these vaccaries may be perpetuated by existing farms, and that some may have much earlier, pre-Conquest origins, and some vaccaries later developed into small settlements (Moorhouse 2003, 341-345). Nicholls (1883, 19-20) alleged that a number of vaccaries were established in Mallerstang by the Prior of Carlisle in the mid 13th century during the minority of Robert de Vipont, but the evidence for this is unclear; it seems just as likely that they were established by Vipont landowners after that date. Detailed topographical and documentary survey of a small settlement such as Castlethwaite, to the east of Pendragon Castle, would be useful in beginning to understand how communities in Mallerstang may have developed from earlier farms into vaccaries and then small communities. The status of Mallerstang as a 'forest' appears to have lasted into the 17th century, as in 1665 several people were fined for killing a deer within the Forest of Mallerstang, belonging to Lady Anne Clifford (Nicholls 1883, 10).

3.10 The history and development of land ownership in this part of the Eden valley is complex and a detailed account lies beyond the scope of this report, but the complexity was in part due to the presence of three substantial medieval residences (Pendragon Castle, Lammerside Castle and Wharton Hall), all within close proximity to one another. The relationship of the three has been explored by Matthews (2015, 78-91).

3.11 The origins of the Lammerside estate (Lammerside Castle is situated some 2.3km north-west of Pendragon) lie in the vast holdings of the Vieuxpont (or Vipont) family, which passed to the Cliffords by forfeiture shortly before the end of the 13th century. In the early 14th century, Sir Thomas Warcop appears to have carved out a holding for himself from the Clifford estate in Mallerstang, but then for the remainder of the medieval period the Warcop family were forced to try to ally themselves with other, more powerful, noble families to prevent absorption back into the Clifford estate. These efforts were ultimately to prove futile in the face of the meteoric rise of the Whartons in the mid 16th century (Matthews 2015, 79). Detailed measured earthwork survey undertaken by EDAS and incorporated into Matthews' paper revealed a series of boundaries, in the forms of banks and ditches, around Lammerside Castle. Some of these no doubt represent a contemporary walled enclosure, but others appeared to pre- and post-date the establishment of this enclosure, and also extend beyond the area that was surveyed.

3.12 Lammerside Castle is stated by Matthews (2015, 82) to overlook "significant elements of the hunting landscape associated with the Clifford estate centred on Pendragon Castle .... principally with a rabbit warren and also a section of park pale surviving to the south and south east". The rabbit warren is located on a prominent mound, some 1.8km north-west of Pendragon, and is not visible from it. Although it is traditionally associated with Pendragon Castle, it is difficult to find any definitive documentary evidence to link the two, and it is still labelled as a rabbit warren on mid 19th century Ordnance Survey mapping, indicating that if it was associated with the castle, the warren outlasted it by at least 300 years. Similarly, there is little published evidence that Pendragon Castle had an associated park. It is possible that the area to the south-west of the castle and west of the river Eden, named as 'The Friths' on the Ordnance Survey 6" to 1 mile map, might represent the remains of a large medieval enclosure associated with the castle (Miles Johnson, YDNPA, *pers. comm.*). The term 'frith', in relation to hunting, is usually applied to areas where beasts were immune from random hunting, and has been used to describe large hunting chases or forests, which may also include enclosed deer parks (Wiltshire *et al* 2005, 44). Rather than being a formal park therefore, the 'Friths' might have been an area set aside for private chase within the larger Forest of Mallerstang. Early county maps, such as Saxton (1579) and Speed (1611) show enclosed parks at Wharton Hall (3.35km north of Pendragon) and Hartley Castle (near Kirkby Stephen) but nothing at Pendragon (*http://www.geog.port.ac.uk/webmap/thelakes/html/lgaz/sax9ny70.htm*). If there was a park associated with Pendragon Castle, then it appears to have fallen out of use by the end of the 16th century. The park at Wharton Hall has been described in some detail by Blackett-Ord (1986, 133-139), and is thought to have been created in the mid 16th century. Its boundary as marked on a map of 1828 includes Lammerside Castle, leading Matthews (2015) to speculate that it might have been used as some kind of lodge by the Whartons after they had regained the estate from the Warcop family.

3.13 Returning to Pendragon Castle, in 1203, King John restored the de Marville estates to Hugh's nephew, Robert de Vipont, who inherited Brough and Brougham

castles at the same time. Fiorato (1990, 11) states that he undertook extensive alterations to Pendragon Castle, and in 1204 he received Appleby Castle in consideration of service done to King John. According to Perriam and Robinson (1998, 300) and the RCHME (1993), the castle is first mentioned in 1228, although it is not certain if this refers to the stone building; this is the same year that Robert de Vipont died (Nicholls 1883, 19). He was succeeded by John de Vipont, who died in c.1242 and left his infant son Robert in the guardianship of the Prior of Carlisle (Nicholls 1883, 19). Nicholls (1883, 19-20) alleges that, during this guardianship, a number of vaccaries were established in Mallerstang, and that the game in the forest or chase area had been run down. One of the daughters of Robert de Vipont subsequently married Roger de Clifford. Following Roger's death in 1283, the castle is noted again in an *Inquisition Post Mortem* of 1284 (Perriam & Robinson 1998, 300); at the same date, the Forest of Mallerstang was worth £44 7s 6d a year (Nicholls 1883, 20).

3.14 There were a series of alterations to both Pendragon Castle and its setting at the beginning of the 14th century. The castle's north ditch was apparently strengthened in c.1300 (Perriam & Robinson 1998, 300). In July 1309, a licence to crenellate was granted to Robert de Clifford, Lord Warden of the Western March; given that this took place within ten years of the strengthening of the north ditch, it may have formed part of a more extensive planned scheme of works. Robert was killed at the Battle of Bannockburn in 1314, and his *Inquisition Post Mortem* of 1314 notes a 'castle of stone in Mallerstang'. As his son was a minor, the custody of the castle was committed by Edward II to Guy de Beauchamp, Earl of Warwick (LUAU 1996, 7; Perriam & Robinson 1998, 300).

3.15 According to Nicholls, the earliest known reference to the use of the name Pendragon comes in an early 14th century document: *"In the 8th Edward II [1315] the jurors find that in the Vale of Mallerstang there is one castle called Pendragon, with a vaccary held by Andrew de Harcla of the rent of 6d a year"* (Nicholls 1883, 25).

3.16 Roger de Clifford came of age in 1321, but fought against Edward II with the Earl of Lancaster at the Battle of Boroughbridge in 1322; he was taken prisoner and his lands forfeited to the King (Nicholls 1883, 25). The "castle of Pendragun and the chase of Mallerstang" are also noted in the Fine Rolls of 1323 (RCHME 1993). In the same year, the garrison comprised one man at arms, two hobelars (a type of mounted infantryman or light cavalry), and eleven foot soldiers. The 1327 Inquisition of Roger de Clifford noted that the castle 'could not be extended for the costs of maintaining it' and that there were diverse vaccaries in the Forest of Mallerstang (Nicholls 1883, 26; Perriam & Robinson 1998, 300). In 1333, the exiled King of Scotland, Edward Balliol, was apparently entertained at Pendragon (Fiorato 1990, 11; Perriam & Robinson 1998, 300).

3.17 The castle was allegedly burnt by the Scots in 1341, although the only known source of information for this event is the diary entry of Lady Anne Clifford, writing over 300 years later, who stated that the castle has lain waste: "*as appeared by many records in Skipton Castle before the late Civil Wars, ever since the 15th of Edw. III [i.e. 1341-42], when the Scotts did then burn down the Timber of it and demolish it with their often inroads and incursions into England ..*" (Curwen 1913, 122).

3.18 Whatever documents Lady Anne Clifford was referring to are now lost, and it is difficult to corroborate her statement; it has been suggested that the isolated location and limited functional use of Pendragon could have been equally

important reasons for its decline and abandonment (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*). According to Curwen (1913, 122), the castle was rebuilt in c.1360-70. Fiorato (1990, 11) states that the roof was reinstated by Roger de Clifford in about 1360, and that the garderobe tower which projects from the south-west corner of the castle is also a 14th century addition. The castle is shown as 'Pendragon' on the Gough map of c.1350-60 (*http://www.geog.port.ac.uk/webmap/thelakes/html/lgaz/ggh2cm.htm*).

The 16th Century

3.19 In 1539, John Leland stated that "*Pendragon is not far distaunt from the very hed of the Swale. Ther standithe yet muche of this Castell*" (Toumlin Smith 1910, 146), indicating that it was already unoccupied and probably in decay by this date. Very shortly afterwards, the castle was allegedly burnt for a second time by the Scots in 1541. Again, the only evidence for this comes from Lady Anne Clifford, and an inscribed plaque or panel she placed on the castle to commemorate her 17th century restoration works. The text of the panel is given in full below, but in summary, it stated that the castle had lain ruinous 'without timber or any covering since the year 1541' (Taylor 1892, 35; Fiorato 1990, 53-54). There is again little independent evidence to corroborate the date, and it was previously suggested that it might be based on a misreading of the plaque which could have mentioned the earlier 1341 burning (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*). However, this is not the case and, as already described above, Lady Anne Clifford stated in her diary that the castle had lain derelict since 1341. Did either she, or the person who carved the panel, confuse the 1341 and 1541 dates? The fact that the last two digits are the same, and that Lady Anne Clifford is the only source for both dates, might suggest so. It seems more likely that there was only one burning of the castle, although on the basis of current evidence, it cannot now be certain which.

The 17th Century

3.20 Restoration works at the castle were undertaken by Lady Anne Clifford (1590-1676) in the later 17th century. She was the last member of the great house of Clifford who had been significant landowners in the north, was the daughter and heiress of George, 3rd Earl of Cumberland, and wife of Richard, 3rd Earl of Dorset and also Philip, 4th Earl of Pembroke; apart from her Yorkshire estates at Skipton and Barden, her Westmorland property included Appleby, Brougham, Brough and Pendragon castles (RCHME 1936, lv).

3.21 Lady Anne recorded in her diary that she formed the design of repairing Pendragon Castle much earlier for use as a library by Mr Christopher Wolridge (Nicholls 1883, 29; Curwen 1913, 122). However, the main restoration began in 1660, when Lady Anne wrote in her diary:

"And in June this year [1660] by my directions was also my old decayed castle of Pendragon in Mallerstang begun to be repaired, which had laid waste, as appeared by many records in Skipton Castle before the late Civil Wars, ever since the 15th of Edw. III., when the Scotts did then burn down the Timber of it and demolish it with their often inroads and incursions into England, there being in his time sharp and bitter warrs betwixt the two nations and it was so well repaired by me that on the 14 of October the year following I lay there for three nights together which none of my Ancestors had done since, Idonea de Vipont lay in it and died the eight of Edward the third" (Curwen 1913, 122).

3.22 The castle was evidently habitable by October 1661, but this did not mark the end of Lady Anne's works. She further recorded in 1662:

"Did I cause a wall of lime and stone to be built round that piece of ground which I had taken in around the castle, ninety roods in compass, with two gates to let in horses and coaches, and within the said wall I caused to be built a stable, coach house, brew house, bakehouse, wash house, and a little chamber over the gate that is arched" (Curwen 1913, 123; LUAU 1996, 8).

3.23 It has been suggested that the site of the 17th century bakehouse was to the east of the castle, at Castlethwaite (Fiorato 1990, 57), but on the basis of what evidence is not clear. Lady Anne reported that in 1662, she was able to lie for six nights 'in the chamber within the great chamber' (Curwen 1913, 124). She kept Christmas at Pendragon in 1663, leaving for Appleby Castle with most of her family in January 1664. She returned in April 1666 for four months and again in July 1667. Lady Anne was also at Pendragon in November 1671, writing that 'after the company had taken their leaves of me here I came up into my own chamber' (Curwen 1913, 123-124; Goodall 2009, 80). The hearth tax roll for Mallerstang between 1669 and 1672 states that the castle had twelve hearths, whilst entries in Lady Anne's account book for 1665 for coal brought from Stainmore to the castle refer to 13 'chiminyes' (Fiorato 1990, 67-68). In 1673 she paid Thomas Strickland for 'drawing ye platform and draught of the castle' (Perriam & Robinson 1998, 300). This might perhaps have been done in anticipation of further works, but it is not known if any took place. According to Fiorato (1990, 96) Lady Anne's bailiff, Robert Branthwaite, had a house of his own in the valley, and did not reside at the castle when she was absent (Fiorato 1990, 66). However, Nicholls (1883, 31) states that in 1664 a Robert Braithwaite, gentleman, was living at the castle, and his wife committed suicide by throwing herself off the building.

3.24 Lady Anne Clifford erected a panel or a plaque which commemorated her work; a similar plaque still remains *in situ* at one of her other houses, at Barden Tower in North Yorkshire. It is stated that the panel was placed over one of the two entrance gates built by her (Nicholls 1883, 29), although a later 1739 print arguably depicts such a feature over the main entrance in the castle's north elevation (see figure 10 top). In 1990, two pieces of the plaque were still in the possession of Raven Frankland, and they were viewed by Fiorato, who gave the full inscription and highlighted those parts that were still remaining (Fiorato 1990, 53-54). The whole inscription read:

"THIS PENDRAGON CASTLE WAS REPAYRED BY THE
LADY ANNE CLIFFORD COUNTESSE DOWAGER OF PEMBROKE
DORSETT AND MONTGOMERIE AND VESCIE HIGH SHERIFESSE
BY INHERITANCE OF THE COUNTY OF WESTMORLAND
AND LADY OF THE HONOUR OF SKIPTON
IN CRAVEN IN THE YEAR 1660 SO AS SHE CAME
TO LYE IN IT HERSELF FOR A LITTLE WHILE IN
OCTOBER 1661 AFTER IT HAD LAYEN RUINOUS WITHOUT
TIMBER OR ANY COVERING EVER SINCE THE YEAR 1541.
ISIAH CHAP.58.VERSE 12 GOD'S NAME BE PRAISED".

3.25 The missing elements of the inscription were presumably filled in from an earlier account, such as the one given by Taylor (1892, 35). The current whereabouts of the inscription fragments are unknown.

3.26 In addition to her other works, the bridge over the river Eden, some 200m to the north of the castle, is said to have been built by Lady Anne Clifford in the later 17th century, possibly 1662 or 1663; according to Fiorato (1990, 12) it bears the initials and date 'AP [Anne Pembroke] 1663', although this is not mentioned in other sources. It is a rubble structure of a single span with a segmental arch, subsequently doubled in width (RCHME 1936, 164; Fiorato 1990, 14; RCHME 1993). If this is the case, then it suggests that, assuming there was no earlier crossing point here, the road (known as the Tommy Road) leading to the bridge which branches off the B6259 up the Eden valley must also be at least partly of the same period. The fact that the road includes two marked changes in angle as it descends the hill from the B6259 may be significant, and could have resulted from it partly incorporating two separate, earlier, routeways approaching, or going around, the castle. It also bisects a large earthwork surrounded by marsh in the base of the valley area to the north of the castle, again suggesting that it is a post-medieval addition to the landscape.

3.27 Apart from the evidence relating to the restoration, there is little other published 17th century material for Pendragon Castle. The Kirkby Stephen parish registers record two entries that refer to the castle - on 27th September 1648, the burial took place of a man who was murdered in a field adjacent to the castle, and on April 29th 1678, the burial of Christopher Jackson took place at Brough Church, who was described as being of Pendragon (Fiorato 1990, 66).

3.28 Lady Anne Clifford died in 1676, leaving two daughters, one of whom was married to the Earl of Thanet. She inherited the entire estate, with the exception of Barden Tower in North Yorkshire. The Earl decided that it was not possible to maintain all of the castles forming part of the estate, and therefore Brough, Brougham and Pendragon were sold for demolition during the 1680s (Fiorato 1990, 14). In 1687, the Earl of Thanet stripped lead from Pendragon and had it taken to Settle en route to Skipton Castle (Perriam & Robinson 1998, 300).

3.29 It is clear that lead was not the only material removed from the castle. Fiorato (1990, 52-60) was the first to try to trace where stone and other architectural material from the castle and associated buildings had been re-used locally. She noted the removal of facing stones and quoins from around the castle, and that there were hardly any facing stones left on the south elevation. Less easily re-used material, such as cusped window heads lying at the base of the west elevation, had been left. The majority of the re-used stonework was found in local walls and buildings within a radius of c.1½ miles from the castle, some as close as the north roadside wall of the Tommy Road. To the north of Pendragon, the farm of Dalefoot (formerly known as Blewgrass) contained three possible re-used architectural elements, including a group of dressed stones possibly taken from a gate arch and part of a stone pillar. To the east of the castle, at Castlethwaite, a house retaining an 1688 AD datestone has a cusped window head of possible 14th century date, and a probable 17th century window perhaps also taken from the castle. To the south, at Outhgill, a 17th century window identical in style to that at Castlewthwaite is built into an early 18th century structure. In some areas, the removal of stone had hastened the process of decay and collapse, as within the south-east mural chamber (LUAU 1996, 13). Fiorato (1990, 54) also identified some wooden fittings further afield which may have come from the castle, such as a plain panelled 17th century door built into an 18th century house at Deepgill in Mallerstang, two miles to the south, and an oak planked and studded door with an elaborate scroll carved lintel some 10 miles away at Smorethwaite in Garsdale.

The 18th Century

3.30 The earliest known image of the castle was published by the Buck brothers, Nathaniel and Samuel, in 1739 (reproduced in Perriam & Robinson 1998, 301) (see figure 10 top). Entitled 'The North-West View of Pendragon-Castle, in the County of Westmorland', the engraving shows the castle seen from the west, as if viewed across the river Eden. The west external elevation is the most prominent, and is shown to survive to at least three storeys in height. To the ground floor and first floors, there is a large, recessed central panel. To the ground floor, there are at least three narrow slit windows, with further examples to the first floor, flanking a semi-circular headed window placed centrally to the recessed panel. Above, to the second floor, there are at least two further slit windows, and then above these the possible remains of a parapet wall or battlements. The garderobe tower is present at the south-west corner, whilst the north elevation appears to survive to a similar height to the west elevation. The ditch surrounding the castle mound is visible, with two ranges of ruined buildings between the ditch and the Eden. The southern range is roofless, but has masonry, possibly a chimney stack, rising above the approximate centre; a gable with an arched opening is shown apparently some distance to the east of the north end of the southern range, rather than being connected to it. The northern range is shorter (although still substantial) and comprised a building with four buttresses to the west wall; the surviving north and south gables indicate that it once also had a pitched roof.

The 19th Century

3.31 An engraving of the castle made by Moses Griffith and published by Edward Harding in 1801, and included in the reprint of Thomas Pennant's 1773 *A Tour from Downing to Alston Moor* (reproduced in Fiorato 1990, 15 and Perriam & Robinson 1998, 300), shows the castle viewed from the north (see figure 10 bottom). Although the north elevation presents rather a jumbled arrangement of architectural features, comparison with the existing remains suggests that there was at least an attempt to portray the overall arrangement. The engraving also suggests that some of the uppermost parts portrayed by the Bucks had collapsed since 1739. A newspaper account of May 1848 noted that the "...*interior is nearly filled up with stones and rubbish, which is grown over with grass and trees. Indeed, all is perfect desolation; the walls are tottering beneath the pressure of centuries, and you scarcely dare move amid the ruins, for fear of letting some portion of them down upon you, and thus involuntarily becoming a martyr to your taste for antiquities*" (*Kendal Mercury*, 20th May 1848).

3.32 The last Earl of Thanet died in c.1849 and the inheritance passed to a gentleman named Tufton who claimed to be the illegitimate son of the last earl. He eventually took the title of Baron Lord of Hothfield and ran the estate throughout the 19th century (Fiorato 1990, 14-16). In 1862, the Ordnance Survey 6" to 1 mile map (sheet 30) names the field in which the castle stands as 'Castle Court' (see figure 11A). The mound is clearly shown, with the ditch to the north and south-east, and the steep scarp to the south and south-west. The house to the north-west of the castle, on the west side of the Eden, is named 'Low Cocklake'. Some 300m east of the castle is the small settlement of 'Castlethwaite'. This comprises three houses laid out in an irregular plan form, linked by an enclosed trackway to two further buildings at Keld Hole to the south. A wider enclosed trackway runs eastwards from Keld Hole and widens to meet the unenclosed fell ('Old Close'), resembling a funnel-like feature leading off the fell.

3.33 Several excellent photographs were made of the castle at the very end of the 19th century by the Westmorland photographer Herbert Bell (*http://www.lakesguides.co.uk/html/lgaz/lgazfram.htm)* (see figure 12). These are particularly useful in that they show parts of the structure which have since collapsed and also more ephemeral features such as drystone retaining walls which have also largely disappeared. In 1883 it was noted that "*enormous quantities of stone have of late years been removed for making fences, and all that remains of the former grandeur of the once great stronghold, are the crumbling ruins of a square tower*" (*Newcastle Courant*, 28th September 1883).

The 20th Century

3.34 The condition of the castle continued to deteriorate throughout the first half of the 20th century. In 1924 it was reported that the castle had been taken over "*by the Office of Works from Lord Hothfield, and will henceforth be looked after and preserved by the state*" (*Leeds Mercury*, 12th April 1924). This must have been a confusion with the scheduling of the ruins in 1922, as Lord Hothfield still owned the castle into the 1950s. In 1936 it was noted that: "*it is now hardly anywhere standing above the second storey and the existing walls are heavily encumbered both inside and out by fallen masonry, which obscures many of the still existing features .... Remains of cusped window heads and other moulded stones are lying on the site"* (RCHME 1936, 163-164). There are also a number of photographs of the castle taken in 1929 by the RCHME (HEA FL00958), as well as other field notes and photographs dating from 1935 as part of their of their 1936 publication (HEA BF008645). In 1950, the Eden Valley Group of the Women's Institute pleaded to the Ministry of Works that the ruins of the castle should be restored (*Penrith Observer*, 27th June 1950). A further plea was made by a local school master (*Penrith Observer*, 4th July 1950), and the local MP, but in December 1950 the Ministry stated that repairs would not be carried out, as "the cost of preservation was out of all proportion to the historic interest of the building" (*Penrith Observer*, 19th December 1950).

3.35 During the 20th century, the Hothfield estate was gradually reduced in size, with many of the larger properties being sold off. The decision to sell Pendragon Castle was taken in 1963, and it was purchased by Raven Frankland for £525 (Fiorato 1990, 16). The Frankland family remained the owners until June 2013, and the site passed to the current owner, Mr John Francis Bucknell in April 2014.

Arthurian Associations

3.36 At some point, the castle gained an Arthurian legendary association. Given that the castle was recorded as 'one castle called Pendragon' in 1315 (Nicholls 1883, 25) and 'the castle of Pendragun' in the Fine Rolls of 1323 (RCHME 1993), this association was already present by the early 14th century. Davis speculates that the works undertaken by Robert de Clifford in the very early 14th century might have been inspired by Arthurian associations, although he admits that to what extent can only be surmised (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*). Ragland-Phillips (1976, 64-66) points out that Pendragon features in Mallory's late 15th century *Le Morte d'Arthur* but also speculates that there must have, at some time, been 'a Celtic Welsh establishment here', noting that the feature of a building standing on an island (i.e. the castle on its prominent mound) is a regular one in Celtic and Arthurian tradition. However, as noted above, there is currently no known archaeological, landscape or documentary evidence to suggest any activity on the castle mound prior to the 12th century.

3.37 Quite why the castle should have gained an association with Uther Pendragon is currently uncertain. There are a few other sites in Cumbria which have Arthurian associations, for example, Penrith and Carlisle, but not many. According to the 12th century chronicler Geoffrey of Monmouth, Uther Pendragon was the father of Arthur, and reigned in Britain following the downfall of Vortigern. Vortigern was at first succeeded by Uther's brother, Aurelius Ambrosius, but he was murdered. At the time, a portent appeared in the sky, a brilliant star with a dragon, from which Uther took the name 'Pendragon'. The newly crowned Uther held court in London at Easter and fell in love with Ygerna, the wife of Gorlois, Duke of Cornwall. This led to a conflict between the two men, and Ygerna was placed in Tintagel Castle for safety. Merlin used magic to transform Uther into a replica of Gorlois, and in this disguise he was able to enter her chamber at Tintagel, as a result of which Arthur was conceived (Ashe 1987, 67-68 & 99). Nicholls (1883, 15) records the tradition that Uther was besieged in the castle at Pendragon by the Saxons, who considered it impregnable and therefore poisoned the well, killing Uther and the garrison. The locally well-known saying, 'Let Uter Pendragon do what he can, the river Eden will run where it ran', recorded by Camden in 1695, is sometimes interpreted as a failed attempt to draw the Eden into the castle moat (Perriam & Robinson 1998, 300).

Previous Surveys and Investigations

3.38 The castle, and to a lesser extent its immediate landscape setting, has been subject of several previous recording projects. There have also been several previous repair schemes undertaken to the structure and its immediate setting, although the nature of the repairs carried out prior to the 1990s is not always certain.

3.39 The first detailed architectural account of the castle was probably given by Curwen in 1913 (Curwen 1913), although Fiorato (1990, 6) states that his account contains a number of inaccuracies which were subsequently repeated in later histories. Curwen had previously published a plan of the first floor of the castle in 1908, together with a short account (Anon 1908, 258-261). Curwen's ground plan of the castle is shown in figure 13A.

3.40 In 1936, the RCHME (1936, 163-164) published a combined ground/first floor plan of the castle, together with a description (see figure 13B); their original field notes and some photographs dating to 1929 survive in Historic England Archives (BF008645 and FL00958). A plan, based on that made by the RCHME, was reproduced by Renn (1973, 274) as part of his wider survey of Norman castles in Britain.

3.41 Ground and first floor plans of the castle at a scale of 1:100 were produced by Tom Clare, then Cumbria County Archaeologist, in 1984 (see figure 13C). Clare also made stone by stone drawings of the internal and external elevations at a scale of 1:50, using rectified photographs. Both plans and elevations were reproduced by Fiorato (1990, 80-90). A detailed study of the castle was undertaken by Fiorato in 1990, as part of a BA Honours in Archaeology at Durham University (Fiorato 1990). This included a reconstruction of the appearance of the missing parts of the external elevations, the first outline plan and wall profiles of the presumed 17th century range to the north of the castle, and an important attempt to trace where stone from the castle had been re-used in the local area.

3.42 A photogrammetric survey of the castle was made by Photarc Surveys Ltd in 1991, with the 1:20 plots being checked and enhanced by Lancaster University

Archaeological Unit (LUAU). At the same time, all exposed architectural fragments on site were recorded, and accurate ground and first floor plans constructed (Wood 1992-93, 20; Binney *et al* 1995, 237-44; LUAU 1996, 5). Following on from this, in 1994-95, limited excavation of fallen debris within the castle was undertaken by LUAU, together with clearance of material which had built up against the outer walls; a new ground floor plan was produced (see figure 13D). All newly exposed areas of fabric were recorded on the 1991 photogrammetric plots and the new architectural fragments discovered during clearance were recorded and removed to safe storage along with those previously found in 1991 (LUAU 1996, 5). At the time of writing (2018), these architectural fragments remained in the barn on the castle site. Most fragments (although not all) appear to retain identification tags presumably relating to when and where they were found in 1994-95; a detailed list of the fragments recovered at that time also exists (LUAU 1996, 19-27). It is stated (Perriam & Robinson 1998, 300) that, during these works, the north entrance to the castle was uncovered, flanked by newel stairs, which was closed by a portcullis, although these features are clearly visible on the plans made by Clare in 1984. Furthermore, the remains of the barmkin wall and the 'Countess' gate' were apparently also exposed, although unfortunately no detailed location is given for these features nor do they appear in the archaeological report on the 1994-95 works. The Cumbria Records Office (Kendal branch) also hold a file of material relating to the castle dating to 1994-95, by R J Hill, Building Surveyor and Consultant (CRO WDX 1957); it is not known whether this is related to the 1994-95 site works, or whether it was a separate project.

3.43 The most recent ground floor plan of the castle was published in 1998 by Perriam and Robinson (1998, 301) (see figure 13E). The Cumbria Records Office (Kendal branch) also holds a file on the castle, comprising an architectural description and photographs produced by Alec Conn, dating to August 1998 (CRO WDX 1281/1).

3.44 In terms of modern repair and conservation, Raven Frankland began repairs to the castle in 1964 following his purchase of the estate in the preceding year (Fiorato 1990, 16). These works included the removal of debris from around the exterior of the castle, the removal of trees from the masonry, some stonework consolidation, the stabilisation of the 14th century garderobe tower which was on the brink of collapse, various structural interventions to support vulnerable parts of the masonry through masonry corbelling and the introduction of supporting steelwork in some locations, and the introduction of security measures in a bid to reduce intruder access and consequent damage and vandalism (Andrew Faulkner Associates 2017, 6). Limited conservation works were apparently also undertaken at the castle during the 1970s (Perriam & Robinson 1998, 300).

3.45 From the early 1990s, English Heritage became directly involved, supervising and undertaking some masonry consolidation and clearance work (LUAU 1996, 9). In 1990, it was reported that the volume of fallen rubble that was then present was roughly half the amount that had been there when the castle was purchased in 1963 (Fiorato 1990, 22). It is clear that some finds and architectural fragments were recovered during this work, including a pillar with an oak leaf motif, two fragments of 17th century inscription and various metal finds (Fiorato 1990, 54, 60), but the current location and condition of these fragments is unknown.

3.46 A detailed topographical survey of the earthworks surrounding the castle was undertaken by the RCHME in November 1993. The resulting survey report contains a description of the earthworks and castle, as well as other features in the vicinity (RCHME 1993). A brief summary of the survey, together with an overall plan, was published in 1996 as part of a wider account of recent work in the

Howgill Fells (Bowden 1996). Full consolidation of the exposed parts of the monument was carried out by Laings Stonemasonry in 1994-95 under the supervision of Christopher Binney, architect, with grants from English Heritage (LUAU 1996, 5; Perriam & Robinson 1998, 300); copies of Binney's specification drawings are held in Historic England's archives. In 2017, a Conservation Scoping Report was produced for the current owner, by Andrew Faulkner Associates (2017), and this also contains a structural survey.

Description of the Earthworks (see figures 15 and 16)

3.47 The earthwork survey area (a Level 3 survey, as defined by English Heritage 2007), was undertaken at a scale of 1:500, of two adjacent fields, that containing the castle itself and the castle mound, and the field to the immediate north, which includes associated earthworks (see figure 14). The whole survey area measured a maximum of 210m north-south by 100m east-west, and covered 1.57ha in total. Two profiles were also made across the castle mound, to include the castle itself, at a scale of 1:250.

3.48 Within the survey area, the surface of the castle mound is set at an average height of 251m AOD, but the ground surface falls away to 241m and 242m to the north and south respectively. The majority of the survey area is bounded by drystone walls, with a partly collapsed post and wire fence to the east bank of the river Eden. At the time of the survey, the area was used as pasture for a small number of sheep. The field survey was undertaken in October-December 2017, with additional work to record the profiles and the kiln in February 2018. A further site visit was made on 30th June 2018 to assess and consider the erosion issues.

*Site **200**: the Castle Ringwork*

3.49 The ruined castle is set slightly to the south-west of the centre of a prominent mound with a motte-like appearance, surrounded by deep ditches to the north and south-east sides; together, these features were described as a ringwork by the RCHME (1993). The ringwork was almost certainly created by the adaptation of a natural promontory, accessed from the east or north-east, which stood above the narrow flood plain of the river here and which gave extensive views to the south.

3.50 The north ditch (**200**/**1**) is curvilinear in plan, and runs for a distance of 65.0m between the east and west causeways (Sites 200/4 and 200/5) [*7/433*] (see plate 31). Where it meets the eastern causeway, it is c.8.0m wide across the top; the internal scarp is c.2.5m high and the counterscarp c.1.5m. The ditch has a flattened bottom, averaging 2.5m in width. There is also a prominent sheep track running along the top of the counterscarp here, with regularly spaced sheep tracks below (see below). A short distance to the north of the eastern causeway, above the counterscarp, there are two well-defined sub-rectangular scoops or depressions, set either side of a flat-topped area of ground (**200**/**2**). These depressions measure on average 7.0m by 5.0m, and are up to 1.2m deep; both appear to pre-date the adjacent drystone field wall, but cannot be traced beyond it as they have been truncated by the construction of the adjacent Tommy Road. The north-west scoop has a shallow linear depression running out of it and down the counterscarp of the ditch; in 1993, this was suggested to be a former excavation trench (RCHME 1993).

3.51 As it curves around to the west, the north ditch becomes both wider and deeper. Where it reaches a point directly to the north of the castle, it measures c.12.5m across the top; the internal scarp is c.3.6m high and the counterscarp c.2.7m high.

At this same point, there is a flattened, but noticeable, projection or bulge which rises the full height of the counterscarp [*7/458, 7/460, 7/461, 7/463, 7/464*] (**200**/**3**) (see plate 32). This projection is aligned on several earthworks (Site 203) to the north, which appear to preserve the line of a formal approach, and may mark the former position of a bridge across the north ditch. West of the projection, the ditch continues to increase in width and depth until it meets the western causeway (Site 200/5) (see plate 33). Here, the ditch measures 15m across the top; the internal scarp is c.4.5m high and the counterscarp c.2.6m high [*7/462*]. The north ditch (200/1) then recommences to the west of the western causeway and, although it is of a similar width, it is a much shallower feature [*7/471*]. It can be traced west and downslope for 15.0m before it meets the level ground between the base of the mound and the river. A spread linear bank runs parallel to the north side of the north ditch, terminating at what seems to be a lump of fallen masonry, now half-buried [*7/470; 10/150, 10/151*].

3.52 The south-east ditch (**200**/**7**) is also curvilinear in plan, and runs for 39m to the south of the eastern causeway (Site 2/004). At its northern end, the ditch measures 11.0m across the top; the inner scarp stands c.3.5m high and the counterscarp c.2.0m high. There is a narrow sheep track immediately above the counterscarp, and then a spread curvilinear bank which runs parallel to the ditch, curving around onto the causeway. At its south end, the bank appears to be cut by a linear depression running at an approximate right-angle to it, itself with a bank running parallel to its south side [*7/434*] (**200**/**6**) (see plate 34). This depression is c.9.0m long and 2.0m wide; there is a lump of masonry in the base of the ditch at this point [*6/309, 6/310; 7/435, 7/436*]. In 1993, this earthwork was again suggested to be a former excavation trench (RCHME 1993). Shortly beyond this point, the base of the ditch drops by 1.7m [*6/311; 7/437*]. The ditch widens and deepens as it moves south, eventually reaching 18.5m in width, with the inner scarp standing over 7.0m in height and the counterscarp over 3.0m [*7/438*] (see plate 35). A bank runs parallel to and outside the ditch, effectively defining the ditch, and it becomes wider and higher as it moves south, eventually reaching 15.0m in width and 3.0m in height [*7/448-7/450*] (see plate 36). Both the ditch and bank terminate at the flat, marshy area to the south of the castle mound.

3.53 The eastern causeway (**200**/**4**) is placed opposite a gateway in the field wall, forming the main existing access into the castle field [*7/430*]. This gateway retains substantial quoins to either side of the gate stoops, although those to the south are now placed within a section of wall which has been rebuilt using modern cement mortar. This is suggested to have been the location of one of the perimeter gates, capable of being driven through by a coach and horses, built by Lady Anne Clifford in 1662, with the other standing towards the bridge over the Eden beyond the 17th century range (see Site 204/1) (Fiorato 1990, 32). The causeway itself is 9.0m wide, and slopes gently upwards to meet the castle mound [*7/432*] (see plate 37).

3.54 The western causeway (**200**/**5**) is narrower, at 4.5m wide, and there is a steeper slope off the castle mound to meet it [*7/468, 7/469*] (see plate 38). In 1993, it was suggested that this causeway may have been constructed in the 17th century, as it provides a direct route to the range of buildings built by Lady Anne Clifford (see Site 204) (RCHME 1993). Rather than the existing trackway (recorded as T1 in 1993), which meanders down towards the gateway leading into the field to the north, the onward route of the causeway may be represented by a break in the natural scarp to the north-west (recorded as T2 in 1993), which leads straight to the southern end of the 17th century buildings.

*Site **201**: the Castle Mound*

3.55 The interior of the castle mound is slightly sub-circular in plan, measuring a maximum of 54.0m north-east/south-west by 50.0m north-west/south-east. The ground surface of the interior is broadly level (although see below) and is set between 1.10m and 2.10m higher than the counterscarp of the ditch; it is also higher than the surface of either of the causeways that give access to it. The height of the interior was almost certainly artificially raised using material excavated from the ditches, and the RCHME (1993) suggested that this might have involved the levelling or infilling of an earlier ringwork. Further evidence for the artificial raising of the interior is provided by erosion scars to the very steep scarp, 10.0m high, which defines the south and south-west sides of the castle mound. The profiles exposed by these scars, which are discussed further below (see 'Erosion Repair and Damage Control') appear to indicate a laminated cross-section to the upper part of the mound, with the upper 0.3m comprising compacted angular stone rubble (up to 0.1m across), below which there are alternating bands of a black/dark brown silt soil and a similar deposit, but with a higher proportion of small stones. No pottery or other finds were exposed in these sections, although they do sometimes contain what appears to be very abraded coal.

3.56 Although broadly level from one side to the other, there is much local variation to the height of the top surface of the castle mound, particularly close to the castle itself. Much of this relates to the clearance works undertaken in and around the castle during the 20th century, and these are outlined below. However, there are a few earthworks which might possibly relate to an earlier structure, or at least other structures associated with the existing tower, which have since been lost.

3.57 A slight north-facing scarp is first visible to the immediate east of the western causeway (Site 200/5), set back c.2.0m from the edge of the north ditch's inner scarp. This slight scarp curves around to the east, running broadly parallel to the ditch. At a point opposite a suggested bridge position (Site 200/3), the slight scarp turns north to meet the ditch's inner scarp. It resumes 2.0m to the east, and again runs parallel to the north ditch, although its line is now set c.4.0m back from the edge. There is another break in the scarp just to the north of the eastern causeway (Site 200/4), and then it recommences for a further 12.0m before fading out altogether. A similar slight scarp is visible for a length of c.12.0m to the south-west quadrant of the mound. These scarps may be no more than erosion, perhaps resulting from stock walking around the edge of the mound in the past, but they could represent the remains of a former palisade or similar feature.

3.58 There are three main areas of raised ground closer to the castle itself. A photograph of the west elevation taken in 1897 by the Westmorland photographer Herbert Bell shows a substantial mound of material towards the north end, with more trees and bushes growing on it than are currently present (see figure 12 top). To the northern half of the west side, there is a now a spread triangular mound, less than 0.5m high, running as far west as an ash tree, and then returning towards the castle. There is a more prominent mound, over 1.0m high, in the same area, immediately adjacent to the castle. This mound partly results from clearance works to the interior undertaken after 1963; excavation of this mound in 1994-95 revealed a substantial collapsed section of the first floor wall. Immediately to the north of this section, a second section of wall was revealed, set at an angle of about 75 degrees, with substantial areas of plaster attached to the internal face, showing the start of internal chamber vaulting (LUAU 1996, 12) (see figure 13C). This second section of masonry was left exposed, and is now held in a semi-upright position by a stainless steel prop [*9/574*]. A shallow north-facing scarp runs

from the aforementioned ash tree around to the centre of the castle's north side; clearance was apparently also undertaken here in 1994-95 (LUAU 1996, figure 1).

3.59 Against the east end of the north side, there appears to be the remains of a sub-rectangular enclosure or collapsed structure, defined by spread banks, measuring 10.0m east-west by 5.0m north-south [*7/456, 7/457*]. A drystone retaining wall is shown here on one of Herbert Bell's 1894 photographs (see figure 12 bottom) and on one published by the RCHME in 1936 (HEA BF008645 WK 485). It can also be seen on an unpublished photograph taken in 1929 (HEA FL00958). No clearance was undertaken here in 1994-95 (LUAU 1996, figure 1) and so it is likely that the earthwork in part reflects the buried drystone wall.

3.60 A low east facing scarp, set 1.5m out from the wall face, can be followed for the full length of the castle's east side; it becomes more prominent at the south end, around an ash tree. There is a third ash tree to the immediate south-west. There was once substantially more material here. When clearance was undertaken here in 1994-95, at the northern end, debris was composed of stone rubble in a matrix of decayed lime mortar and soil. Immediately to the south of the northern central window, a drystone retaining wall was exposed, three to four courses high. This wall ran at right angles to the main elevation and returned to the base of the ash tree at the castle's south-east corner. Beyond the edge of the drystone wall there was an area of collapsed masonry, including several fragments which retained a layer of skimmed plaster to their former exterior sides. The drystone wall appears on the aforementioned 1894 photograph and the 1936 RCHME photograph, and was thought to have been constructed subsequent to the collapse of the upper parts of the east elevation which took place after 1913 (LUAU 1996, 11-12 & 15, figure 1). A drystone wall may also be shown running along the base of the south elevation on another of Herbert Bell's 1897 photographs (see figure 12 top), and there is a slight south-facing scarp here, but no clear evidence for a wall.

*Site **202**: Trackway, south-east of the castle mound*

3.61 A trackway first becomes visible to the immediate west of the gateway giving access to the castle field, where it is carried on a low scarp. However, this section is probably a later addition, and the trackway probably originally left the line of the main road slightly further to the south; a straight joint in the adjacent drystone field wall marks an earlier gateway. The trackway has an average width of 4.0m, and it slopes down from north to south. The east side of the trackway is defined by an intermittent spread bank, up to 1.5m wide but less than 0.3m high [*7/442, 7/443*]. The trackway follows the curve of the bank flanking the south-east ditch (Site 200/7), but then fades in the marshy area to the south of the castle mound.

3.62 In 1993, it was suggested that the trackway (then labelled T5) was an earlier alignment of the road to Kirkby Stephen, and that it may have led to a ford positioned some 300m upstream (south) of the castle (RCHME 1993). The onward route of the trackway through the marshy area and beyond the wall marking the southern limit of the EDAS survey area is unclear. It may curve around to the south-east, and then follow the base of the natural scarp marking the edge of the higher ground to the east. Alternatively, it may skirt a slightly raised, sub-rectangular mound within the marshy area (210), and then continue south-west across the field to the south as a shallow depression, flanked by low spread banks.

*Site **203**: Formal approach, north of the north castle ditch*

3.63 There are a number of earthworks on the north side of the north ditch (Site 200/1) which may represent the former line of a formal approach [*9/556*]. As has already been noted above, at a point directly to the north of the castle, there is a flattened, but noticeable, projection or bulge which rises the full height of the counterscarp of the north ditch (Site 200/3), and which is suggested to mark the position of a bridge across the ditch. Interestingly, in 1990, Fiorato noted that 'patches of cobbling' had been found to the north of the castle, which had been uncovered, cleaned and then allowed to grass over again for protection (Fiorato 1990, 35); might these have been the remains of a metalled approach to the building, running south from a bridge?

3.64 The projection is approached from the north by a west-facing scarp, 0.3m high, which runs between it and the field wall to the north, a distance of 20.0m [*7/466*] (see plate 39). The scarp cannot be traced to the north of the wall, but there are a number features, visible only in the wall's north face, which appear to be associated. Where the scarp meets the wall, there is a straight joint, preserving quoins which define the west side of a blocked gate or opening, 4.0m wide [*9/560*]. To the west of the blocked gate, the north side of the wall has a slightly projecting stone footing, which can be followed for 14.0m until the wall angles to the north-west [*9/562*]; to the east of the gate, the same footing runs as far as the roadside boundary wall [*9/563, 9/564*]. A very shallow, 4.0m wide, linear depression runs parallel to the west side of the west-facing scarp, and there is a possible building platform to the west of this. This platform, measuring c.5.5m east-west by 5.0m north-south [*7/465*], is partly formed by a small L-shaped scarp, comprising spread banks apparently with a high rubble content, representing a line of stone footings, 1.0m wide, running for a distance of 10.0m, set back slightly from the edge of the north ditch's counterscarp [*7/467*]. In 1993, this feature was suggested to be the remains of a building (RCHME 1993).

3.65 A slight depression to the north might define another former structure measuring c.10.0m east-west by 5.0m north-south, although it may be significant that further to the north, there is a slight east-facing scarp in line with the return of the footings, which terminates at a small stony mound passing beneath the drystone field wall here.

*Site **204**: 17th century building range, north-west of the castle*

3.66 There are the earthwork remains of a range of buildings to the north-west of the castle, traditionally interpreted as some of those constructed by Lady Anne Clifford in 1662 as part of her works on the complex (RCHME 1993); specifically, these were *'90 roods of wall with 2 gates ... a stable, coach-house, brew house, wash house & little room over the gate which is arched'* (Perriam & Robinson 1998, 300). The buildings remained standing in 1739, when they appeared on the engraving of the castle made by Nathaniel and Samuel Buck (see figure 10 top). At this date, they comprised two distinct parts or ranges. The southern range was roofless; a gable with an arched opening is shown apparently some distance to the east of the north end, rather than being connected to it. The northern range was shorter, although still substantial, and comprised a building with four buttresses to the west wall; the surviving north and south gables indicate that it once also had a pitched roof.

3.67 The earthworks representing the buildings shown in 1739 are aligned north-south, and have total measurements of 56.0m long by 8.0m wide [*7/473*] (see plate 40);

they were first surveyed by Fiorato (1990, 49-50). The earthworks are separated by the surviving field barn (see below). Commencing at the north end, to the north of the surviving field barn, the gabled building shown in 1739 survives as an earthwork defined by banks up to 1.3m wide and 1.0m high (**204**/**1**); all banks appear to contain a high proportion of stone rubble. A break, 1.2m wide, in the bank marking the position of the north gable was previously suggested to be an entrance (RCHME 1993). The building appears to have had approximate total dimensions of at least 17.0m long by 7.0m wide [*7/481; 9/565*] (see plate 41). Part of its footprint, at the south end, is now occupied by a later field barn (see below). However, at 0.7m, the west wall of the field barn is substantially thicker than the other three walls, and it is also butted by the building's north and south gables (see figure 18). It therefore seems likely that it represents a standing remnant of the building shown in 1739; indeed, in 1993 it was stated that the position of the four buttresses shown in 1739 were still visible in the wall (RCHME 1993), although this was no longer the case at the time of the current survey. It was further stated in 1993 that the height of the wall to the north of the barn was the result of rebuilding carried out during the 1990s (RCHME 1993).

3.68 To the south of the extant field barn, the previous RCHME survey noted the remains of four rooms or cells; the current survey has recorded a similar number, although the divisions between the cells do not necessarily correspond to those given in 1993 (see plate 40) (**204**/**2**). There is a raised area of ground to the immediate south of the barn, the west side of which is retained by a ruinous drystone wall standing up to 0.8m high (see plate 67). This first cell or room measures c.5.5m long by 6.0m wide, although the east and south sides are defined by wall lines partially visible in plan only. The ruinous west wall incorporates the remains of the north jamb of what appears to be a chamfered doorway opening, indicating that not all cells were necessarily entered from the east side only. The next cell to the south measures c.11.0m long by 6.0m wide, and might be sub-divided internally into two smaller spaces of unequal size; there is a large tree in the centre of the west wall [*7/477*]. The interior of this cell is lower than that to the north. The south end is defined by a prominent, flat-topped bank, 3.2m wide in total and standing up to 1.0m in height [*7/478*]; in the top of the bank, the remains of stone wall, 0.65m wide, are visible in plan only. Moving south, the next cell measures 7.5m long by 6.0m wide. The bank defining the south side is 2.2m wide and stands up to 1.0m high, again with a stone wall to the core, visible in plan only [*7/476*]. In contrast, the east side is defined only by a less prominent east-facing scarp. The southernmost cell measures c.5.0m square, the north and south sides being defined by banks up to 2.4m wide and standing up to 1.0m in height. The south bank returns to the north for a short distance at its east end [*7/474, 7/475*] (see plate 42). The RCHME (1993) noted that, with all of the cells or rooms to the south of the extant barn, the remains of the east walls seem very slight compared with the other three walls; they suggested that this might be the result of the cells being timber-fronted, with the timber-work resting on low footings. But it is also possible that some of the cells could have been open-fronted.

3.69 A spread linear bank, on the same alignment as the cross-walls of the earthwork range described above, runs down the natural scarp to the east, in line with the centre of the southern cell, but it is not known if it is associated.

*Site **205**: Trackway, west side of 17th century buildings*

3.70 To the west of the range of 17th century buildings, between it and the river, a trackway, visible as a north-south shallow linear depression, appears to run beneath the ruinous stone wall which continues beyond the end of the range. It

runs for a distance of c.60.0m and is typically 5.0m wide at the top and up to 0.5m deep; the north end coincides with a prominent right-angled bend in the drystone field wall. This trackway might once have been continuous with one (T3) recorded by the RCHME in 1993 which skirted the south-west base of the ringwork, although this was no longer clearly visible at the time of the current survey.

*Site **206**: Scoops or depressions, north of the north ditch*

3.71 There is a pair of scoops or depressions to the north of the castle's north ditch (Site 200/1), immediately adjacent to the south side of a drystone field wall [*7/480*]. The lower scoop is oval in plan, measuring 7.5m by 5.0m, and has a maximum depth of 1.5m. The upper scoop measures 4.5m by 4.0m, but is less than 0.5m deep. Neither can be seen to the north of the field wall. The larger scoop might feasibly be the remains of some kind of kiln, although it is far less substantial than the surviving example (see Site 208 below). In 1993, it was suggested that both features were minor quarry scrapes and likely to be relatively recent in date (RCHME 1993), and they may well be associated with repairs to the adjacent wall. There is a narrow blocked opening, perhaps a former sheep creep, in the adjacent drystone wall.

*Site **207**: Trackway, northern part of the survey area*

3.72 A trackway (recorded as T4 in 1993) is first visible at the south-east corner of the northern of the two survey fields. It is overlain by the drystone field wall here, and presumably once had a junction with either the Tommy Road or its predecessor. As it runs downslope to the west, the trackway curves gently first to the north-west and then to the west. It is slightly terraced into the natural slope here, with an average width of 2.5m and maximum depth of 0.5m [*7/483, 7/484; 9/559, 9/570*] (see plate 43). The trackway becomes fainter as it nears the base of the slope, although its onward course appears to be represented by a north-facing scarp which once carried it. The trackway curves around the north end of the 17th century building range (Site 204), possibly to join with another from the south (Site 205) and then curves to the north again. It enters a low lying and marshy area (see Site 209 below), although there is a sufficiently wide drier strip between the marshy area and the river to take the trackway. If this was the case, then it may have been heading for Castle Bridge.

*Site **208**: Kiln and well, northern part of the survey area*

3.73 Although there have been suggestions that there may once have been a well within the castle itself (Fiorato 1990, 29), it is clear that perhaps as early as the late 18th century, and certainly by the 19th century, the well that is referred to lies to the north of the castle. Nicholls (1883, 111) was lent an old notebook which contained observations on the weather in Mallerstang. There was a great drought in the summer of 1765, causing the springs which formed the usual sources of water to dry up: "*Castle well we laded, it could not run down the gutter, nor betimes out of the well, it stood below the first step, it is flagged in the bottom, we watered a cow at Eden out of it*". The well was still pointed out to people during the 19th century as that which the Saxons had poisoned to kill Uther Pendragon and the castle garrison (Nicholl 1883, 15). The 1862 Ordnance Survey 6" to 1 mile map (sheet 30) marks a 'Well' in this general area, and it is located more accurately on the 1898 Ordnance Survey 25" to 1 mile map (sheet 30/1) (see figure 11B) and by Curwen (1913). The well was not identified by the RCHME 1993 survey. In the past, the well (**208**/**1**) has been mistakenly identified with a sub-circular earthwork close by to the south-west (see Site 208/2 below). However, it is almost certainly

represented by what is now a small fenced off area, within which a depression towards the base of the natural scarp here has been crudely blocked using stone and wooden pallets [*7/489*].

3.74 The sub-circular earthwork, c.5.0m to the west, is set into the base of the same steep, north-west facing natural scarp (**208**/**2**) (see figure 16). It was previously suggested to possibly be a corn-drying kiln (RCHME 1993), although more recently it has been proposed as an early lime kiln, perhaps associated with the 17th century works undertaken by Lady Anne Clifford (Johnson 2013, 192); this latter suggestion seems the more likely. The kiln is broadly U-shaped in plan, and open to the north-west (see figure 16); there is no obvious way to access the upper side. The earthwork has maximum external dimensions of 7.0m by 5.0m, with the outer sides defined by two spread banks, each up to 1.8m wide and standing up to 1.0m in height [*7/485-7/488*] (see plate 44). Internally, the kiln measures 5.0m by 4.7m, with the entrance to the north-west side being 1.5m wide. The internal scarp stands to a maximum height of 1.3m and stone lining appears to be eroding out of it in several places. It has all the characteristics of a pre-enclosure period sow kiln, in which limestone packed with wood would have been placed, covered with turf and then burnt to extract the lime, although it is slightly larger than the usual examples (Johnson 2002, 39-40).

*Site **209**: Cocklake Pond, northern part of the survey area*

3.75 In 1993, it was stated that the low lying area to the north-east of the Tommy Road was formerly known as 'Cocklake', and that it formed part of the river Eden's flood plain. It was further suggested that the area contained the remains of an old river bed, which still flooded in wet weather, but which may have been accentuated to create a more permanent landscape feature (RCHME 1993). The name may stem from the adjacent farm on the west side of the river, which is 'Low Cocklake'. Alternatively, the farm may have taken its name from periodic flooding of the old river bed which then attracted water fowl.

3.76 Within the northern part of the EDAS survey area, below a steep north-west facing natural scarp, there is a U-shaped shallow depression, which remained water-filled throughout the course of the survey work, although it later dried up during a period of exceptionally dry weather. The depression has a maximum depth of c.1.0m and is up to 20.0m wide, although more typically it is between 8.0m to 12.0m wide. There is some disturbance from modern drainage to the north-west part. The main body of the depression is set on a shallow north-west/south-east alignment, and measures 65.0m in length, returning to the north-east at either end [*6/301*]. It is noticeable that, from certain positions when the depression is water-filled, it has the ability to reflect the castle in the water's surface [*9/566-9/568*]. The depression encloses a slightly raised area.

3.77 It is clear that both the water-filled depression and the raised area it encloses are bisected by the line of the Tommy Road leading to Castle Bridge, which takes the form of a causeway [*7/492, 7/496*]. The survey undertaken by the RCHME to the north-east of the road in 1993 demonstrates that the southern return of the water-filled depression within the EDAS survey area continues for c.80m, below a steep north-west facing natural scarp [*7/494*]. The northern return is not as clearly defined, although it may perhaps have been drained by the numerous modern drains crossing the area. The raised area therefore has a broadly parallelogram-shaped plan, and measures c.85m by 50m in total. The surface of the raised area appears to contain no features apart from modern drains [*7/493*]. At the north-east end of the raised area, there is a D-shaped marsh, with both overlooked by a steep

natural scarp to the south-east. When viewed from the Tommy Road, this scarp can be seen to be continuous with the one within the current survey area, and an approach along the scarp would have provided views across the Cocklake Pond. A visitor might then have turned to the south-west to approach the castle via the earthworks described above (Sites 207 and 203), although such a formal, planned approach route remains conjectural.

*Site **210**: Raised earthwork, southern corner of the survey area*

3.78 A slightly raised sub-square earthwork, measuring 10.0m north-south by 15.0m east-west overall, lies in the southern corner of the survey area, emerging from the surrounding marshy ground [*10/175*]. It is unclear whether this earthwork represents an archaeological feature, or indeed what date it might be, but it is noticeable how it is raised from the marsh. It might, for example, represent the position of a detached building away from the castle (such isolated structures are often associated with medieval castles, where peace and seclusion could be obtained) or be a viewing platform. However, it could equally be a natural feature, perhaps augmented by later drainage work in the marsh.

Other Sites

3.79 Although lying beyond the current survey area, in 1993 the RCHME recorded another interesting feature on the west bank of the river Eden, directly opposite the castle mound. There are a number of earthworks here, including a sub-rectangular ditch, measuring 18.0m by 5.5m [*7/498*], which was probably the source of earth for a roughly semi-circular platform projecting from the steep natural scarp above the river [*7/497*]. The top of the platform measures 6.4m by 2.7m but might once have been larger. The platform is placed some 70m west of the castle, apparently at approximately the same height as the surface of the castle mound [*7/499*] (see plate 45). It was thought unlikely that the platform represented a gun emplacement or minor siege work, rather that it might represent some kind of prospect mound constructed by Lady Anne Clifford (RCHME 1993).

The Castle Ruins (see figure 17)

3.80 An earthwork survey (a Level 3 survey, as defined by Historic England 2016) was undertaken at a scale of 1:50, showing the interior of the castle. In order to show the earthworks within their structural context, a ground floor plan of the castle was also produced, using a combination of EDM total station and traditional hand measurement survey techniques. Some parts of the castle (principally the south-east chamber) are no longer accessible following the repairs carried out in 1994-95, and so measurements were taken from the survey made previously in 1991 by LUAU.

3.81 Apart from the ground level plan, the YDNPA project specification did not require that a new detailed architectural survey of the castle was required as part of the current works. The following outline description therefore expands on that previously given by the RCHME (1936, 163-164), and is primarily limited to the ground floor only.

Plan Form, Structure and Materials

3.82 The castle is virtually square in plan, measuring 19.00m east-west by 19.40m north-south (with the exception of the later garderobe tower at the south-west corner); the slight difference in measurements may well be due to later bulging and

collapse. The RCHME (1936, 163-164) stated that the castle 'has shallow clasping buttresses at the angles'. These are a common feature of later 12th century keeps or great towers, for example, see Newcastle upon Tyne, built 1172-79 (Guy 2017-18, 186), Brough in Cumbria, built c.1170 (Perriam & Robinson 1998, 262-263), or Peveril in Derbyshire, built 1175-77 (Renn 1973, 279). The use of such clasping buttresses or turrets created recessed panels between them, and these formerly characterised all four external elevations of Pendragon. At ground level, all walls are on average between 3.80m-3.90m in width, accommodating mural chambers and passages. All four external elevations rise from chamfered plinths, which step up in several locations. A stepped footing remains visible projecting beyond the chamfered plinth in several places, although neither preserve the extent of detail recorded in 1991; the plinth to the north elevation in particular is now heavily mossed, obscuring the joints between individual stones.

3.83 Reduced to its most basic form, Pendragon is best described as a great tower or keep, and was originally of three storeys, perhaps with access to the roof level behind a crenellated parapet. It appears that the ground and first floors were connected by newel stairs flanking the main entrance. Curwen (1913, 120) shows a mural stair rising from the north-west corner of the first floor to the second floor, and this detail was repeated by the RCHME (1936, 163-164) (see figures 13A and 13B). However, this is suggested to be a mistake by Fiorato (1990, 6). It was not possible to confirm or deny this detail, as there was no access to the upper levels of the castle as part of the current survey.

3.84 The major parts of the external and internal walls of the castle are built of roughly coursed and squared limestone rubble [*6/321*]. Fiorato (1990, 18) states that the majority of this stone came from quarries at Hugh's Seat on Mallerstang Edge, with waterborne stone for the wall cores taken from the river; what appear to be river stones certainly are visible within the core, although this would have required a substantial amount of material to have been removed from the Eden adjacent to the castle. Finely dressed red sandstone, the use of which appears to be concentrated around the newel stairs to the castle's north wall, was apparently obtained from near to Kirkby Stephen, whilst the grey sandstone used for quoins remained unsourced in 1990 (Fiorato 1990, 18). The stone was originally set with a lime mortar. The stonework of the later garderobe tower in the south-west corner is notably better coursed and squared than that of the main body of the castle [*9/581*] (see plate 50). The original roofing material remains unknown, although a lead ball with traces of gilding on it has been discovered on the site, perhaps a former roof finial (Fiorato 1990, 54). A small number of probable mason's marks were noted around the castle, but these were not recorded systematically as part of the current works; other examples are illustrated in the original 1935 RCHME surveyor's field notes (HEA BF008645).

External Elevations

3.85 The principal elevation of the castle faces north. It appears to have been symmetrically disposed originally, with the entrance flanked by narrow recessed panels, each 2.60m wide [*9/572, 9/573*] (see plate 46). The chamfered plinth steps up to the south at the castle's north-east corner [*9/571*], whilst just beyond the north-west corner, there is the piece of fallen masonry uncovered in 1994-95 and now propped with a stainless steel support [*9/574*] (see plate 47). The 1739 Buck print shows the east panel rising to first floor level, with a square-head, and perhaps also Lady Anne Clifford's inscribed panel or plaque over the main doorway (see figure 10 top). Harding's 1801 engraving shows the north elevation in a rather confused manner, but does arguably depict the recessed panels rising to the first

floor, where they are square-headed (see figure 10 bottom). The lancet-type windows flanking the main entrance may be an attempt to portray those once lighting the newel stairs (see below), whilst to the centre of the first floor, there appears to be a large three-light window set below an exposed barrel vault running north-south. The three-light window is presumably that referred to by the RCHME (1936, 163-164), when they stated that the north and south walls each formerly contained a large window, probably inserted in the 17th century, both having disappeared by the time of writing in the 1930s. Fiorato's reconstruction of the north elevation (1990, 46) shows the two panels combining above the entrance to form a single panel.

3.86 The east elevation has a large, single, central recessed panel between the clasping turrets/buttresses, measuring 8.70m in width [*7/512-7/514*] (see plate 48). There were originally four windows at ground floor level, again symmetrically disposed, two within the recessed panel and two without. The northernmost window has been broken through to provide access into the north-east chamber, and the other three have lost most of their external surrounds. However, it is likely that they were once of the same form as those surviving to the west elevation; the inner pair of windows were double-chamfered externally, with round-heads, whilst the outer windows were of much simpler chamfered form. The southernmost window retains evidence for a vertical iron standard socketed into the frame. The east elevation survived to a substantially greater height well into the 20th century. One of Herbert Bell's 1894 photographs shows a large round-headed first floor window within the recessed panel; the head is cusped to the interior (see figure 12 bottom). The north jamb of a window of similar size and set at the same height survived to the south, as did the part of the oversailing course marking the former square-head of the recessed panel; both first floor windows and the square-head of the panel are apparently shown as complete on Moses Griffith's 1801 engraving (see figure 10 bottom). Bell's 1894 photograph was later reproduced by Curwen (1913, 124) and by Braithwaite (1922, 16). In 1936, the RCHME wrote: "*In the main E. wall, the tall central fragment retains the jambs of two original windows; they were probably of two lights with jambs and round arch of two orders, the outer chamfered and the inner moulded; above them is part of the oversailing course of the destroyed top storey*" (RCHME 1936, 163-164). The upper part of the east elevation must have collapsed after 1936, but it is not recorded when. Only the south jamb of the north window within the recessed panel now survives to the first floor.

3.87 The south elevation again had a large, single, central recessed panel between the clasping turrets/buttresses, measuring 8.40m in width; the chamfered plinth steps up from west to east at the west end of the recessed panel [*7/511*]. There were originally three windows at ground floor level, two within the recessed panel and one to the west lighting the south-west chamber [*6/318; 7/508-7/510*] (see plate 49). All three were probably of simple, chamfered loop form. As already noted above, the RCHME stated that the north and south walls each formerly contained a large window, probably inserted in the 17th century, both of which had disappeared by the 1930s (RCHME 1936, 163-164); although the 1801 engraving provides some evidence for the north window, it is unclear what the evidence for the presence of the south window is.

3.88 At the west end of the south elevation, the garderobe tower projects at an angle to the main wall faces. There is a ragged joint between the original south elevation and the later garderobe tower, and the chamfered plinth of the latter is set higher than that of the former [*6/317; 7/505, 7/506*] (see plate 50). There is no surviving evidence for any windows to the south-east elevation. A square-headed chute with

a relieving arch over is present at the base of the south-west elevation; there is again no surviving evidence for windows above [*9/582, 9/583*] (see plate 51). At the base of the garderobe tower's north-west elevation, the chamfered plinth again steps up from the main west elevation of the castle. The ragged joint between the two has the remains of a window to the garderobe tower at ground floor level, and there is another window, a chamfered single-light, to the first floor. The ground floor window may be a later insertion into the earlier fabric [*6/316*].

3.89 The west elevation had a large, single, central recessed panel between the clasping turrets/buttresses, measuring 8.70m in width; it is the only one now to retain evidence (to the south side) of the oversailing course which marked the former height of the panel's flat head [*6/314, 6/315; 9/577, 9/579*] (see plate 52). There were originally three windows at ground floor level, two within the recessed panel and one at the north end, lighting the north-west chamber; a fourth window at the south end (already described above), situated where the original elevation meets the garderobe tower may be a later insertion, presumably when the garderobe tower itself was built. The original windows within the panel are round-headed and double-chamfered externally [*9/575, 9/578*], whilst the north window was of simpler chamfered form [*9/576*]; two of the windows retain evidence for a vertical iron standard socketed into the frame. There is a narrow, chamfered, square-headed light to the south side of the panel at first floor level (see plate 52); one of Herbert Bell's 1897 photographs shows that there was once a similar first floor window to the south, outside of the panel, but this section of wall has since collapsed (see figure 12 top). In 1739, the Bucks showed a single, large round-headed window to the centre of the panel's first floor, similar to the first floor windows in the east elevation (see figure 10 top). The RCHME stated that there was still evidence for this first floor window in the 1930s (RCHME 1936, 163-164). A conjectural reconstruction of the east elevation has been made by Fiorato (1990, 63).

3.90 Interestingly, during the recovery of *ex situ* stonework as part of the 1994-95 works, it was noted that plaster attached to some of the recovered fragments suggested that all or parts of the outer wall faces were plastered (LUAU 1996, 15). It is of course not certain during what phase of the castle's history it may have been plastered.

Circulation

3.91 As noted above, the only original entry point to the castle was through the central entrance in the north side; this appears to be shown with a rounded segmental arch over on Moses Griffith's 1801 engraving (see figure 10 bottom). The 2.40m wide entrance is chamfered externally and was guarded by a portcullis, the slots for which remain (see plate 54); immediately behind the portcullis there must have been a pair of two-leaved doors, as there is a substantial drawbar recess, extending for a distance of 3.00m into the west jamb.

3.92 The entrance led into a small passage or porch, which once had a high barrel vault over, the lowest courses of which just remain [*9/557*]; again, this barrel vault is arguably shown on Moses Griffith's 1801 engraving through an area of collapse. The porch was flanked by newel stairs to the east and west; both wind in a clockwise direction, although the west stair is of somewhat larger diameter than the east stair. But this is not the only difference. The doorway to the east stair has a square-head with a bullnosed surround [*9/541, 9/542, 9/544*] (see plate 53), whilst that to the west stair is round-headed of well-cut voussoirs and the surround again bullnosed, with a hoodmould over [*9/536-9/538*] (see plate 54). There are three

vertically aligned small sockets or recesses to the immediate north of the east doorway, and two in a similar position to the west doorway, with a third to the immediate south. The interior of both stairs was lined with sandstone ashlar [*9/540*], and the base of the newel survives to the east stair [*9/545*]; in addition, the east stair was lit by a small splayed window in the north wall. The return which marked the south end of the passage is still visible to the south of the west doorway; in addition, the hoodmould to the doorway once continued as far as the south end of the passage, and then also returned to the west [*9/547*]. The south end of the passage has been rebuilt to the south of the east doorway, probably in conjunction with the creation of the existing wooden steps here [*9/546*].

3.93 The ground floor of the castle may have comprised a single main space, c.11.0m square, with smaller mural chambers to all four corners. There may be evidence for a former east-west wall sub-dividing the main chamber to the centre of the west wall, where there is a vertical scar, 0.50m wide, visible between the windows [*9/549*] (see plate 55). It does not seem thick enough to form a cross-wall, but could be a remnant of an original partition or sub-division. A staggered north-south cross wall to the approximate centre of the south wall is clearly later, and is traditionally ascribed to Lady Anne Clifford's 17th century works [*9/554*] (see plate 56).

3.94 The main space was lit by a pair of deeply splayed windows with semi-circular rear-arches of neatly cut voussoirs to each of the east, south and west walls; the southern window to the east wall is completely filled with soil and rubble, and several of the others have some ex-situ stone and rubble within them. There are walls set across the north-west and south-west angles of the main space. That to the north-west is slightly curved, and only just visible above the rubble/soil infill of the interior; there is little evidence on the adjacent wall faces that it ever rose much higher. However, that to the south-west rises almost as far as the former first floor level. Its north-west end is poorly tied into the main wall face, but the south-east end better so. There is no visible indication of similar walls to the north-east and south-east angles of the main space, but they may be either buried or have been destroyed.

3.95 As already noted above, the north-east mural chamber is now reached externally by an enlarged window to the east wall [*9/603*] (see plate 57), but it was originally accessed through an internal doorway in the main space's north wall; the internal east jamb of the doorway was chamfered. This north-east chamber has a barrel vault over. The west wall is set at a shallow angle to the other three walls, is poorly tied in to the north and south walls, and is also rather crudely corbelled out c.0.75m above floor level [*9/601, 9/602*]. The angle of the wall and the corbelling was necessary to accommodate the east newel stair, and the way in which it has been done suggests some alteration or modification.

3.96 The south-east mural chamber is no longer accessible following the repairs undertaken in 1994-95 [*9/555*], but it can be viewed through the external window. It is essentially of the same form as the north-east chamber, without the angled west wall. Excavation of the chamber prior to these works showed that the jambs and voussoirs of the vault entrance had been robbed out, which may have contributed to the collapse of its northern side (LUAU 1996, 13). The west end of the chamber is now supported by a stainless steel ribbed cage [*9/600*] (see plate 58).

3.97 The north-west mural chamber was entered through a doorway in the north wall of the main space. This chamber has an angled east wall, like the north-east mural

chamber, although the plan suggests that the west newel stair could have been accommodated without it [*9/584*] (see plate 59). The chamber has a barrel vault over, and was lit by a window in the west wall [*9/586; 10/184*]. The vault of the chamber, like others on the ground floor, preserves evidence for plank shuttering in the render which covers it [*9/585*].

3.98 The south-west mural chamber was entered through a doorway in the south wall of the main space; the doorway has the same round-head and hoodmould as the doorway to the west newel stair [*9/553*]. The internal west jamb of the doorway is chamfered [*9/598*]. The south-west chamber is divided into two cells. The east cell has a barrel vault over [*9/599*] and was lit by a window in the south wall [*9/594*]. A square-headed doorway [*9/592, 9/593*] (see plate 60) in the west wall, with a chamfered south jamb to the west face, leads into the west cell, which formed a garderobe. It too has a barrel vault over [*9/588*], and was lit by a window in the west wall [*9/589*]. This window may be a later insertion, perhaps contemporary with the 14th century garderobe tower itself. The west cell was apparently originally lit by a small single-light in the south wall, which was blocked when the garderobe tower was added [*9/591*] (see plate 61) - this may have been the reason for the inserted west window. There are two steps up to the floor of the south end of the garderobe [*9/587*]; these, and what remains of the garderobe itself, with no clear evidence for a seat, suggest that it may actually have been a urinal designed only for male use.

The Internal Earthworks

3.99 Some idea of the appearance of the interior of the castle, and its parlous structural condition, in the earlier 20th century can be gained from a series of photographs taken by the RCHME in 1929 (HEA FL00958). However, it is more useful to compare the plan of the internal earthworks made during the current survey to that made by Tom Clare in 1984 (Fiorato 1990, Appendix B) (see figure 13C). At that date, there was more material heaped across the eastern side of the interior, obscuring the internal east wall, filling the two windows here, and spreading into the south-east chamber. There were depressions leading into the north-east, south-west and south-west chambers, and a lowered area to the south-east corner of the interior, the eastern side of which was marked by the later north-south cross-wall.

3.100 At the time of the EDAS survey, the ground level in the flattened north-west part of the interior was set at c.253.95m AOD [*9/543, 9/548*]. Given that the ground level to the immediate north of the entrance in the north wall is set at 252m AOD, this indicates that in some parts of the interior there could be as much as 2.0m depth of rubble and soil infill. In reality, it could be somewhat less; the structural remains in the entrance passage might suggest that the floor level stepped up from the passage into the main ground floor space, although the depth of rubble will still be considerable.

3.101 The main differences in the existing earthworks to those recorded by Clare in 1984 relate to the clearance work carried out in 1994-95. There is a deep sub-circular depression at the south end of the entrance passage where this was excavated out, exposing the newel stairs more fully. There is a second depression to the south-east corner, where material was removed to access and repair the south-east chamber, and material was also removed from along the line of the east wall. The earthworks to the south-west corner of the interior are much as shown by Clare in 1984, as are the steep depressions leading into the doorways of the other three mural chambers. In general, the ground surface to the interior of the castle

now slopes downwards south-east to north. There is a very slight bank, set on a slight north-west/south-east alignment, which crosses the interior to the west of centre. It appears to be set on a similar alignment to the later north-south cross wall, and whilst it is unlikely to represent the actual line of the wall, it may reflect where the wall has collapsed and fallen to the west [*9/539, 9/550, 9/558*] (see plates 62 and 63).

The Field Barn (see figure 18)

Introduction

3.102 A detailed building survey (a Level 3 survey, as defined by Historic England 2016) was undertaken of a field barn standing to the north-west of the castle ruin, close to the north-western limit of the Scheduled Monument. Plans were made at a scale of 1:50 of the lower and upper levels of the building. All four external elevations were drawn at the same scale, and a cross-section was constructed, also at 1:50. The survey work was undertaken on 9th November 2017.

Historical Background

3.103 The barn was already present in 1862, when the 1st edition Ordnance Survey 6" to 1 mile map (sheet 30) was published. It is similarly depicted on the 1898 and 1915 25" to 1 mile Ordnance Survey maps (sheets 30/1) (see figures 11A to 11C).

Architectural Description

3.104 The barn is located some 95m north-west of the castle itself, at an elevation of c.243m AOD (see figure 15). It sits within the footprint of the 17th century range built by Lady Anne Clifford, with the west wall apparently incorporating part of that range (see plates 64 and 67) (see Site 204 above). The barn is aligned north-south, with maximum external dimensions of 7.00m in length by 5.00m in width [*3/200*]. The ground surface rises steeply to the southern end of the barn, so that the lower half of the south gable is completely obscured [*3/205*]. The north and east walls are on average 0.50m in width. The west wall, at 0.70m in width, is somewhat thicker and is probably a remnant of the original west wall of the 17th century range. The south wall is of a similar width, but clearly butts the west wall, as does the north wall. There may be traces of a slightly projecting external plinth, only just visible in plan, to the north-west corner of the building.

3.105 The barn is of a single storey, having a pitched stone slated roof with stone ridge coping; the coping piece to either end of the ridge has an short, integral, slightly raised square end, resembling a finial base [*3/206*] (see plate 64). It is built of a mixture of roughly squared and thinly coursed stone rubble, interspersed with short bands of re-used squared ashlar, presumably taken either from the castle or the earlier stable block. The west elevation is generally better coursed, and uses longer, shallower stone rubble. There are dressed quoins to the north-east and south-east corners, with rubble quoins to the south-west corner. All stone was originally set with a lime mortar, although there is also much modern repointing to the east elevation.

3.106 Internally, the barn has a maximum height of 4.60m from the internal floor level to the underside of the roof ridge. The roof comprises a single east-west truss, approximately centrally placed [*3/217*]. The truss is of tie-beam and principal rafter form, and apparently of hardwood throughout; there is no visible evidence for pegged joints [*4/235, 4/236*]. The west principal overlaps the east principal at the

apex of the truss, the latter being slightly cut into the soffit of the former. Each principal carries staggered trenched purlins supporting the common rafters, and there is a ridge piece set into the top of the western principal. The ridge piece, together with some of the purlins and common rafters, are softwood, and appear to post-date the main elements of the truss. There are no visible carpenters', assembly or other marks on either face of the truss.

3.107 Regarding the external elevations, as already noted above, rising ground level means that only the upper part of the south gable remains visible [*3/187*] (see plate 65). There is an opening to the centre of this gable, with quoined jambs and a flat head formed by a stone lintel [*3/189*]. The sill is re-used, perhaps from the 17th century buildings. There is an area of re-used stone to the east of the opening, with some modern repointing to the west; above, there are two through stones. The west elevation has a doorway at the south end, with a thin stone lintel which barely overlaps the jambs [*3/198*]. There is a single intermittent course of through stones, set c.2.60m above ground level [*3/196, 3/197*] (see plate 66). To the south of the doorway, the elevation is continued as a wall stub, containing the north jamb of a chamfered doorway opening; this has been heavily repointed, so that its relationship to the main body of the elevation is now unclear [*3/194, 3/195*]. The ruinous back wall of the 17th century range (see Site 204/2 above) continues to the south [*3/193, 3/207, 3/208*] (see plate 67). To the north of the doorway in the west elevation, there is a drain at a low level [*3/199*], and further east, three possible sockets, although they are more likely to mark where stones have fallen from the elevation [*3/201*]. The north end of the elevation appears to be continuous with the wall running to the north [*3/202*]. This stands 1.50m high on average and also contains what appear to be former sockets to the west face, although again they may mark where stones have fallen or been removed [*3/203, 3/204*].

3.108 The north gable contains three courses of through stones, set at 1.0m, 2.2m and 3.3m above ground level [*3/193*] (see plate 68). The gable is heavily repointed or rebuilt above the level of the uppermost through stone course. Between the second and third courses of through stones, there are two sockets which pass through the full thickness of the wall. The east elevation has a blocked ground floor doorway placed just to the north of centre [*3/191*] (see plate 69). This doorway has neatly dressed quoined jambs and a deep, monolithic lintel [*3/192*]. There is a single course of through stones placed at c.2m above ground level, with a single through stone at a higher level over the doorway.

3.109 At the time of the survey, the only access to the interior of the barn was through the doorway at the south end of the west elevation. The doorway was fitted with a wooden frame, supporting a plank and batten door hung on long, round-ended strap hinges [*4/222*]. The interior of the barn has a narrow sunken area, floored with earth, running the full width of the southern end [*4/238*]. Along the north edge, a line of 0.10m deep flat stones edge the main body of the floor, which is cobbled. The barn is currently used to store fallen stone from the castle, which obscures most of the cobbled floor, and so it is not certain if any evidence for former internal partitions survives; one of these stones contains a cusped window head [*4/232, 4/233*] (see plate 70). Towards the centre of the west wall, a decayed timber projects from a socket in the wall set c.1.4m above floor level [*4/231*]. At c.1.85m above floor level, the west wall face is inset by 0.10m. This inset is not carried across the full length of the wall, but appears to have been infilled or built out at the northern end [*4/223, 4/224*]. The remainder of the internal walls contain no features that cannot be seen externally [*4/225-4/230*].

Discussion and Conclusions

3.110 The survey work undertaken at Pendragon Castle has raised a number of questions meriting further discussion.

Early History

3.111 Despite speculation about the presence of Celtic or Roman structures at Pendragon, there is currently no firm evidence for any structures on or around the castle mound dating to before the later 12th century. Clearly, the castle was not set down in a landscape devoid of any previous activity, and it is possible that the pattern of vaccaries and settlement that had developed by the later medieval period may have earlier, pre-Conquest, origins. The exact relationship of the castle to the Forest or Chase of Mallerstang also remains unclear. This would require a sustained programme of documentary research and fieldwork to investigate, and lies beyond the scope of this report.

3.112 Nevertheless, Fiorato's (1990, 34) suggestion that the castle mound might be an 11th century, post-Conquest, construction, originally crowned by a timber palisade, and Davis' argument that in its earliest phase Pendragon was a ringwork castle with timber buildings (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*), should not be dismissed out of hand; it is in a fairly classic early Norman topographical location, i.e. a defensive position potentially controlling the main low-lying communication route along Mallerstang. The castle mound was almost certainly created by enhancing an existing spur or promontory, using material excavated from the ditches to heighten the mound, and perhaps even extending it to the south-west. The resulting ringwork occupied a locally elevated position (although overlooked to the west and north-east), at a point where the valley floor is barely 520m wide. Some of the slight earthworks (Site 201) recorded around the edge of the mound might represent the remains of a timber palisade, but there are no clear internal structures, although any traces of these could have been removed when the stone keep was built.

3.113 There are also no convincing traces within the survey area of a bailey associated with the ringwork. The local land form makes it highly unlikely that a bailey could ever have existed to the south or west of the ringwork, with the most suitable location being either to the north-east or the east. The remains of an early bailey associated with a ringwork might be ephemeral, as at Ashley in Hampshire (Renn 1973, 95), but one would have expected some evidence of its former presence, such as, for example, a means of access between the two, as has been recorded at William's Hill at Middleham in North Yorkshire (Moorhouse 2003, 318). One would have expected some evidence of an access between the ringwork and the bailey, such as a break in the latter's scarp or ditch as recorded at William's Hill at Middleham in North Yorkshire (Moorhouse 2003, 318). At Pendragon, the causeways across the ringwork ditch lie on the east and north-west sides of the mound (Sites 200/4 and 200/5). In 1936, the RCHME thought that the north-west causeway was probably original (RCHME 1936, 163-164), although others have suggested that the east causeway marks the original entrance. In fact, it is not certain that either causeway is original (see below), and in any case, there is no evidence that either led into a bailey. The RCHME recorded no earthworks in the raised area of the field to the north-east of the castle (between the Tommy Road and the B6259) that resemble a bailey, and they stated that the fields to the east of the castle had been intensively ploughed and contained no earthworks (RCHME 1993).

The 12th Century Castle

3.114 The stone tower or keep at Pendragon is generally dated to around c.1170 to 1180, and it shares many characteristics with other 'great towers' or keeps of this period. At 19.40m square externally, it is a sizeable example; it is, for example, larger in ground plan than the c.15m square keep of Richmond Castle, North Yorkshire (built in the second half of the 12th century), although of course not as high and lacking the extensive associated structures (Guy *et al* 2017-18, 51 & 53). The exterior elevation made use of clasping turrets and recessed panels.

3.115 In its original form, Pendragon was of three storeys, with the main entrance on the ground floor, in the north wall, provided with a portcullis, doors and a drawbar. The entrance led into a small passage or porch, which had a high barrel vault over, and was flanked by newel stairs to the east and west. The doorway to the east stair has a square-head, whilst that to the west stair is round-headed; the west stair is also somewhat larger in diameter than the east stair. The south end of the passage communicated with the main ground floor space. It is unclear if this space was sub-divided, although a scar between the windows in the west wall might mark the position of a former (rather narrow) east-west cross wall. The stonework across the north-west and south-west angles might be interpreted as being the remains of supports for ribs, although there is no other evidence to support the idea of a ribbed vault over the ground floor, and what does remain points to a wooden internal first floor. Nevertheless, there may once have been some kind of intermediate supports for floor beams.

3.116 The main ground floor space gave access to four corner mural chambers; the south-west chamber was equipped with a garderobe/urinal. There is no surviving evidence for heating to the ground floor. It appears that the ground and first floors communicated via the newel stairs flanking the main entrance.

3.117 The first floor was again formed by a main space, lit by large, round-headed windows in the east and west walls, with smaller mural chambers to the four corners; again, there is no surviving evidence for the original heating arrangements. Earlier sources suggested that a mural stair rose from the north-west corner of the first floor to the second floor, but this is discounted by others. Although it is possible that the corner turrets rose above the general line of a crenellated parapet (as at Scarborough in North Yorkshire - built 1158-68), Guy (2017-18, 195) argues that this characteristic is not necessarily as common as is sometimes thought. The 1739 Buck print is ambiguous on the matter, but it might be taken to depict a parapet without corner turrets, similar to those surviving at towers or keeps of the late 11th century and first half of the 12th century (Guy 2017-18, 195).

3.118 Pendragon does however contain a number of features which are unusual. Principal amongst these is the fact that it appears to have been a freestanding tower or keep of the second half of the 12th century which lacks an associated stone curtain wall (Fiorato 1990, 18); the apparent lack of a bailey has already been noted above. Of Henry II's building work on castles undertaken after c.1150, all of his *donjons* appear to have had accompanying stone curtain walls to a bailey; the only exception perhaps is Bowes, which occupied the corner of a Roman fort, inside a ditched enclosure without evidence of stone fortifications (Hulme 2007-8, 216-217). It is difficult to believe that there was no enclosure of any kind at Pendragon, as a range of ancillary structures such as stables would have been necessary for the day-to-day functioning of any garrison and/or household that was present. These were not necessarily stone buildings because, as pointed out by

Davis (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*), although a stone keep was erected, the curtain wall and other structures could have remained in timber. Nevertheless, it may be significant that in 1662, Lady Anne Clifford wrote that she had caused a wall of lime and stone to be built around "that piece of ground which I had taken in around the castle" (Curwen 1913, 123; LUAU 1996, 8). Although this does not prove that there was no curtain wall, it does suggest that by the later 17th century there was no clear trace of an earlier enclosure that could be re-used. As a later 12th century keep or great tower, the castle might also have been expected to have some kind of forebuilding or gatehouse. The possible presence of such structures on the north side of the north ditch is discussed below, but one might speculate as to why the northern end of the south-east ditch (Site 200/6) is set at a higher level than the rest of this part of the ditch. Could a stone building have once been positioned here, adjacent to the east causeway (Site 200/4), with its subsequent removal creating the existing earthwork? Such an interpretation would have implications for how the castle was originally approached and the early form of the ringwork.

3.119 The lack of a stone curtain wall and bailey might partly explain some of Pendragon's unusual structural features. Many 12th century keeps or great towers have separate entrances to the ground floor and upper levels; for example, at Richmond, the entrance was originally at first floor level, with an internal newel stair linking the ground and first floors only added later (Guy *et al* 2017-18, 53). At Pendragon, the main (and indeed only) original entrance is at ground floor level, in the north wall, and is unusual in that it is flanked by the newel stairs; the ground floor doorway at the keep of Appleby Castle, Cumbria (built c.1170) has a newel stair close by, but like many other contemporary structures, it also had a first floor entrance (Perriam & Robinson 1998, 252-254). Fiorato (1990, 20) attributes the angled and corbelled western wall of the north-west chamber to poor planning, in that it had to be built like this to allow sufficient space for the west newel stair. However, the angled wall is poorly tied into the main walls of the chamber and looks rather awkward, and it must be a possibility that both it and the west newel stair are later insertions. This might explain the differing door heads to the east and west doorways off the passage/porch, although both are built of very similar stone. In addition, Guy *et al* (2017-18, 58) note that within the keep at Richmond, arch-topped doorways signalled through routes, whereas square-headed doorways led to dead ends; architectural detailing is thus used as a marker, defining function and access. It may be that different door heads also defined different functions at Pendragon.

3.120 Finally, the combination of portcullis and drawbar at Pendragon is also suggested to be unusual in a keep or tower of this date, although it is stated to also occur at Castle Rising in Norfolk (built c.1140) (Fiorato 1990, 40). But this is not mentioned by Guy (2015-16, 147), in his description of Castle Rising forming part of his very detailed discussion of the development of the portcullis. Interestingly, the arrangement at Pendragon (the square portcullis grooves set forward of the door and visible to the external visitor) appears to conform to Guy's Type A, which occurs in 12th century hall and tower keeps dating from the first half of the 12th century and also at Orford in Suffolk (built 1160-70) (Guy 2015-16, 141).

Later Medieval Works: The Castle

3.121 Fiorato (1990, 11) states that extensive alterations were undertaken to Pendragon by Robert de Vipont at the very beginning of the 13th century, although no evidence is provided. The principal later medieval works appear to have taken place in the early 14th century, presumably as a result of the licence to crenellate

granted to Robert de Clifford in July 1309. The exact extent of any of these works is unknown, but the garderobe tower at the castle's south-west corner is generally attributed to the 14th century, and Fiorato (1990, 24-25) argues that some of the large round-headed first floor windows were modernised during the same period with the addition of cusped-heads, as indicated by surviving fallen stonework. Nevertheless, the opinion given at the 1327 Inquisition of Roger de Clifford that the castle "could not be extended for the costs of maintaining it" should not be overlooked; it may suggest that more extensive planned alterations were never put into place because of a lack of finance. It is now impossible to be certain if the 1341 burning date by the Scots is correct, and the evidence for a suggested rebuilding in the 1360s (Curwen 1913, 122; Fiorato 1990, 11) is also unclear.

Later Medieval Works: The Castle Landscape

3.122 Any structural works undertaken at Pendragon during the early 14th century were apparently preceded by, and perhaps also accompanied by, changes to the landscape setting of the castle. It is possible that together these formed an extensive planned scheme of works to remodel the building and its setting.

3.123 The castle's north ditch was apparently strengthened in c.1300 (Perriam & Robinson 1998, 300), and this is of interest in relation to the earthworks recorded by the survey to the north of the north ditch (Site 203). Taken together, these are suggestive of a formal approach to the north side of the castle. The drystone wall to the north preserves the remains of a c.4m wide blocked gate or opening, defined by quoins to one side and apparently associated with a c.14m long section of wall to the west that has a slightly projecting footing. A scarp runs south from the blocked opening towards the north ditch; where it meets the ditch, it is flanked by earthworks resembling structures with stone footings, and there is a noticeable projection or bulge to the ditch's counterscarp, perhaps marking one side of a former (timber?) bridge. This bulge is placed opposite the entrance to the castle in its north wall, and the remains of cobbled surfaces have been discovered between the castle and the north ditch. Of course, not all of these features are necessarily contemporary; as will be described below, it is possible that some relate to the later 17th century works of Lady Anne Clifford. The strengthening of the ditch in c.1300 could have taken several forms - it could have been re-cut and deepened, perhaps provided with a new, taller palisade or wall, or a new gate structure/forebuilding could have been erected. The structures flanking the scarp where it meets the north ditch could be interpreted as gate structures set in front of a bridge crossing the ditch, although their footings are not substantial and they were perhaps largely timber-framed.

3.124 The possible presence of a bridge across the north ditch, and a formal approach to it, leads to several other questions. If there was a bridge, why would there be a need for one or more causeways across the ditch, and would this imply that they are later infilling? If, as speculated above, there was an earlier and perhaps more substantial forebuilding or gate at the north end of the south-east ditch, why was it replaced? There is also the matter of where this formal approach came from. There are no clear indications of it to the north of the drystone wall with the blocked gate or opening but, when viewed from the north, the steep, north-west facing natural scarp here can be seen to be continuous with one in the field to the north-east surveyed by the RCHME (1993). It is conceivable that a formal approach might have left the existing line of the main road up the valley and run along the top of the scarp, and then turned south-west towards the castle, although such a route remains conjectural.

3.125 An interesting aspect of this conjectured route is that it would have overlooked the Cocklake Pond (Site 209). The presence and form of ornamental or 'designed' landscapes around castles and medieval residences is now a well-established and much discussed aspect of castle studies, particularly the use of water and mobility through these landscapes (see Jamieson & Lane 2015 for a recent example). The raised area apparently enclosed by the pond has a broadly parallelogram-shaped plan, and measures c.85m by 50m in total; within the survey area, the pond itself is up to c.20m wide but probably no more than 1m deep. There are no features visible on the surface of the enclosed area apart from modern drains, and the eastern end, if one was ever present, is now poorly defined within an area of marsh. The RCHME 1993 survey suggested that the pond was a natural feature which may have been accentuated to create a more permanent landscape feature, and this seems highly likely. It is possible that as well as being overlooked, the raised area enclosed by the pond could be visited to view the castle within its wider landscape setting; as has already been noted, from certain positions, the pond has the ability to reflect the castle in the water's surface.

3.126 If the pond and raised area are indeed an ornamental feature, then they were no longer of importance by the date that the Tommy Road was laid out, as this bisects them. Taken as a whole, it could argued that the pond is actually more like a shallow moat, enclosing the raised area to create what is effectively a small island. Moated retreats set apart from the main residence, and sometimes on actual islands, are known to have been constructed at a royal level in England from at least the 14th century onwards (Jamieson & Lane 2015, 264). There is no evidence for any buildings on the raised area enclosed by the pond at Pendragon, but it is considered likely that the creation of the feature took place in the medieval, rather than the early post-medieval period.

3.127 The possible 'island' nature of the feature may also have a tenuous relevance to Pendragon's Arthurian connections. Although much of what Ragland-Phillips wrote about in his book *Brigantia: A Mysteriography* (1976) would now be considered well beyond the pale of a mainstream archaeological archive report, his observation that the feature of a building standing on an island is a regular one in Celtic and Arthurian tradition (1976, 64-66) could have significance. The name 'Pendragon' appears only to have been applied to the castle from the early 14th century onwards, close to the date when Robert de Clifford gained his licence to crenellate. Davis speculates that the works undertaken by Robert de Clifford in the very early 14th century might have been inspired by Arthurian associations, although he admits that to what extent can now only be surmised (*http://www.gatehouse-gazetteer.info/English%20sites/650.html*). The reverse could also be proposed, namely that it was Robert de Clifford who deliberately created these Arthurian associations. Ragland-Phillips was referring to the 12th century keep on its prominent mound when he discussed buildings standing on islands, but could the Cocklake pond have been part of an attempt by Robert de Clifford to recast the castle landscape in an Arthurian mould? More research would be needed into both Clifford himself and the resonance of the Arthurian myth amongst the 14th century nobility.

The 17th Century Works

3.128 Goodall (2009, 73-86) provides a detailed discussion of Lady Anne Clifford's building works in the context of 17th century aristocratic practice. He argues that that her works (concentrating on the restoration of ancient churches and castles, rather than commissioning new buildings in the neo-Classical style) has been misrepresented as a curiosity, whereas in fact, although it was medieval in

inspiration, to a 17th century audience it was also contemporary because it celebrated the medieval formulation of nobility which had survived into the post-medieval period. Goodall's thesis is that there is a profound historiographical misunderstanding about the nature of the Renaissance in England; there occurred in the 16th century not a rebirth, but a re-direction, of English cultural life in which existing traditions of patronage were augmented and sophisticated (Goodall 2009, 73 & 86).

3.129 Pendragon was Lady Anne's last major architectural project, started in 1660 (Goodall 2009, 79). Within the castle, a north-south spine wall was inserted, the remains of which are visible on the ground floor. Goodall (2009, 79) states that this spine wall was used to create a pair of chambers to each floor and this seems likely, given that Lady Anne undertook a similar alteration to the interior of the 12th century keep at Appleby. Fiorato (1990, 43 & 45) notes that part of the 14th century garderobe tower was converted into a fireplace to heat one of the first floor chambers, and that it is probable that the large windows were also inserted into the north and south elevations of Pendragon. It would be no surprise if the heating arrangements were given a substantial overhaul as part of the 1660-61 works, with more than one new fireplace being created; accounts in the 1660s indicate that there were twelve or thirteen hearths or 'chiminyes' at the castle, although at least some of these would have been in ancillary structures. No mention is ever made of a hall at Pendragon (Goodall 2009, 79). The castle was habitable enough for Lady Anne to stay there in October 1661, when she occupied a second floor chamber with eastern and southern windows i.e. on the south side of the building (Goodall 2009, 79). Goodall (2009, 79 & 82) also notes the different names that Lady Anne gave in her diaries to the 12th century great towers or keeps that she restored; for example, she called the great tower at Appleby 'Caesar's Tower' and that at Brougham 'Pagan Tower'. Over the medieval period many such towers became the object of legend and were attributed to figures in the remote past. In this sense, her chosen names were following in an established tradition; whether anyone believed such claims is less important than the fact that they were made at all. Pendragon is the only structure of its kind which does not appear with such a name in Lady Anne's diaries. Goodall suggests that this was because Lady Anne did not believe it to enjoy either the antiquity or family associations of the towers at her other castles, but it could be argued that there was no need for her to invent a name as Pendragon had been attributed to figure from the remote past since the early 14th century.

3.130 In addition to the keep at Pendragon, Lady Anne also undertook work on its setting, a process which was also repeated at Appleby, where she constructed a barn and stable in 1651 and 1653 respectively, and also at Brough and Brougham, where service buildings were renewed (Goodall 2009, 75 & 79-80). Lady Anne described her 1662 works at Pendragon as follows: *"Did I cause a wall of lime and stone to be built round that piece of ground which I had taken in around the castle, ninety roods in compass, with two gates to let in horses and coaches, and within the said wall I caused to be built a stable, coach house, brew house, bakehouse, wash house, and a little chamber over the gate that is arched"* (Curwen 1913, 123; LUAU 1996, 8).

3.131 It is difficult to find any published details of 17th century enclosure walls erected by Lady Anne at any of her other residences with which to make comparisons. A stone wall at Barden Tower in North Yorkshire, incorporating a gateway or small gatehouse, appears to bisect a proposed medieval precinct, and might form part of the works undertaken there by Lady Anne after 1657 (Dennison & Richardson

2016); however, this is considerably more substantial than anything surviving at Pendragon.

3.132 Although it has been stated (Perriam & Robinson 1998, 300) that the remains of the barmkin wall and the 'Countess' Gate' were exposed during the 1994-1995 consolidation works, unfortunately no detailed location is given for these features nor do they appear in the relevant archaeological report on these works. As a result of the current survey, several suggestions can be made as to the area which was enclosed in 1662, and the location of the two gates. Lady Anne's description shows that the range of 17th century buildings (Site 204) to the north-west of the castle were placed within the enclosed area, and it is probable that the wall which forms their western side, and which continues in a ruinous form to the south, represents the western side of the enclosure. The adjacent trackway (Site 205) could then be interpreted as a route past the enclosed area, perhaps heading for the bridge over the Eden, supposedly also built by Lady Anne. The only section of drystone walling surrounding the survey area which is noticeably different to the rest is that already described above in relation to the formal approach (Site 203), to the west of the blocked gate/opening, and it is possible that this represents part of the alignment of the north side of the enclosure. The blocked opening itself might form a remnant of one of the 1662 gates, although it might have been expected to lie further to the north-west, closer to the bridge over the Eden. It may be that the trackway (Site 207) in this area actually defines the northern edge of the 1662 enclosure area, curving as it does beyond the range of 17th century buildings towards the bridge.

3.133 Several previous authors have suggested that the second 1662 gate was located somewhere near the existing field gate from the main road, and this seems sensible. The placement of the gates to the east of the castle and to the north-west closer to the Eden bridge would have implications for movement and access through the enclosed area. Such an arrangement would strongly suggest that the causeways (Sites 200/4 and 200/5) were created by infilling the moat in the later 17th century. Doing so would create easy access to the castle from a road or trackway (Site 202) following the approximate line of the existing road past the complex, and then an internal link from the castle mound to the newly erected range of buildings to the north-west (Site 204). Regarding this range, it is suggested that the brew house, bake house and wash house occupied the southern end of the range, with the stable and coach house at the northern end.

Erosion Repair and Damage Control for the Castle Earthworks (see figure 19)

3.134 There were a number of sheep in the two fields forming the EDAS survey area at the time of the initial survey work (October-December 2017), and when the repeat visit was made in June 2018 to assess the erosion concerns. The number of stock was actually relatively small, but it is clear that they have been responsible for most, if not all, of the generally small-scale and localised areas of erosion. Conversely, in late June 2018, some parts of the site, especially the top of the castle mound (201) and the interior of the castle itself, were overgrown, primarily with nettles. It could be argued that the introduction of additional numbers of sheep may well reduce this overgrowth, but they may also exacerbate the existing erosion issues. Clearly, a delicate balance needs to be struck.

General Erosion Issues

3.135 The movement of sheep across and through the steep earthworks forming the castle ditch (200) and the sides of the castle mound (201) is causing some

localised areas of erosion. For example, there are sheep tracks running around the tops of the ditch, especially on the north side of the castle (200/1). There are also several areas of regularly spaced sheep tracks running around and across these slopes. Once they are established, the sheep tracks continue to be used as they present easy routes through the steeper parts of the site, and they gradually become more prominent and better defined, so that they resemble shallow earthwork terraces.

3.136 The areas of sheep tracks are shown on figure 19, and they lie on all sides of the castle mound (Areas 5, 13, 14, 15, 16, 17 and 19). As might be expected, these tracks are more visible in winter, when vegetation is short [*7/449*, *7/460*] (see plates 32 and 36), but they can still be seen in the summer months, although in some cases they become completely grassed over [*10/126, 10/152-154, 10/170*]. Areas 16 and 17 lie on the south facing slope of the north ditch (200/1), between the potential bridge site (200/3) and the eastern causeway (200/4); Area 16 covers an area measuring 20m long by 7m wide extending to the full extent of the slope [*6/312; 10/156-10/158*] (see plates 71 and 72), while Area 17 lies to the south-east and covers an area of some 20m by 3m near the top of the slope [*10/164*]. In these cases, no remedial action is considered necessary as the summer growth of vegetation seems to stablise the tracks. However, there are a number of more prominent sheep tracks on the south and south-west sides of the mound (Areas 4, 9, 10 and 12) which are more severe where some intervention is needed; these are discussed under 'specific areas' below.

3.137 In addition to the sheep, it is clear that the site as a whole suffers from a considerable problem from moles. Evidence for widespread mole activity, represented by surface mounds of earth or molehills, was clear over the flatter parts of the site during the winter survey, for example on the top of the castle mound (201), in front (east) of the building range (204) either side of the existing barn [*7/432, 7/477, 7/481; 9/565*], around the possible formal entrance (203) [*7/466*], around the southern edge of Cocklake (209) and the kiln (208/2) [*7/485; 9/570*], and in the south-east corner of the site [*7/436*] (see plates 37 to 41 and 43 to 44). Although these areas seemed less prominent, and were certainly less visible when summer grass growth was at its maximum, some mounds could still be seen in June 2018 [*10/159-10/161, 10/163, 10/165, 10/166, 10/168*].

3.138 Some rabbit activity was also evident, again mostly on the shallower slopes within the site. There were some rabbit burrows in the east side of the depression (200/6) at the north end of the south-east castle ditch (200/7) [*10/169*], in the south end of the bank forming the south-east ditch (200/7) [*10/125*], and between the area of sheep tracks (Areas 16 and 17) on the outer edge of the north ditch (200/1) [*10/164*]; there were also some areas of more severe erosion which are discussed below. Rabbits were also present around some of the trees on the south side of the castle mound (201), and next to the piece of propped masonry adjacent to the north-west corner of the castle [*9/574; 10/167*] (see plate 47). However, the areas of rabbit activity were much more localised than the mole activity.

Severe Areas of Erosion

3.139 There are a number of more severe areas of erosion visible on the steep slopes of the castle mound (201). These are again shown on figure 19, and lie primarily on the south-west, south and south-east sides of the mound which represent the steepest sections (Areas 1 to 4 and Areas 6 to 12). Most are represented by erosion scars, typically forming an 'eye-brow' shape, and most seem to result from

natural slumping and then probably augmented by the movement of sheep and some lying-in.

3.140 One of the most severe erosion scars lies on the south side of the castle mound (201), towards the top break of slope, where a large scar measuring 13.0m long by 0.6m deep is evident, with an area of bare soil downslope from this (Area 7) [*7/451*, *7/453-7/455; 10/131-10/135*] (see plates 73 and 75). The ends of the 'eye-brow' are turning south to fall down the slope slightly. Stone can be seen eroding from the exposed section, and some of the larger stones have rolled down the slope to rest in the bottom of the ditch [*10/140*]. There is also a secondary scar developing to the east under a small hawthorn tree (Area 8). It is clear that both scars have been created from soil slumping down the steep slope, and there are several soil slips below (Area 9), which have been exacerbated by sheep, to create small terraces typically 0.7m high and 0.4m wide, although they are mostly grassed over [*10/138, 10/139*] (see plate 74). These scars and the related slippage below are highly visible from the south of the castle [*10/173, 10/174*] (see plates 30 and 75). It is also clear that previous smaller areas of slumping have largely healed themselves, for example an earlier scar just to the east of this major slip near the top of the slope (Area 8), measuring 3.0m long by 0.3m high, is now largely grassed over, although of course, it may be more prominent in the winter [*10/136, 10/137*].

3.141 To the east of the above area is evidence for further earlier slumping exacerbated by sheep movement, covering an area measuring 12.0m long by 6.0m wide in the lower part of the slope (Area 4). Here, the terraces area typically 0.4m wide and 0.4m high, although they are mostly grassed over and do not seem to be actively eroding [*7/446; 10/122, 10/124, 10/176*] (see plate 76). This area of soil slip has obviously been here for some time, as it is clearly visible on a photograph taken in 1935 (HEA BF008645 WK486). To the west of this area, there is further slumping around a small hawthorn tree with sheep lying-in forming a hollow next to the trunk (Area 6) [*10/117, 10/118, 10/120, 10/121*].

3.142 To the east again, another smaller erosion scar resulting from slumping, this time possibly resulting from a hawthorn tree moving down the steep slope, is evident (Area 1) [*10/112, 10/114, 10/171*] (see plate 77). The scar is again 'eye-brow' shaped, 5.0m long by 0.4m high, with some small stones and pebbles visible in the exposed section. Immediately adjacent to the west is another slumping scar (Area 2), 8.0m long by 0.6m high, with some quite large stones visible in the section and some have rolled down the slope into the base of the ditch [*7/440; 10/114, 10/115, 10/116, 10/119, 10/172*]. Finally, in this section of the mound, a tree towards the bottom of the slope has some minor slumping and sheep tracks around it (Area 3) [*10/117, 10/118, 10/120, 10/121*].

3.143 The second area of greatest concern relates to further slumping which has occurred around the south-west part of the castle mound (201). This affects an area measuring 15.0m by 9.0m wide (Area 11), and is due to the profile breaking at the top of the slope which has exposed a scar with a lot of stone (possibly a structure?) in the section [*10/143, 10/144*] (see plate 78). The resulting terraced slips downslope are typically 0.5m high, with further smaller scars evident amongst them [*10/143-10/145*]. To the north, in Area 12, the slips are more prominent, and have probably been exacerbated by sheep using them to move through what is effectively a pinch-point between the mound and the adjacent field boundary above the river. Here, there are six closely spaced terraces or small lynchets with eroded sides, typically 0.9m high by 0.6m wide, covering an area extending for 15m [*10/146-10/148*] (see plate 79). A tree in the slope towards the north-west end of

this area has a piece of fallen masonry against it [*10/149*]. To the south-east, another small slumping scar is evident (Area 10), but here the slips are mostly grassed over [*10/141*], and they extend east to a small partially dead hawthorn tree [*10/142*].

Discussion and Recommendations

3.144 It is not surprising that the main areas of concern, primarily resulting from slumping, occur on the steepest slopes of the castle mound (201), on the south-east, south and south-west sides (Areas 1 and 2, Areas 7 and 9, and Areas 11 and 12). In all cases, slumping has occurred at the top of the slope, resulting in visible erosion scars, with areas of soil slippage, probably exacerbated by sheep movement, creating small terraces in the mound slope.

3.145 It is recommended that the two most prominent and visible sections of erosion (comprising Areas 6, 7, 8 and 9, and Areas 11 and 12) should be subject to some remedial action. Without closer, more detailed, examination, precise solutions cannot be found, but this type of erosion repair has been carried out very successfully in the past (e.g. Frodsham 1994; Streeton 1994). Such work would normally involve removing the turf from the affected area(s), reprofiling the slope and then infilling with soil; where necessary, the soil can be retained using pegged vertical boards and larger areas of erosion can be infilled using soil-filled hessian or hemp sacks which can also be pegged in place (Streeton 1994, 11). Once the slope profile has been restored, the area can be returfed, or resurfaced with a turf-like material or blanket, which will hide the pegged boards or sacks below. Once again, it may be necessary to peg the new turf or surface down to prevent it slipping down the slope, and some temporary fencing should also be used to keep stock away until the area has fully regenerated. Such remedies have already been successfully utilised at Castlehaw motte and bailey castle in the Yorkshire Dales National Park (White 1994, 95-101). Areas 7 and 9 cover an area measuring c.12sqm, while Areas 11 and 12 cover 30m long by 10m wide.

3.146 Some of the smaller areas of slumping scars (e.g. Areas 1 and 2) could also be repaired in this way, although the areas of work would be more localised. Before this work is undertaken however, it would be appropriate to archaeologically-examine the erosion scars, and if necessary clean the exposed sections back, to see whether any information can be gained regarding the construction of the mound, and also whether the stone seen eroding from the scar in Area 11 is actually a structure. Some palaeo-environmental coring and scientific analysis of the mound might also be usefully undertaken, to try and get some dating evidence for the castle mound. The fallen stone in the base of the ditch should also be examined and recorded as necessary.

3.147 It might be thought that the presence of several hawthorn trees on the castle mound's southern slopes would help to bind the underlying soil and thus preserve the overall profile of the mound. However, many of the above areas of concern coincide with the hawthorn trees, and it is possible that it is the trees actually moving downslope which is causing or assisting with the slumping. In addition, the trees provide some shelter for the stock, and in several cases there are lying-in hollows around the trees and sheep tracks leading to them. It is therefore recommended that consideration should be given to cutting down all of the trees on the sides of the mound, but to ground level only and then treating the stumps, as digging out will damage the underlying archaeological horizons.

3.148 However, the fact that some areas of previous slumping, for example Areas 4 and 8, have largely now been grassed over (at least in the summer months) means that intervention is not always necessary, and some areas should be left to regenerate and repair of their own accord. Again, this 'no-intervention' action has been successful in the past (e.g. Barclay 1994, 26-27), although it can take several years and, of course, the original profiles of the affected areas will not be restored. It may also be necessary to hasten or help this process with some seeding and more permanent fencing. Nevertheless, it is suggested that many of the areas of sheep tracks seen elsewhere within the site on the slightly less steep slopes could be left to regenerate naturally, although some temporary fencing might be required during the winter months to prevent stock from traversing the areas.

3.149 The problem of the moles is difficult to address, especially as they are so widespread across the site. Moles spend most of their lives in extensive and elaborate systems of tunnels, which vary in depth from just below the surface to well over 1m down and are characterised by the molehills created from the spoil from excavating the tunnel system. Moles live solitary lives for most of the year and occupy largely exclusive territories; a single territory normally covers between 0.13ha and 0.28ha, which is the equivalent to a circle of between 20m-30m radius. During the short spring breeding season (March-June), male territories can increase to around a 50m radius to find receptive females (Rimmington 2004, 62).

3.150 Mole populations can be controlled by chemical or physical means (Rimmington 2004, 69). The methods used include poisoning using strychnine hydrochloride treated worms, fumigation using aluminium phosphide tablets, trapping and non-lethal repellents. Both the chemical controls are highly toxic, and should only be undertaken by licensed trained operators familiar with the necessary precautionary measures. There may also be a problem to any existing stock within the site. However, worms treated with Strychnine hydrochloride powder are a widely used and effective method of control, whereby the treated worms are actually inserted into the mole tunnels by means of a small diameter. Aluminium phosphide tablets are inserted into a tunnel between molehills, and the entry hole is plugged so that the gas created by the reaction of the tablet with the moisture in the soil does not escape; this needs to be repeated at sufficient points to ensure the entire tunnel system is gassed. The use of mole traps is generally not recommended for archaeological sites as their use requires digging and so may disturb underlying deposits. Non-lethal repellents include ultrasound and bone-oil, although their effectiveness is not conclusive. Given the widespread nature of the mole distribution within the Pendragon Castle site as a whole, it might be appropriate to experiment in a localised area, with the necessary advice from a specialist contractor, to establish the most efficient and cost-effective method of control. Surface molehills should also be removed by raking or harrowing, as they can cause secondary management problems, such as providing a seed bed for weeds and other invasive plant species.

3.151 The problem of active rabbit erosion on archaeological sites is well-known, and has attracted a number of solutions in the past. However, it is virtually impossible to remove rabbits from a specific area without considerable expenditure in terms of time and resources, and in many cases any removal work simply transposes the problem elsewhere. Methods commonly utilised for removing rabbits from archaeological sites include shooting, trapping, snaring, fumigating, netting and/or fencing (Dunwell & Trout 1999, 8-9; Rimmington 2004, 65-67). Trapping may be effective, but often involves a resource issue, as traps need to be checked at least once a day. Fencing can be used, but the act of burying rabbit-roof fencing may well also cause damage to the archaeological site or its context, as well as being

visually intrusive. Given that rabbit burrows appear relatively localised across the site (especially when compared to the moles), low-tech, small-scale, options might be more appropriate, for example, netting or blocking the active holes, although as noted above, this may simply transfer the problem elsewhere. If netting is laid over the affected area, it should be close meshed and extend for at least 0.5m beyond the area, and it should be pegged down to prevent movement or removal; wire mesh should not be used as this may affect soil conditions and prevent further archaeological investigation, e.g. geophysical survey. After a period of time, the existing grass sward should grow through the netting and it will become invisible. However, blocking off the existing rabbit holes, and infilling internally as far as is possible, may be more practicable, and this should also prevent the reuse of holes by other burrowing animals such as moles, foxes or badgers. Once infilled, the ground around the rabbit holes should be reinstated, and returfed or reseeded as appropriate.

3.152 In all cases, return site visits are likely to be needed (perhaps by volunteers), to check on the success of any remedial works, and to identify any additional or new problems.

3.153 As Pendragon Castle is a Scheduled Monument, Scheduled Monument Consent would also most likely need to be applied for and approved prior to carrying out any of the above works. Given the relatively low-key and non-ground disturbing nature of some of the works, it is thought likely that archaeological supervision or monitoring would not be required for all of the interventions. However, the costs and logistics of undertaking any of the above recommended remedial work need to be considered alongside the significance, importance and fragility of the earthworks, together with any public awareness and visitor appreciation of the monuments, and the wishes of the landowner would also need to be considered.

Erosion Repair and Damage Control for the Castle Interior (see figure 20)

General Comments

3.154 The earthworks in the interior of the castle were subject to an archaeological survey (described above), and it was noted that the main differences between those recorded by Clare in 1984 and those which survive today relate to the clearance work undertaken in 1994-95. For example, a deep sub-circular depression at the south end of the entrance passage relates to excavations carried out to expose the newel stairs more fully. A second depression in the south-east corner relates to repair to the south-east chamber. However, other areas, for example the south-west corner of the interior and the steep depressions leading into the doorways of the other three mural chambers, are much as shown by Clare in 1984.

3.155 In contrast to the situation recorded at the time of the winter survey work (October-December 2017), the repeat visit made in June 2018 to assess erosion concerns shows that, although large parts of the interior were overgrown, primarily with nettles, especially in the four corners, most of the earthworks were well-rounded and did not present especially significant health and safety issues [*10/185-10/187*]. More interestingly, the walls at the south-west corner had a thriving colony of ferns despite the exceptionally hot weather seen in June 2018 [*10/181*]. The interior is also accessible to sheep, who use the window reveals or splays and mural chambers for shelter; as well as the main entrance passage, they use some of the external window openings, both for shelter and to access the interior [*10/162*]. As

a result, the areas around many of the internal window openings are devoid of vegetation.

3.156 Public access into the interior of the castle is unrestricted, through the entrance passage, via a set of wooden steps inserted as part of the 1994-95 works [*9/546*] (see plate 80). Although the steps are themselves stable, there is a steep slope on their south side which people then have to clamber up. It is not really possible for the general public to access the interior in any other way, unless they are particularly energetic. Access is possible into the north-east chamber from the exterior (see plate 57), but there is no easy route into the interior of the castle from here. Once inside the castle, access into the north-west mural chamber is possible down a relatively steep and unstable slope probably already used by sheep [*10/182, 10/183*] (see plate 81) but, in general, access into the south-west and north-east chambers is not really possible without a certain amount of scrambling [*10/177*] (see plate 84) - the repairs carried out in 1994-95 means that the entrance into the south-east chamber is barred with infill and an iron grille [*9/555*] (see plate 83). Many of the window reveals are partially filled with soil and rubble, with some loose stone on the surface [*10/178, 10/180*] (see plate 85), and a couple of voussoirs of the western window in the south wall have recently been dislodged [*10/179*] (see plate 82).

Discussion and Recommendations (see figure 20)

3.157 Given that it is assumed that public access into the interior of the castle is still considered necessary, some attention needs to be made regarding the pedestrian route once the top of the wooden steps has been reached. This can be easily solved by creating a series of new steps, utilising ex situ stone rubble from within the interior, to create curving routes either side of the existing scarp. These steps could be of stone, or another similar durable material such as wood, and could be terraced into the existing slope with minimal excavation - they would create a new formal route and most people would stop climbing the steep and relatively unsafe slope that currently exists beyond the existing steps. Repairs to stabilise and re-establish the grass sward on the existing slope should also be carried out.

3.158 Similarly, it is clear that the public enter the north-west mural chamber from the interior of the castle, although the existing access is uneven and potentially hazardous. Once again, the creation of a flight of stone or wooden steps down the existing steep slope would formalise this access (assuming it is to be maintained), thus avoiding erosion to adjacent areas; existing ex-situ stone in this location could be used. The floor of the interior of the chamber is rather uneven with some large stones present - the stones could be used for the steps and the floor levelled off to present a better impression. If funds were available, it might be appropriate to excavate the floor of the chamber to see if any original floor surface survives, and then undertake limited backfilling with the spoil overlain with gravel to create an even surface.

3.159 In order to prevent public access into the south-west chamber and adjacent window opening, it might be appropriate to fence off this corner of the interior of the castle. However, this is not ideal, and a better and less intrusive option might be to infill this area slightly, as has been done for the south-east chamber, sufficient to deter access but still to allow views into the spaces beyond. It might also be appropriate to prevent external access into the north-east chamber by erecting a number of stainless steel bars across the east opening, again to deter access but still allow people to view the space beyond.

3.160 Consideration should also be given to preventing sheep from being able to access the interior of the castle and the various window openings. Although they appear to be causing little erosion or other damage to the interior, it is also clear that they are not keeping the vegetation down. This prevention of stock access can easily be achieved by inserting bars across the necessary windows and, in the case of the opening to the north-east chamber, using a mesh-like fence across the opening secured to the previously mentioned bars; alternatively, a waist-high wooden gate would serve both purposes. The prevention of stock access into the main interior of the castle can be achieved by the construction of a gated entrance across the north side of the entrance passage. At its simplest, this could be formed by a number of horizontal poles secured in brackets either side of the entrance, acting like drawbars, that the public could slide across and reposition. A slightly more complex solution would be to erect a fence across the gap with a small latched gate which the public could open (and close) as required. Another advantage of securing the interior of the castle against stock is that it would be possible to keep this area separate from the rest of the site, for example, if it was decided that goats should be used to reduce vegetation cover in the interior.

3.161 Rubble from the interiors of the window openings should also be collected and removed to a safer location, for example in the south-east chamber or perhaps even to the nearby field barn.

3.162 It is not considered necessary to undertake any further clearance work to the interior of the castle, i.e. to reduce the level of the existing earthworks. Although such work might be interesting, and potentially archaeologically informative, the costs would be better spent on other erosion repair work within the site. However, it would be appropriate to infill and reseed some of the hollows and areas in front of the window openings, to establish a decent grass sward across the interior. Again, the prevention of stock access into the interior would mean that this sward should become established relatively quickly. If funds are available, it would also be appropriate to undertake some minor consolidation works, e.g. around the door and window openings.

3.163 Finally, it is clear that significant numbers of people visit and explore the site. Several people visited during the winter survey work (October-December 2017), and there were several local families picnicking on the castle mound and the site was also visited by cyclists and walkers on the single day of the repeat visit in June 2018. It might therefore be appropriate to erect a notice board adjacent either to the castle entrance, or the roadside gate into the site, explaining the history, development and significance of the complex.

4 RAVENS' GILL BARROW CEMETERY

Site Location

4.1 A group of five prehistoric barrows lies overlooking the east side of Ravens' Gill, south of Gilts Bridge, on Gilts Lane, an unclassified road linking Orton with Crosby Ravensworth, close to Gilts Farm (NGR 627 199 centred) (see figure 3). Blasterfield Farm lies 0.4km to the south-east. The site lies some 3km south-east and 3.45km north of Crosby Ravensworth and Orton respectively.

Site Designations

4.2 The five barrows are all Scheduled Monuments, and all were first listed on 18th February 1993. The northern barrow on the site is scheduled as a "Bowl barrow 25m east of Ravens' Gill (NHLE 1007604; SM 22485). The SM description reads: "*The monument is a bowl barrow located on a narrow plateau 25m east of Raven's Gill between the bottom of the hillslope and the steep declivity to the gill. It includes an oval earthen mound up to 1.4m high with maximum dimensions of 9m by 7m*". It is located at NGR NY 62753 11968.

4.3 The barrow in the central part of the site is scheduled as a "Bowl barrow 20m east of Ravens' Gill (NHLE 1007603; SM 22484). The SM description reads: "*The monument is a bowl barrow located on the western edge of a narrow plateau east of Raven's Gill between the bottom of the hillslope and the steep declivity to the gill. It includes a slightly oval earthen mound up to 0.6m high with maximum dimensions of 8m by 7.5m*". It is located at NGR NY 62754 11927.

4.4 The final three barrows at the southern end of the site are scheduled as "Three bowl barrows east of Ravens' Gill (NHLE 1007602; SM 22483). The SM description reads: "*The monument includes three earthen bowl barrows located on a narrow plateau east of Raven's Gill between the bottom of the hillslope and the steep declivity to the gill. The southern barrow is situated at the western edge of the plateau and measures up to 0.4m high with maximum dimensions of 8.5m by 7m. The central barrow lies 10m to the north-east of this barrow and has been partly mutilated by the removal of its centre. It measures up to 0.4m high with maximum dimensions of 9.5m by 8.5m. The northern barrow lies 10m to the north of the central barrow and measures up to 1.2m high with maximum dimensions of 10m by 8m*". The group is located at NGR NY 62766 11902.

4.5 The barrows are also listed on the YDNPA Historic Environment Record. The northern barrow is site MYD62303, the central barrow is site MYD62302, and the southern group of three is site MYD62304. All the barrows are also grouped under a general entry in the National Record of the Historic Environment (Pastscape 13439; NMR NY 61 SW 20).

4.6 The central barrow (NHLE 1007603) is on the current 'Heritage at Risk' register, with the condition being listed as generally unsatisfactory with major localised problems, and the principal vulnerability being extensive stock erosion (Historic England 2017, 1).

Historical Background

4.7 Bowl barrows, which comprise the most numerous form of round barrow, are funerary monuments dating from the late Neolithic period to the late Bronze Age, with most examples belonging to the period 2400-1500 BC. They were

constructed as earthen or rubble mounds, sometimes ditched, which covered single or multiple burials. They occur either in isolation or are grouped as cemeteries, and often acted as a focus for burials in later periods. Often superficially similar, although differing widely in size, they exhibit regional variations in form and a diversity of burial practices. There are over 10,000 surviving bowl barrows recorded nationally, occurring across most of lowland Britain. Often occupying prominent locations, unexcavated examples in Cumbria are rare, as are small groups such as that found at Ravens' Gill (SM text).

4.8 The group of barrows here clearly do not exist in isolation, and form part of a complex, multi-phase, historical and archaeological landscape in the area. The nearest known settlement to the barrows is located some 180m to the north-east, although some features that may be associated with it, such as a large, oval-shaped, boulder-walled enclosure, are only 130m to the south-east. This settlement site, which comprises circular huts surrounded by a series of rectangular and irregularly-shaped enclosures and fields, is also a Scheduled Monument (NHLE 1007578). The bowl barrows are all set at a lower level than the settlement and its associated features, and indeed occupy a relatively concealed position close to the gill, although they may perhaps have been more visible in the past from the western side of the gill. Rising ground to the north and eventually also to the south means that there are no expansive views of the surrounding landscape from the barrows, nor do they appear to have any visual association with natural or man-made features in the surrounding landscape. It is noticeable that several of the barrows appear to be built over or across the natural west-facing north-south aligned scarps which cross the survey area, rather than occupying the more level ground between these scarps.

4.9 The examination of molehills in fields to the south of the barrows in 1985 identified several scatters of flint and chert artefacts, comprising waste flakes, cores, blades, scrapers, awls and arrowheads, as well as a few pieces of Neolithic pottery. These all point to fairly extensive occupation of the area in the early prehistoric periods, especially around the 300m contour in relatively sheltered locations (Cherry, Cherry & Ellwood 1985).

4.10 The 1863 Ordnance Survey 6" to 1 mile map (sheet 22) marks 'Tumuli' in the survey area, and shows three barrows (most probably Sites 302, 305 and 306 - see below). The 1898 Ordnance Survey 25" to 1 mile map (sheet 22/5) shows all five barrows (see figure 21B).

4.11 Four of the five barrows were also noted by the RCHME as part of their 1936 inventory of historical monuments in Westmorland (RCHME 1936, 89-90, Site 49) (see figure 21A). The northern mound was recorded as being oval in form and 34ft by 27 ft and 4½ft high, the central mound was oval in form and 21ft by 24ft and 2½ft high, the northern of the group of three was oval in form and 32ft by 27ft and 3½ft high, and the southern of the group of three was circular, 24ft in diameter and 2½ ft high.

Description of the Earthworks (see figure 23)

4.12 The earthwork survey area (a Level 3 survey, as defined by English Heritage 2007), undertaken at a scale of 1:200, comprised part of the field containing five bowl barrows to the immediate east of the small, steep-sided valley of Ravens' Gill. The field survey was undertaken in November-December 2017. A further visit was made on 30th June 2018 to assess and consider the erosion issues.

4.13 The survey area measured a maximum of 130m north-south by 55m east-west (see figure 22 and plate 86). Within this area, the ground surface is set at an average height of 251m AOD, but the ground slopes fairly evenly from 274m AOD in the south to 265m AOD in the north, and in a series of steps from 274m AOD in the east to 267m AOD in the west. The stepped nature of the ground surface reflects the underlying geology of the survey area. There is an extensive area of denuded limestone pavement to the east; the eastern limit of the survey area effectively forms the western edge of the pavement. From this point, the surface steps down to the west across a series of west-facing scarps, up to 1.0m in height. These scarps are set on a very shallow north-west/south-east alignment, and represent terraces within limestone pavement which have become covered in soil; in several places, outcropping limestone remains visible along the line of the scarps. The survey area is bounded by a drystone wall to the north, by limestone pavement to the east, and by Ravens' Gill to the west [*5/244*]. At the time of the field survey, the area was used as rough pasture for a small number of sheep [*5/239, 5/272-5/274, 5/276, 5/277*]. At the time of the erosion visit, the area was well vegetated with a preponderance of wildflowers including orchids.

Field wall, north end of the survey area

4.14 The field wall stands on average 1.5m in height, with a battered profile, measuring up to 0.9m across the base and 0.6m across the top. It is built of limestone rubble, with two courses of throughstones, set at 0.9m and 1.3m above ground level, and it is surmounted by slant coping [*5/240, 5/241*]. In that part of the wall within the survey area, a single sheep creep was noted to the north-west of a depression (Site 301). There is a low scarp at the base of the southern face of the wall, containing a high proportion of stone rubble. The eastern section of the wall within the survey area may have a slight depression or ditch running parallel to its south side. Some 4.0m to the south of the wall, there is a parallel, spread, south-west facing scarp, perhaps defining a short section of raised former trackway running parallel to the wall.

*Site **301**: Depression, north part of the survey area*

4.15 There is a sub-oval depression at the northern end of the survey area, close to the drystone boundary wall; it is aligned north-west/south-east, measures c.6.0m by 4.2m, and is up to 0.5m deep. It has a spread bank around the western side. Although it might possibly represent a barrow which has been dug out, it is more likely to be a tree pull [*5/242*].

*Site **302**: Barrow, north part of the survey area*

4.16 There is a barrow in the north part of the survey area, which is a Scheduled Monument (NHLE 1007604). It is most probably one of three 'Tumuli' shown here on the Ordnance Survey mapping of 1863.

4.17 The barrow is oval in plan, measuring a maximum of 10.0m east-west by 8.0m north-south, and it stands a maximum of 1.2m high and has a flattened top [*5/245, 5/248; 10/210*] (see plate 87). In the northern half of the flattened top, there is a low U-shaped bank, open to the west, which contains a high proportion of grassed-over rubble [*5/246, 5/247*] (see plate 88). This could represent the remains of a smaller cairn placed on the main barrow, or perhaps disturbance to the barrow itself, although there is little evidence for any associated depression. There is a low scarp, resembling a low apron, running around the base of the western side of the barrow, whilst the barrow itself appears to have been built across two of the

natural west-facing scarps, visible to the north. Vehicle tracks run close to the north and west sides of the barrow [*5/243*].

4.18 Some 17m to the east of the barrow, there may be a small cairn, poorly defined and less than 1.0m in diameter, placed on the edge of one of the natural west-facing scarps.

*Site **303**: Scooped platform, north-east part of the survey area*

4.19 There is an oval platform in the north-east part of the survey area, cut or scooped into a natural west-facing scarp, close to an electricity pole. The platform is aligned roughly north-south, and measures 8.0m long by 5.0m wide [*10/209*]. The western side of the platform is formed by a low scarp, 0.5m high, with the 0.75m high eastern side terraced into the natural scarp; limestone pavement is visible eroding out of the latter [*5/249, 5/278*] (see plate 89). There are two low curvilinear banks, both apparently containing a high proportion of stone rubble, that may define a small structure that was placed on the platform. Notwithstanding the limestone visible in the eastern side, the features do not resemble a small quarry or modern disturbance associated with the erection of the electricity pole, and so may be a prehistoric feature.

*Site **304**: Possible boundaries, central part of the survey are*

4.20 There are two possible boundaries to the central part of the survey area, perhaps of two different phases. The possible earlier boundary (**304/1**) comprises a spread bank, up to 18.0m long, which is significantly aligned north-east/south-west against the natural linear scarps which characterise much of the survey area. The west end of the boundary overlies one of these scarps, which is visible to either side [*5/260*]; the boundary is formed by a bank, 2.5m wide, with a flattened top, standing up to 0.5m in height [*5/251, 5/252*]. There is a similarly aligned, but very spread, bank to the immediate north-west. This bank runs east, becoming more spread as it does so, to the point where it appears to be crossed by the second boundary (see below). Its line may be continued beyond the latter as a spread north-facing scarp.

4.21 The possible later boundary (**304/2**) comprises what appear to be intermittent sections of limestone rubble, placed along or enhancing a natural west-facing scarp. They may be visible for a total length of c.60m, and it may be significant that the possible small cairn described under Site 302 above is placed on the same natural scarp as the sections of boundary. The northernmost section is c.6.0m long and 0.8m wide, and appears to run across the earlier north-east/south-west bank (304/1) described above. There is then a short gap, and a second section of limestone rubble, 13.0m long and up to 1.5m wide [*5/253*]. This is very irregular in plan form, and probably represents an isolated area of denuded limestone pavement which has been artificially enhanced [*10/208*] (see plate 90). A substantial glacial erratic boulder is set to the east [*5/255; 10/207*]. There is then a 24.0m wide gap, and a third section of possible boundary similar to the first, but 14.0m long, and which may continue further to the south [*10/201*] (see plate 91). It is possible that these three sections of boundary are defining, or relate to the clearance of, a terrace to the east [*5/250, 5/254*].

*Site **305**: Barrow, central part of the survey area*

4.22 There is a barrow in the central part of the survey area, close to the break of slope forming the eastern edge of Ravens' Gill; it is a Scheduled Monument (NHLE 1007603). It is most probably one of three 'Tumuli' shown here in 1863.

4.23 The barrow is oval in plan, measuring a maximum of 10.0m north-south by 8.0m east-west. It stands 0.5m high and has a flattened top [*5/256*] (see plate 93). In the northern half of the flattened top, there are two small sub-square depressions, both open to the north side; one of these results from current rabbit activity, and the other perhaps by the collapse of an older burrow underground [*5/257*]. A fairly large hawthorn tree is established on the west edge of the barrow, towards the south end. The external scarp is markedly steeper and straighter around the south-west section, and the original extent of the barrow has almost certainly been slightly truncated, again by current rabbit activity [*5/258*] and possibly also stock erosion [*5/259*] (see plate 94). A natural west-facing scarp runs towards the north end of the barrow and then appears to curve beneath it. Vehicle tracks run within 1.5m of the east side of the barrow.

*Site **306**: Barrow, south part of the survey area*

4.24 There is a barrow in the southern part of the survey area, forming one of the group of three (see also Sites 307 and 308); the group is a Scheduled Monument (NHLE 1007602). It is most probably one of three 'Tumuli' shown here in 1863.

4.25 This barrow is oval in plan, measuring a maximum of 8.0m east-west; the western end is 8.0m wide, but the barrow narrows to 5.0m at its eastern end [*5/261, 5/262*] (see plate 95). The barrow stands a maximum of 1.0m high and once had a flattened top, but the western half has been substantially eroded, probably by sheep lying-in, leaving a bare scrape 0.4m high [*5/263; 10/206*] (see plate 96). There is a low scarp running parallel to the base of the north-west side, which might also result from erosion. A natural west-facing scarp runs towards the north end of the barrow and then appears to curve beneath it. Vehicle tracks run within 1.0m of the barrow's eastern edge.

*Site **307**: Mutilated barrow, south part of the survey area*

4.26 There is a mutilated barrow in the south part of the survey area, forming one of the group of three (see also Sites 306 and 308); the group is a Scheduled Monument (NHLE 1007602).

4.27 The centre of the barrow appears to have been dug away, leaving two separate parts set c.3.0m apart. The northern part is formed by a low spread oval mound, measuring 5.0m east-west by 2.5m north-south, and standing up to 0.3m high. There is a hawthorn tree growing out of the upper surface [*5/264*]. The southern part is formed by a more prominent oval mound, measuring 7.0m east-west by 3.0m north-south and standing up to 0.5m high [*5/265, 5/270*] (see plate 97). This southern part has some minor disturbance to the top, formed by old rabbit activity [*10/202*] and it appears to overlie two natural west-facing scarps. Vehicle tracks run within 1.0m of its western end.

*Site **308**: Barrow, south-west part of the survey area*

4.28 There is a barrow to the south-west part of the survey area, on the edge of the break of slope forming the eastern edge of Ravens' Gill. It forms one of a group of

three (see also Sites 306 and 307); the group is a Scheduled Monument (NHLE 1007602).

4.29 The barrow was originally oval in plan, but has been severely truncated at its west end, reducing its dimensions to 5.0m east-west by 7.0m north-south; the truncation appears to have been caused by a combination of stock erosion (lying-in hollow) and natural movement of soil into the gill (see plate 92). The barrow stands 0.6m high and has a flattened top [*5/267*] (see plate 98). There is a coppiced tree to the immediate west of the barrow, with a disused stock feeder set on its side at the base [*5/268, 5/269*]. Vehicle tracks run within 1.0m of the barrow's eastern edge [*5/266, 5/271*].

Discussion and Conclusions

4.30 It is clear that the barrows and other features (possible boundaries and a scooped platform) identified by this survey represent part of a wider prehistoric landscape, elements of which have already been noted and/or recorded by others (e.g. RCHME 1936, 89-90; Cherry, Cherry & Ellwood 1985). Nothing further can be gained from any additional survey work on the barrows themselves (apart from detailed excavation, which it is assumed is not an option), although additional research and survey work into the surrounding landscape would be beneficial, and would help to place the barrows into their wider setting and context. In particular, the relationship between the barrows and the adjacent field system, elements of which were noted on the eastern edge of the current survey area, could be explored.

Erosion Repair and Damage Control

4.31 Not all of the surveyed barrows have problems with erosion or damage, and there does not appear to be a problem regarding overstocking or grazing levels. However, some vehicle tracks pass very close to some of the monuments and, if unchecked, these have the potential to start erosion and damage.

Barrow 302

4.32 There has been some damage to the flattened top of the northernmost barrow (Site 302), where there is a slight U-shaped bank, open to the west, which contains a high proportion of rubble [*5/246, 5/247*] (see plate 88); this might represent the remains of a smaller cairn or perhaps previous disturbance revealing the material involved with the construction of the barrow itself. However, although potential damage is represented by slight earthworks, there does not appear to be any active erosion and the areas of damage have now grassed over. No remedial work is therefore suggested for this monument.

Barrow 305

4.33 There is, however, active erosion occurring to the central barrow (Site 305). This was the barrow (NHLE 1007603) identified by Historic England as being in a generally unsatisfactory condition with major localised problems, principally extensive stock erosion (Historic England 2017, 1). There are two small sub-square depressions in the northern half of the flattened top. One of these results from active rabbit burrowing, and the other perhaps by the collapse of a disused burrow underground [*5/257; 10/189, 10/190*] (see plate 93); the main area of erosion measures c.4.0m by c.3.0m. A fairly large hawthorn tree has become established on the south-western edge of the barrow, whose roots are almost

certainly causing damage or disturbance to the barrow's below-ground structure. Rabbits are currently using this area, and there are several active burrows and areas of bare soil around the roots. Some lie on the east side of the tree [*10/191, 10/192*] but the problem is more extensive on the west side, above the steep slope down to the gill [*5/259; 10/193, 10/194*] (see plate 94). Here there is active erosion, over an area measuring 6m by 3m, from both active rabbit burrows and also a sheep track which runs along the top of the steep slope to the gill [*5/258, 5/259; 10/195, 10/196*]. As a result, the original line of the barrow's external scarp around the south-west side has almost certainly been truncated.

Barrow 306

4.34 The most obvious and active erosion can be seen on the largest barrow in the southern group, Site 306, where there is a characteristic bare 'eye-brow' shaped scrape or lying-in hollow caused by sheltering stock (probably sheep) measuring 2.6m north-south by 3.2m east-west and 0.4m high [*5/263; 10/200*] (see plates 95 and 96). Although currently relatively small, this erosion scar has the potential to become larger through continued use, and so should be repaired. There are also numerous mole hills all around the monument, but especially on the north and east sides [*10/199*].

Barrow 308

4.35 There is a similar lying-in hollow or scrape truncating the west side of barrow 308, on the east side of the hawthorn tree which lies at the top of the steep slope down to the beck; a large patch of bare earth is visible [*10/203, 10/204*]. As with barrow 305, there are several active rabbit burrows amongst the exposed roots of the tree, especially on the west side, and this erosion has been exacerbated by the movement of stock along the top of the steep slope which has created terraces [*10/205*] (see plate 92). Overall, this western area of erosion measures some 10m long (north-south), mostly to the north of the tree. The long vegetation at the time of the erosion site visit meant that the adjacent vehicle tracks noted during the survey work were no longer evident.

Discussion and Recommendations

4.36 As has been noted in relation to Pendragon Castle above, the problem of active rabbit erosion on archaeological sites is well-known, and has attracted a number of solutions in the past. However, it is virtually impossible to remove rabbits from a specific area without considerable expenditure in terms of time and resources, and in many cases any removal work simply transposes the problem elsewhere. Methods commonly utilised for removing rabbits from archaeological sites include shooting, trapping, snaring, fumigating, netting and/or fencing (Dunwell & Trout 1999, 8-9; Rimmington 2004, 65-67). Trapping may be effective, but often involves a resource issue, as traps need to be checked at least once a day. Fencing can be used, but the act of burying rabbit-roof fencing may well also cause damage to the archaeological site or its context, as well as being visually intrusive. Low-tech, small-scale, options on small sites such as the Ravens' Gill barrows, may provide the answer, for example, netting or blocking the active holes, although as noted above, this may simply transfer the problem elsewhere. If netting is laid over the surface of the burrows, it should be close meshed and extend for at least 0.5m beyond the affected area, and it should be pegged down to prevent movement or removal; wire mesh should not be used as this may affect soil conditions and prevent further archaeological investigation, e.g. geophysical survey. After a period of time, the existing grass sward should grow through the netting and it will

become invisible. However, blocking off the existing rabbit holes, and infilling internally as far as is possible, may be more practicable, especially in localised areas, and this should also prevent the reuse of holes by other burrowing animals such as moles, foxes or badgers. Once infilled, the ground around the rabbit holes should be reinstated, and returfed or reseeded as appropriate (see below).

4.37 The repair of the erosion hollows on barrows 306 and 308 should be a relatively simple process. The eroded bank profiles should be restored by rebuilding using soil dug from elsewhere on the site (in an archaeologically non-sensitive part of the site which can be identified by the detailed earthwork survey). The grass sward should then be re-established by laying turves again cut from a nearby non-sensitive location. The advantage of using locally-sourced material means that the ecosystems present in the area will be maintained. Once the new turf has been laid over the infilled hollow, it needs to be protected from stock, either by using some form of temporary fencing or secured netting, or more simply by just covering the area with an old gate, hurdle or pieces of wood. Care should be taken not to completely cover the repaired area to exclude the light, otherwise the newly laid turf will not become established; some periodic watering may also be required.

4.38 The same process of soil re-profiling and turf reinstatement may be used around the eroded western edges of barrows 305 and 308, although in this case some stonework may also be required to be placed around the margin of the earthworks to form a shallow revetment, to prevent the newly laid material from being eroded by rainfall and falling down the steep slope into the gill; again, some pegged netting or similar may be required to prevent this. Temporary fencing should be erected around the repaired areas, until such time as the new grass sward has become established. It might also be appropriate to cut down the hawthorn trees on these two barrows (but to ground level only and then treat the stumps, no digging out as this will damage archaeological horizons), so as to reduce the potential for new rabbit activity and root disturbance.

4.39 In all cases, return site visits are likely to be needed (perhaps by volunteers or rangers), to check on the success of any remedial works, and to identify any additional problems.

4.40 As the monuments are scheduled, Scheduled Monument Consent would most likely need to be applied for and approved prior to carrying out any of the above works. Given the relatively low-key and non-ground disturbing nature of the works, it is thought likely that archaoelogical supervision or monitoring would not be required. However, the costs and logistics of undertaking any of the above recommended remedial works needs to be considered alongside the significance, importance and fragility of the earthworks, together with any public awareness and visitor appreciation of the monuments. For example, the site, at present, does not have any public access. The wishes of the landowner would also need to be considered.

5 CROSBY LODGE SHIELING

Site Location

5.1 The Crosby Lodge shieling is located c.640m to the south-west of Crosby Lodge farm, beyond the small valley of the Lyvennet Beck, some 3km south-east and 3.45km north respectively of the settlements of Crosby Ravensworth and Orton (at NGR NY 61389 11879) (see figure 3).

Site Designations

5.2 The shieling is a Scheduled Monument (SM), first scheduled on 22nd February 1993 (NHLE 1007596). The SM description reads: *"The monument is a medieval shieling located south of Cow Green and situated c.80m west-south-west of the southern end of the medieval dyke at Cow Green. It is a rectangular single-roomed shielding measuring c.11m by 4m and is of boulder construction standing one course high above ground level. It is one of five shielings located in close proximity to a medieval deer park which was enclosed in 1336 by the Threlkeld family of Crosby Lodge, then known as Crosby Gill, and extends to about 700 acres. During medieval times it was owned successively by the families of Pickering, Wilson and Rawlinson"*.

5.3 The site is also listed on the YDNPA Historic Environment Record (site MYD62872), and the National Record of the Historic Environment (Pastscape 13460; NMR NY 61 SW 30).

5.4 The shieling is on the current 'Heritage at Risk' register, with the condition being listed as generally unsatisfactory with major localised problems, and the principal vulnerability being extensive vehicular damage and erosion (Historic England 2017, 1).

Historical Background

5.5 A shieling is a hut, often within an enclosure, found singly or in groups in areas which may be considered upland or marginal in relation to their local environment. They served as temporary summer accommodation for herdsmen and their families involved in transhumance, i.e. the removal of stock from permanent farmsteads and enclosures to areas of summer pasture some distance away, in areas of upland, marshland or fen. They were in use from at least the early medieval period and historical documentation suggests this use continued up to the 15th century, although their numbers declined in the later medieval period. Shielings persisted in northern England and southern Scotland in a few documented areas into the 17th century (SM information; Ramm, McDowall & Mercer 1970, 1-8; Winchester 2000, 84).

5.6 Winchester (2000, 85-90) provides a detailed description of shieling practises as they can be understood from 16th and 17th century documentation for northern England. The place-name elements most commonly interpreted as referring to seasonal settlement are 'scale' and 'shield', but there are notably few of these in the vaccary areas of the Central Pennines; here, the term 'lodge' may refer to refer to shieling practises. However, place-name evidence is of limited value, as the same elements were used to refer to other isolated sheds and huts which did not relate to shieling practises. In other cases, 'scalings' appears to have been used to refer to whole tracts of summer pasture, rather than a single structure (Winchester 2000, 90-93).

5.7 The remains of a medieval shieling at Crosedale in Howgill, to the north-west of Sedbergh, were excavated in 1995-96 by members of the Sedbergh and District History Society (Hair & Newman 1999). A level platform had been created by terracing into the natural slope, and the building constructed of low drystone walls, often quite narrow and with crude coursing; the hipped probably turved roof seems to have been secured using turf or timber on top of the walls. The building measured c.10m by 5m and the single internal space had a fire pit in the eastern corner. The excavated evidence suggested that the building had been constructed probably no earlier than the later 12th century, and was abandoned by the mid 14th century.

5.8 The Crosby Lodge shieling clearly does not exist in isolation, and it forms part of the area's complex, multi-phase, historical and archaeological landscape, of which only a brief description is given below. Some 195m to the north-east of the shieling, there is what may be a Neolithic long cairn, although it is also possible that it may result from clearance across the adjacent lynchet field system to the west (Yvonne Luke, *pers. comm.*). There is a settlement comprising conjoined enclosures and associated features to the north of the possible Neolithic cairn, whilst the Scheduled Monument description states that the shieling is only one of five located in close proximity to a medieval deer park which was enclosed in 1336 by the Threkeld family of Crosby Lodge, then known as Crosby Gill, and extending to about 700 acres. During medieval times it was owned successively by the Pickering, Wilson and Rawlinson families (SM information). The park appears on early maps, such as Robert Morden's 1695 map of Cumberland and Westmorland (*http://www.geog.port.ac.uk/webmap/thelakes/html/lgaz/md10ny61.htm*). A substantial bank enters Cow Green from the north and then runs south, passing very close to another shieling (see 400/2 below). This latter shieling appears to overlie another bank, which forms the south side of a funnel-like feature, diverging to the west and with an east end heading towards the aforementioned settlement. A second bank enters the field close to the north-western corner, and then curves around to the south-west, coming close to the shieling forming the subject of the recording work.

5.9 Many of these features also appear on early Ordnance Survey map coverage. The shieling is shown on the Ordnance Survey 1899 6" to 1 mile map (sheet 21NE) as a square earthwork mound, as are the large medieval boundary banks, and the settlement to the north-east, which is labelled as 'British Settlement'. The shieling also appears as an earthwork with a parallelogram plan on the 1898 Ordnance Survey 25" to 1 mile map (sheet 21/8) (see figure 24).

5.10 The shieling and another adjacent were also noted by the RCHME as part of their 1936 inventory of historical monuments in Westmorland (RCHME 1936, 89, Sites 36c and 36d), as remains of similar buildings, (c) 140 yards S of (b), and (d) 110 yards WSW of (c) (see figure 21A).

Description of the Earthworks (see figure 25)

5.11 The earthwork survey (a Level 3 survey, as defined by English Heritage 2007), undertaken at a scale of 1:50, comprised a single structure, a suggested medieval shieling, to the west of Crosby Lodge beyond the small valley of the Lyvennet Beck. The shieling is set at a height of c.288m AOD. It was surveyed using traditional hand-measurement techniques, with assistance from Stephen Douglas, a member of the local Lunesdale Archaeological Society. At the time of the survey (7th February 2018), the area was used as rough pasture for sheep, and there was

a dusting of snow. A further visit was made on 1st July 2018 to assess and consider the erosion issues.

*Site **400/1**: Shieling 1*

5.12 The shieling is located to the south of the area known as Cow Green, within an area of rough ground with dense bracken coverage, flanked by limestone pavement to the east and south. There may be other small structures or enclosures nearby, not in the immediate vicinity of the shieling but no more than 50m distant. Some of these resemble small platforms, perhaps partly defined by larger boulders or stones which have been cleared from them, although the degree of bracken cover and the presence of the pavement makes it difficult to be certain. The shieling is set within a generally level area, sheltered by rising ground to the west but with extensive views to the north-east as far as the North Pennines.

5.13 The shieling, a Scheduled Monument (NHLE 1007596; see above), had a dense covering of bracken, dead at the time of the survey, and was not easy to locate, as it is formed by a low earthwork, no more than 0.50m in height; the SM description notes that the walls are of boulder construction standing one course high above ground level, but this detail was largely obscured at the time of the current survey.

5.14 The earthwork is aligned north-east/south-west, and has maximum dimensions of 13.50m in length by 9.50m in width, forming a single celled, sub-rectangular structure [*8/518-8/520, 8/522-8/524*] (see plate 99). It falls within the upper end of the dimensions given for recorded shielings in north-east Cumbria and Northumberland (Ramm, McDowall & Mercer 1970, 9), although this may well be due to poor definition and spreading of the wall footings; excavation might reveal that in fact it is smaller. The bank defining the northern side is 11.50m long by 3.20m wide, and is rather spread. The slightly more prominent south bank is 13.00m long by 3.30m wide. There is a large Shap pink granite glacial erratic boulder at the south-west corner [*8/521, 8/525*], and a similar, but much smaller, boulder at the south-east corner. The structure appears to have been open to the east end, or there may at least have been an entrance here. This would be unusual in north-east Cumbria and Northumberland, where the entrance was normally in one of the long walls, although interestingly it was noted that in west Cumbria and Westmorland, there were examples with end entrances, including a medieval house at Crosby Ravensworth, although this was not a shieling (Ramm, McDowall & Mercer 1970, 9-10).

*Site **400/2**: Shieling 2*

5.15 A survey was made of a second shieling, some 200m to the north-east of the first, using the same methodology as described above and with the assistance of volunteer Stephen Douglas. Due to the lack of bracken, this shieling is far better defined than the first. The survey recorded its overall plan form, defined by the limits of the stone rubble spreads forming the walls; a more detailed survey could record some of the individual stones that appear to remain *in situ*, and which define elements such as wall faces, for example.

5.16 This shieling (NGR NY 61495 12026) is aligned north-east/south-west and comprises walls, mostly surviving as rubble spreads, no more than 0.50m in height; it is set at an elevation of c.269m AOD [*8/526-8/531*] (see plate 101). It has maximum dimensions of 13.30m in length by 7.60m in width, although the average width is closer to 6.80m. The short end walls are the best defined, and appear to have been partly faced; although they have now spread as a result of decay, their

original width was c.1.00m. The shieling formed a two-cell, sub-rectangular structure. The larger south-west cell measures c.6.50m by c.3.30m internally, whilst the smaller north-east cell measures 4.20m by 2.70m internally. The two may once have been connected by an internal doorway towards the south-east end of the cross wall. The north-east cell also has possible former entrances in the north and west sides, the latter being rather narrow.

Discussion and Conclusions

5.17 It is clear that the two shielings recorded by this survey represent part of a wider multi-period landscape, elements of which have already been noted and/or recorded by others (e.g. RCHME 1936, 89). Nothing further can be gained from any additional survey work on the two shielings themselves (apart from detailed excavation, which it is assumed is not an option), although additional research and survey work into the surrounding landscape would be beneficial, and would help to place the presumed medieval monuments into their wider setting and context. In particular, the relationship between the shielings and their associated field system and enclosures could be explored, as well as to what extent the medieval features were integrated into the earlier prehistoric and Romano-British landscape formed of settlements and associated field systems.

Erosion Repair and Damage Control

5.18 The entry in the current 'Heritage at Risk' register notes that the condition of the shieling (Site 400/1) is generally unsatisfactory with major localised problems, with the principal vulnerability being extensive vehicular damage and erosion (Historic England 2017, 1). However, although the site was severely affected by, and completely covered with dead bracken at the time of the field survey (February 2018), no evidence for any vehicular damage or other erosion was noted. By the time of the erosion survey visit (June 2018), the site and its surroundings were completely covered with a dense cover of bracken, and no earthworks could be identified [*11/216*] (see plate 100).

5.19 The second surveyed shieling (Site 400/2) lay in pasture and was overgrown, although was still identifiable [*11/211*] (see plate 102). There was an isolated clump of bracken starting to cover the south-west corner of the monument, and nettles on the east side and in the interior [*11/212, 11/214*]. Parts of the long walls were also completely covered with long grass [*11/213, 11/216*].

5.20 The presence of bracken on archaeological sites has been the subject of some research, and various remedies to alleviate the damage caused by bracken have been proposed (e.g. Rees & Mills 1999; Rimmington 2004, 81-82). Given bracken's preference for freely draining soils, it is obvious that rubble or embanked structures are likely to suffer the most from bracken infestation. Over time, this results in the degradation of upstanding features and the destruction of wall faces and rubble structures. Effective management of a bracken infestation requires the implementation of a long term management plan which uses a variety of differing techniques. These techniques can involve the cutting and crushing of growing fronds (usually twice a year), hand pulling and removal of fronds, cultivation (ploughing or otherwise disturbing bracken rhizomes), grazing by appropriate stock (with careful consideration of stocking levels and other erosion that might result - cattle and pigs have proved more effective than sheep), burning, and herbicide control. It goes without saying that each archaeological site will present their own problems and solutions.

5.21 For the Crosby Lodge shielings, cutting and crushing, with some hand pulling, in the winter months would seem to be the most likely solution, although grazing with goats within a temporary fenced enclosure may also be an alternative; the latter would probably solve most of the problems noted at the rubble shieling (400/2). However, bracken clearance at the earthwork shieling (400/1) would need to be fairly extensive so as to cover its surroundings as well as the monument itself. Return site visits are likely to be needed (perhaps by volunteers), to check on the success of any remedial works, and to identify any additional problems.

5.22 As with the Ravens' Gill barrow cemetery above, the costs and logistics of undertaking any of the above recommended remedial works needs to be considered alongside the significance, importance and fragility of the earthworks, together with the public awareness and visitor appreciation of the monuments. It may, for example, be considered more appropriate to undertake some limited management work on the prehistoric and Romano-British settlement complexes which lie nearby.

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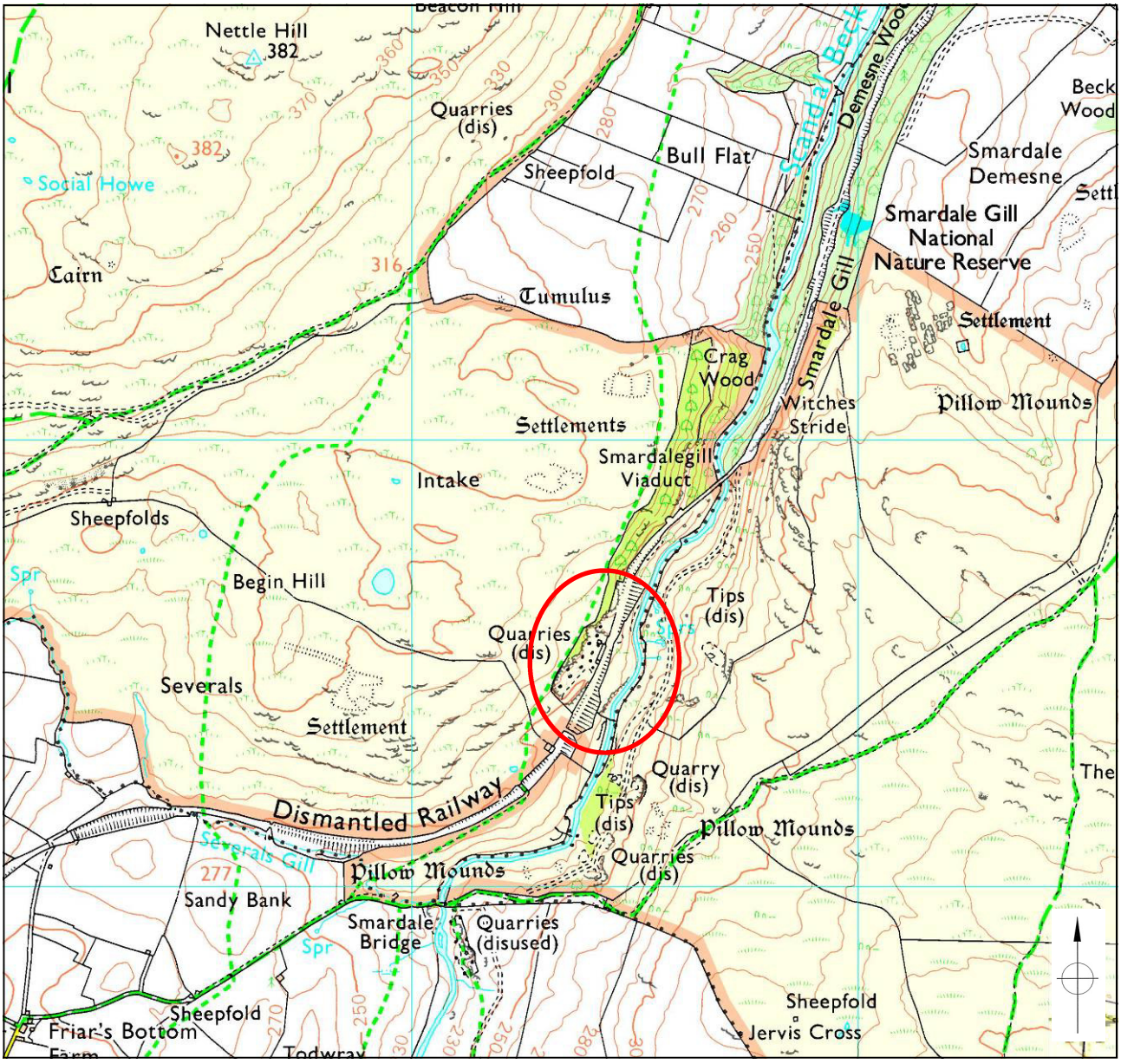
7 ACKNOWLEDGEMENTS

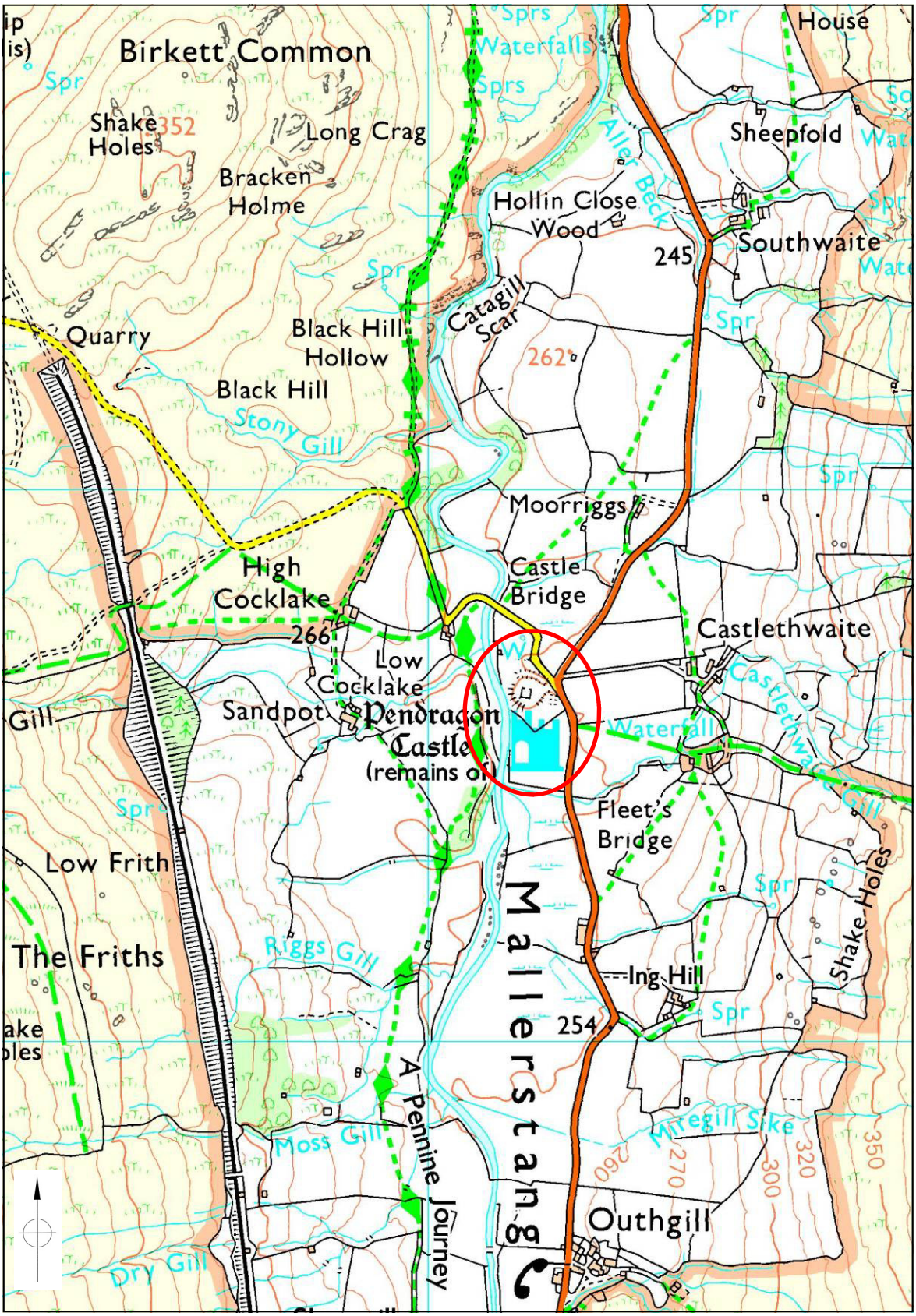
7.1 The project was funded by the Yorkshire Dales National Park Authority (YDNPA) as part of the Westmorland Dales Hidden Landscapes Project, led by the Friends of the Lake District. EDAS would like to thank Miles Johnson, Senior Historic Environment Officer of the YDNPA for his continued support during the project, as well as the various landowners who granted access to the respective monuments, namely the Cumbria Wildlife Trust (Smardale kilns and quarry), Mr John Bucknall (Pendragon Castle), Mr M S Taylor (Ravens' Gill barrows) and Mr J E Wood (Crosby Lodge shieling).

7.2 The archaeological and architectural surveys were undertaken by Shaun Richardson; the EDM surveys were completed with Dave Kempley of Benchmark Surveys of Leeds, while the building recording was completed with the assistance of Richard Lamb. Stephen Douglas, of the Lunesdale Archaeological Society, assisted with the surveys of the Crosby Lodge shielings. Ed Dennison visited the sites to assess any erosion and other issues. Robert White also visited the Cumbria Record Office in Carlisle for any relevant information. The structural survey and specification for consolidation work was undertaken by conservation architect Peter Gaze Pace. Shaun Richardson took the site photographs and produced the field drawings, and a draft report. Insightful and informative comments on the draft report were received from YDNPA and Friends of the Lake District.

7.3 Several organisations and individuals provided EDAS with help and co-operation during various stages of the project, namely Lucinda Walker (Historic England Archives), Luke Bassett Barker (YDNPA HER), Mr John Bucknall, and RIBA library staff. Despite all this assistance, the final report was produced by Ed Dennison, with whom the responsibility for any errors remains.



PROJECT	WESTMORLAND MARS
TITLE	SMARDALE KILNS AND QUARRY LOCATION
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 1



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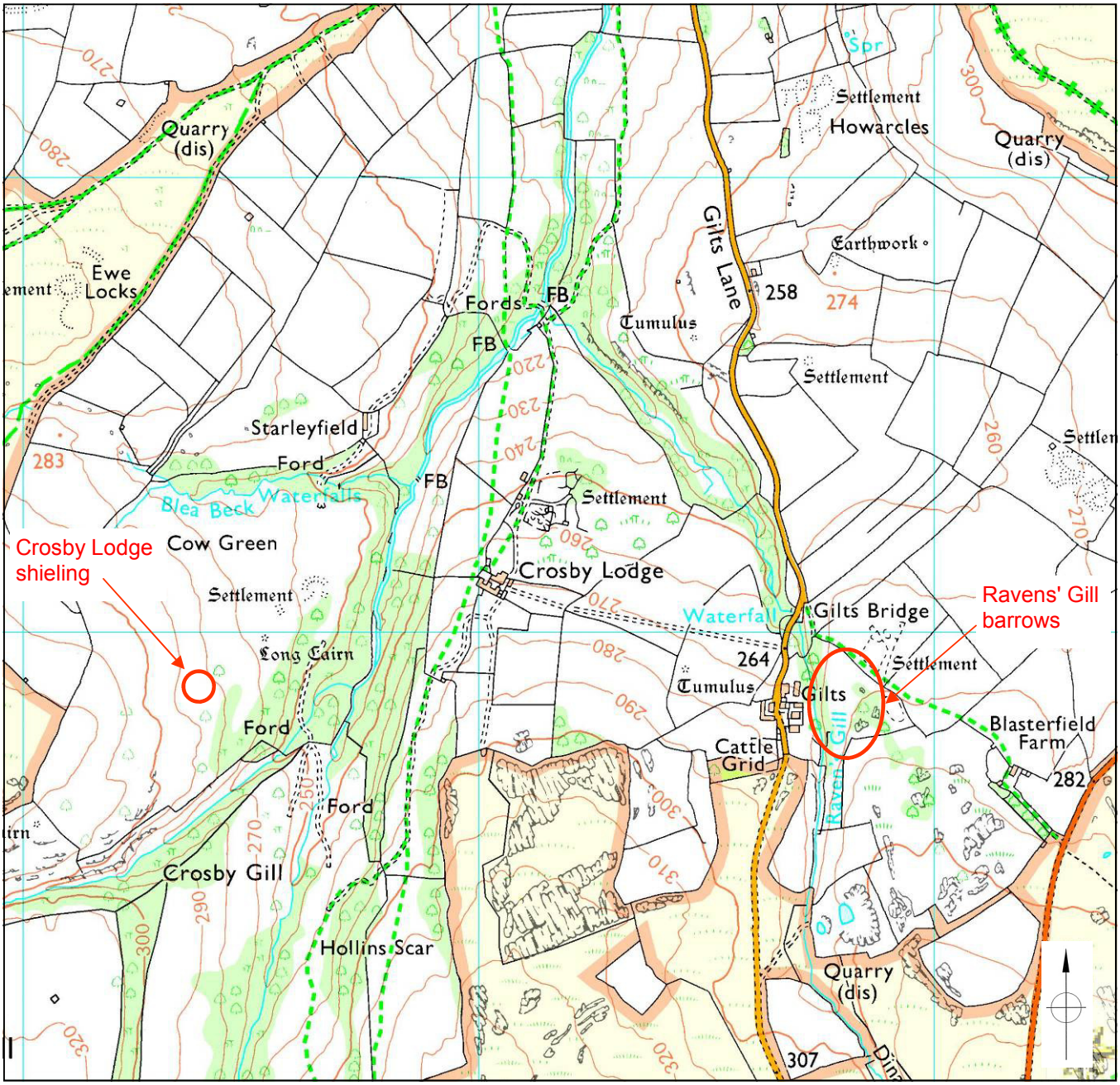
PROJECT: WESTMORLAND MARS	
TITLE: PENDRAGON CASTLE LOCATION	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 2



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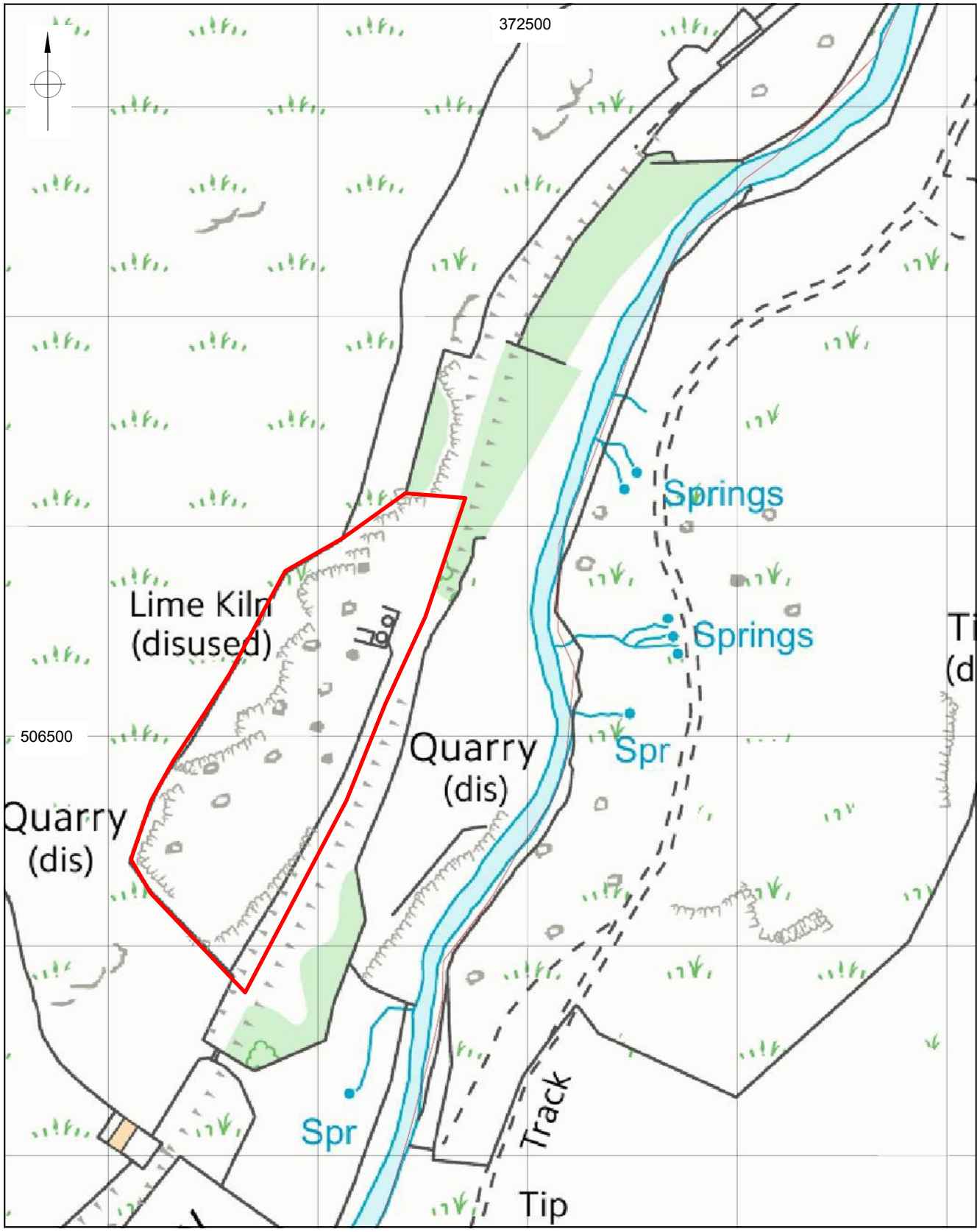
PROJECT: WESTMORLAND MARS	
TITLE: RAVENS' GILL BARROWS AND CROSBY LODGE SHIELING LOCATIONS	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 3



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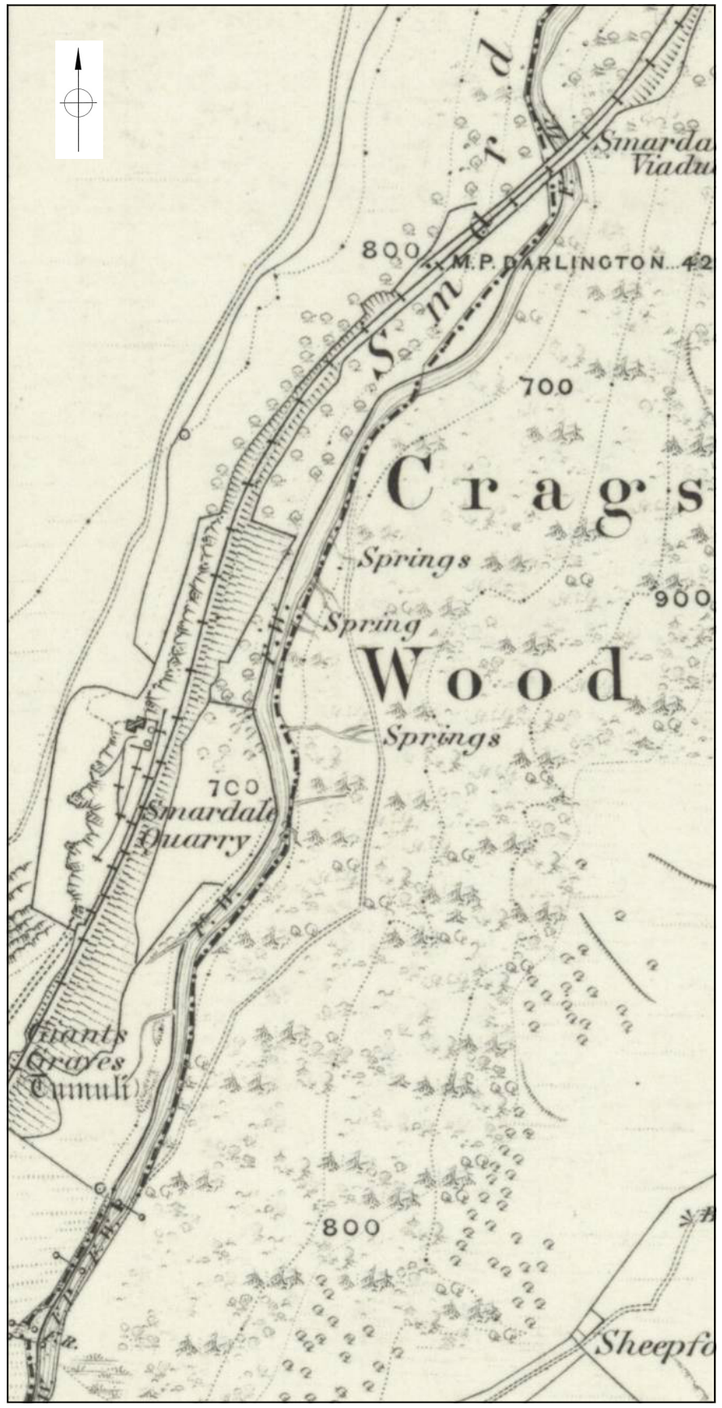
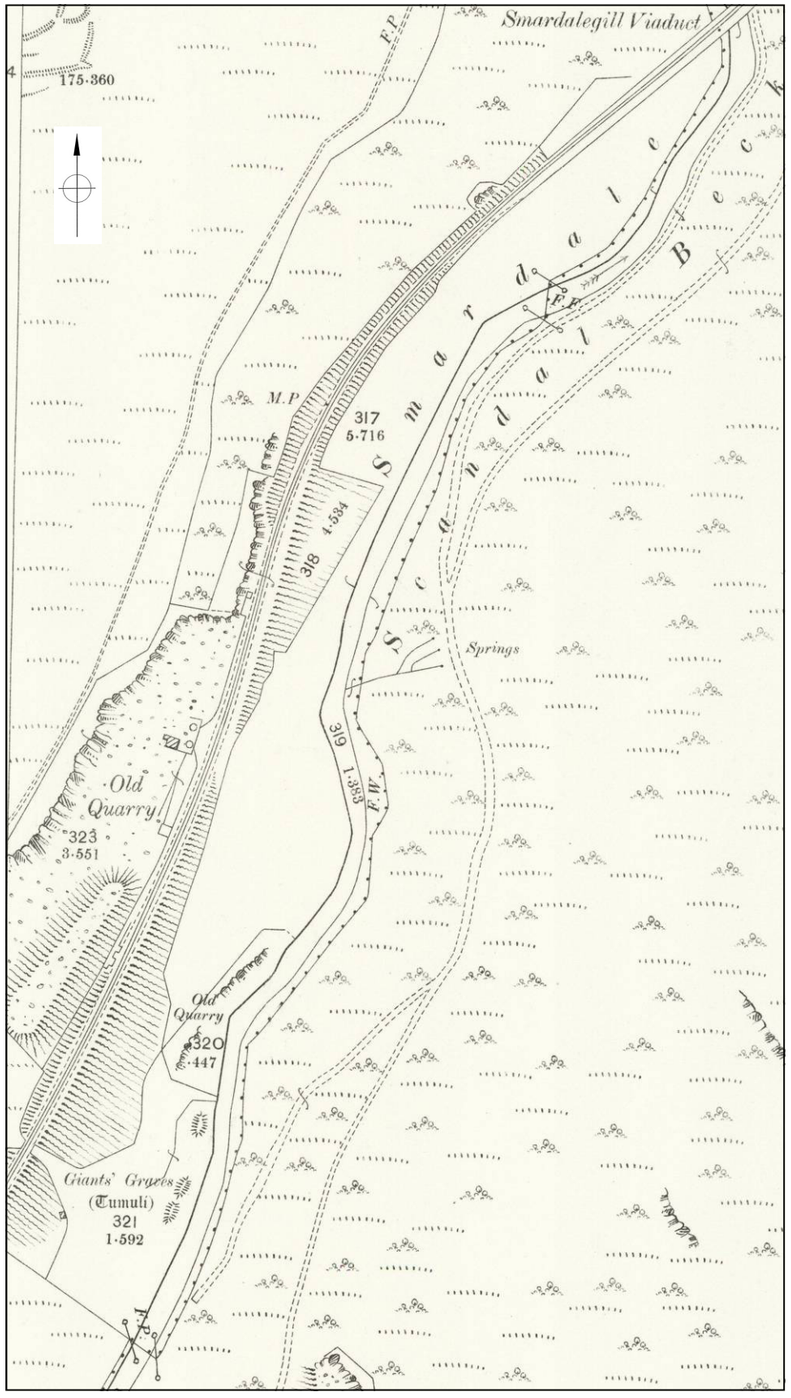
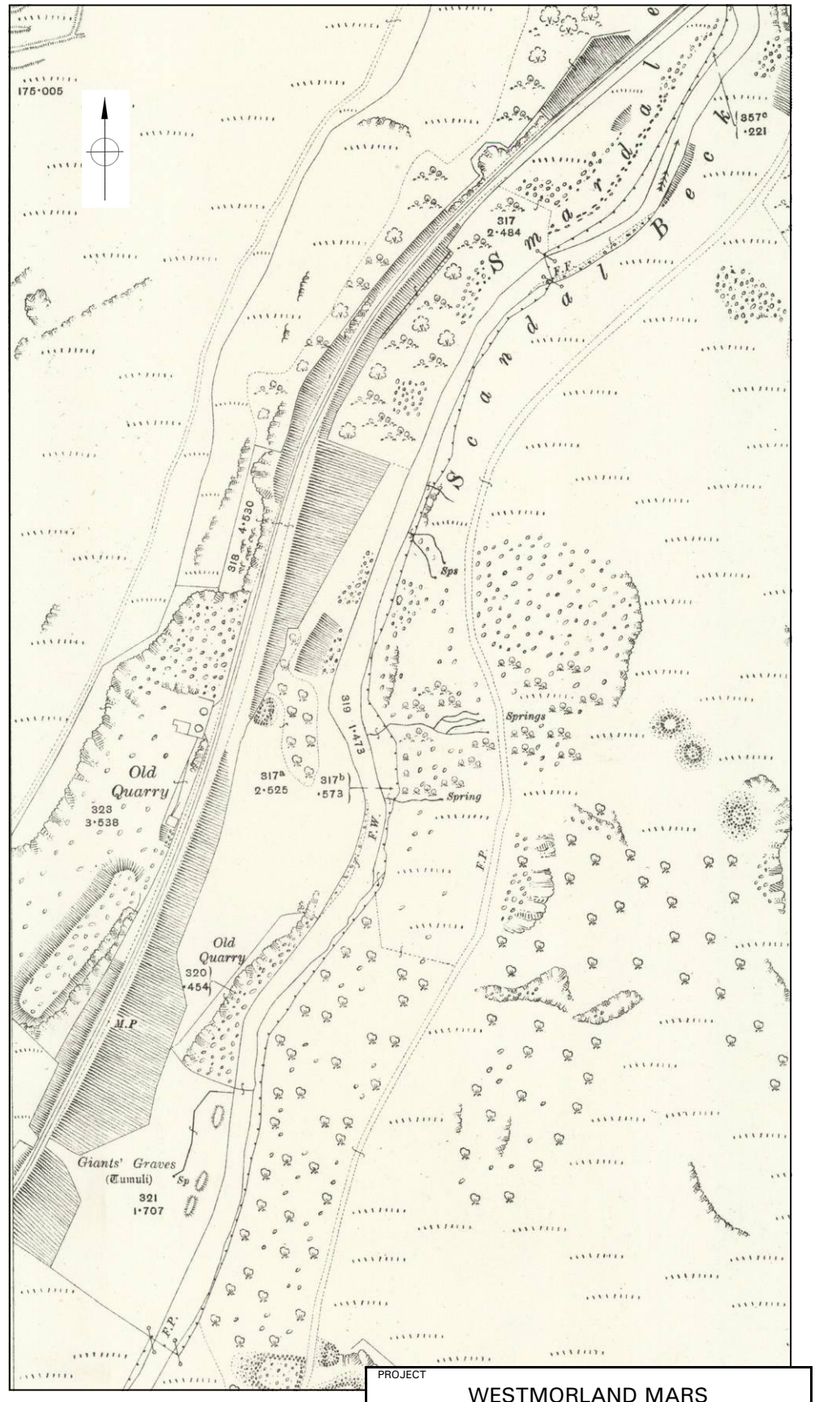
PROJECT: WESTMORLAND MARS	
TITLE: SMARDALE QUARRY AREA OF SURVEY	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 4



A: Ordnance Survey 1862 6" map
Westmorland sheet 30, surveyed 1857.



B: Ordnance Survey 1898 25" map
Westmorland sheet 30/1, surveyed 1897.

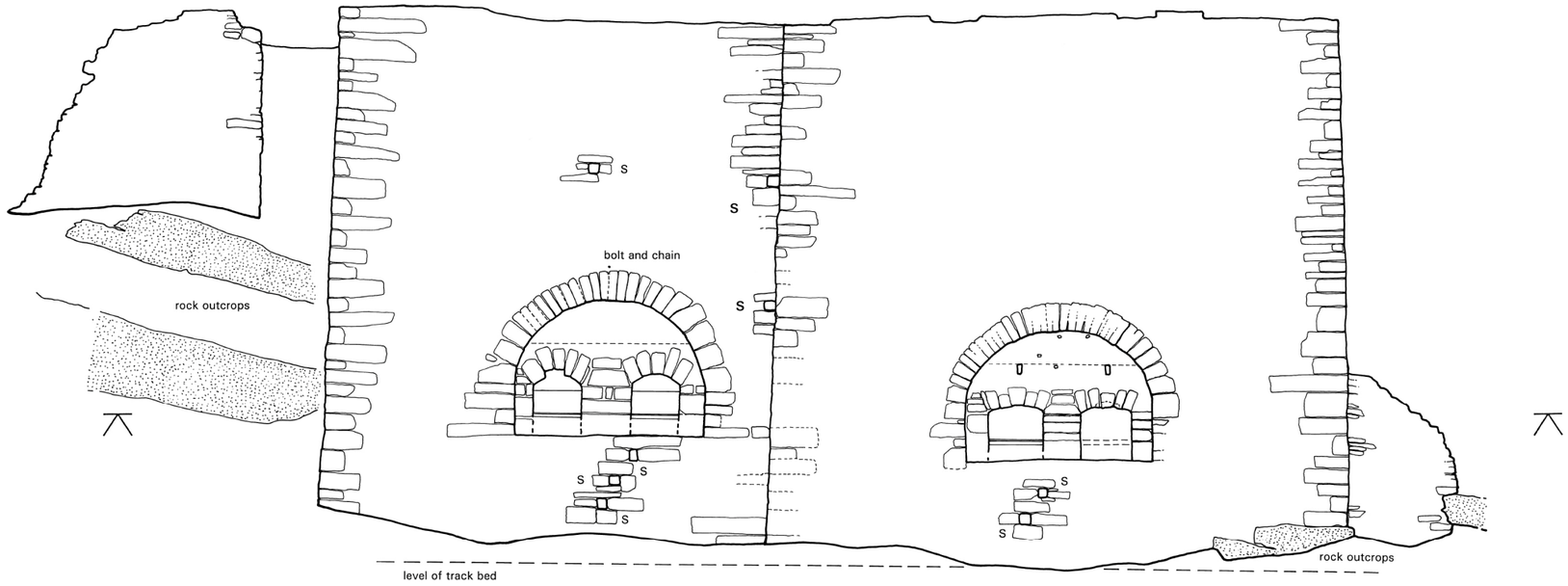


C: Ordnance Survey 1915 25" map Westmorland sheet 30/1, revised 1913.

PROJECT	WESTMORLAND MARS
TITLE	SMARDALE QUARRY OS MAPS
SCALE: NTS	DATE: JUL 2018
EDAS	FIGURE: 5

S

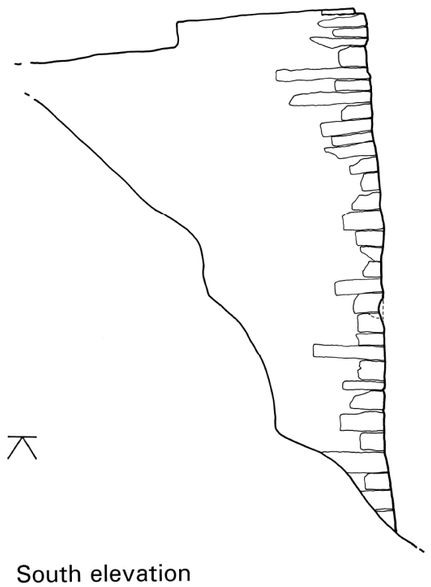
N



East elevation

W

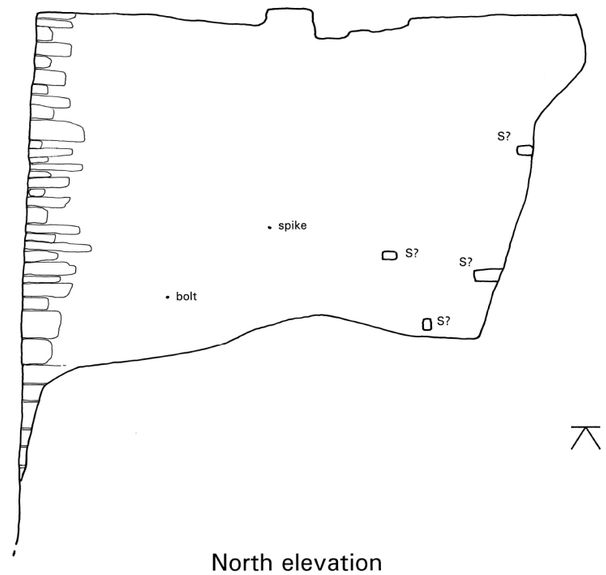
E



South elevation

E

W



North elevation

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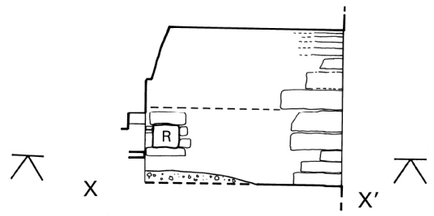
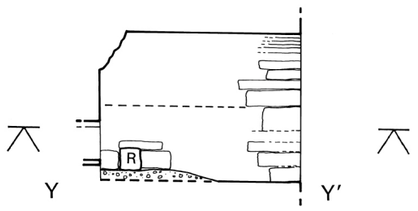
PROJECT: WESTMORLAND MARS	
TITLE: SMARDALE KILNS - ELEVATIONS	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 6



North internal face of south draw arch



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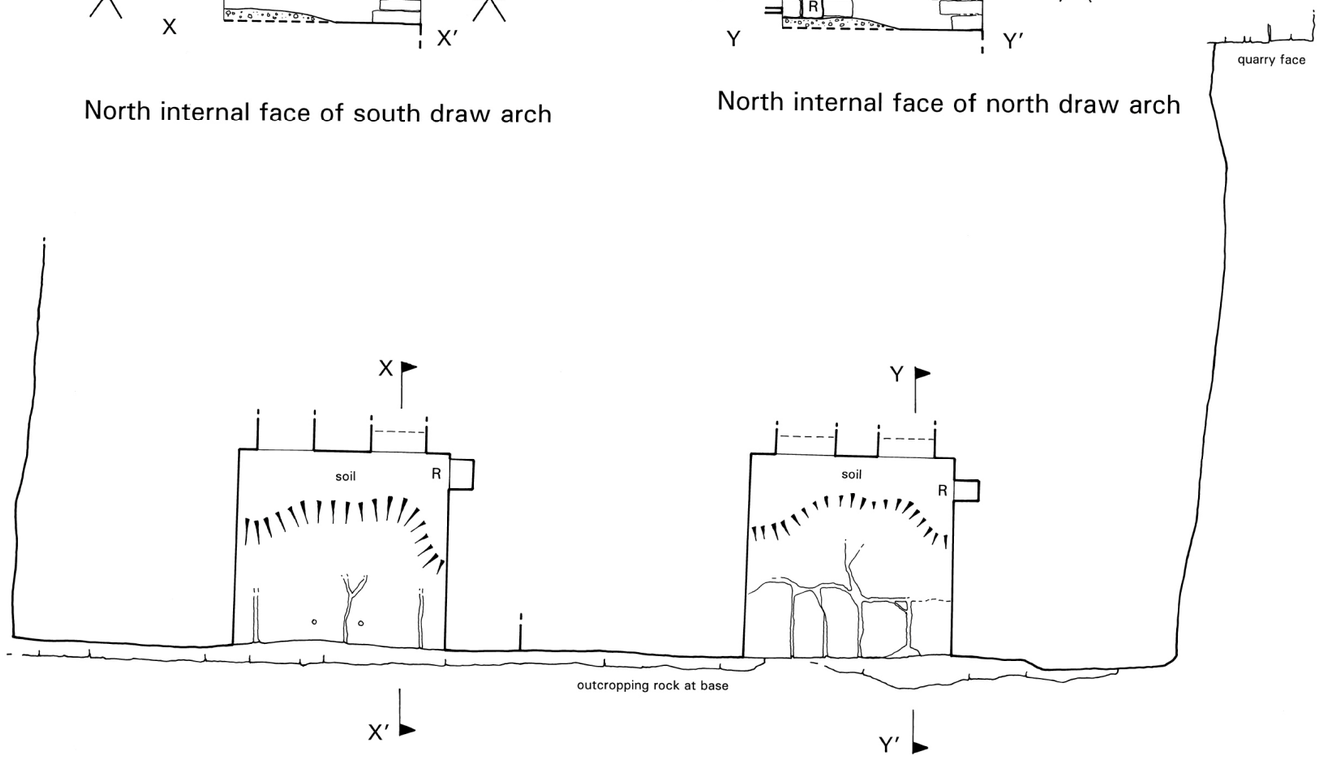
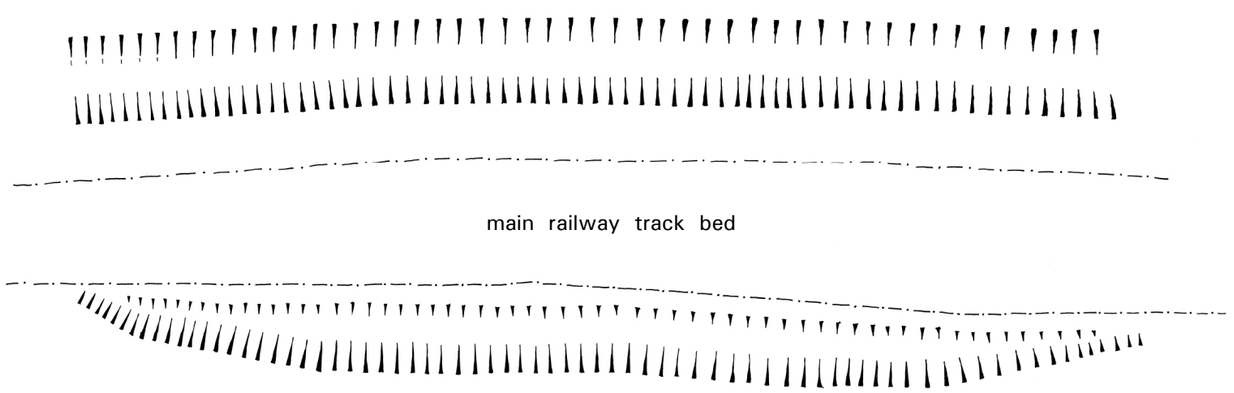
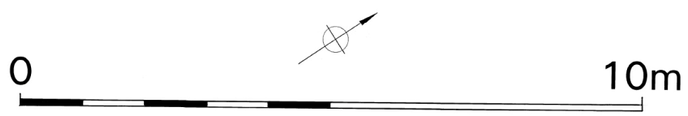




Base level plan



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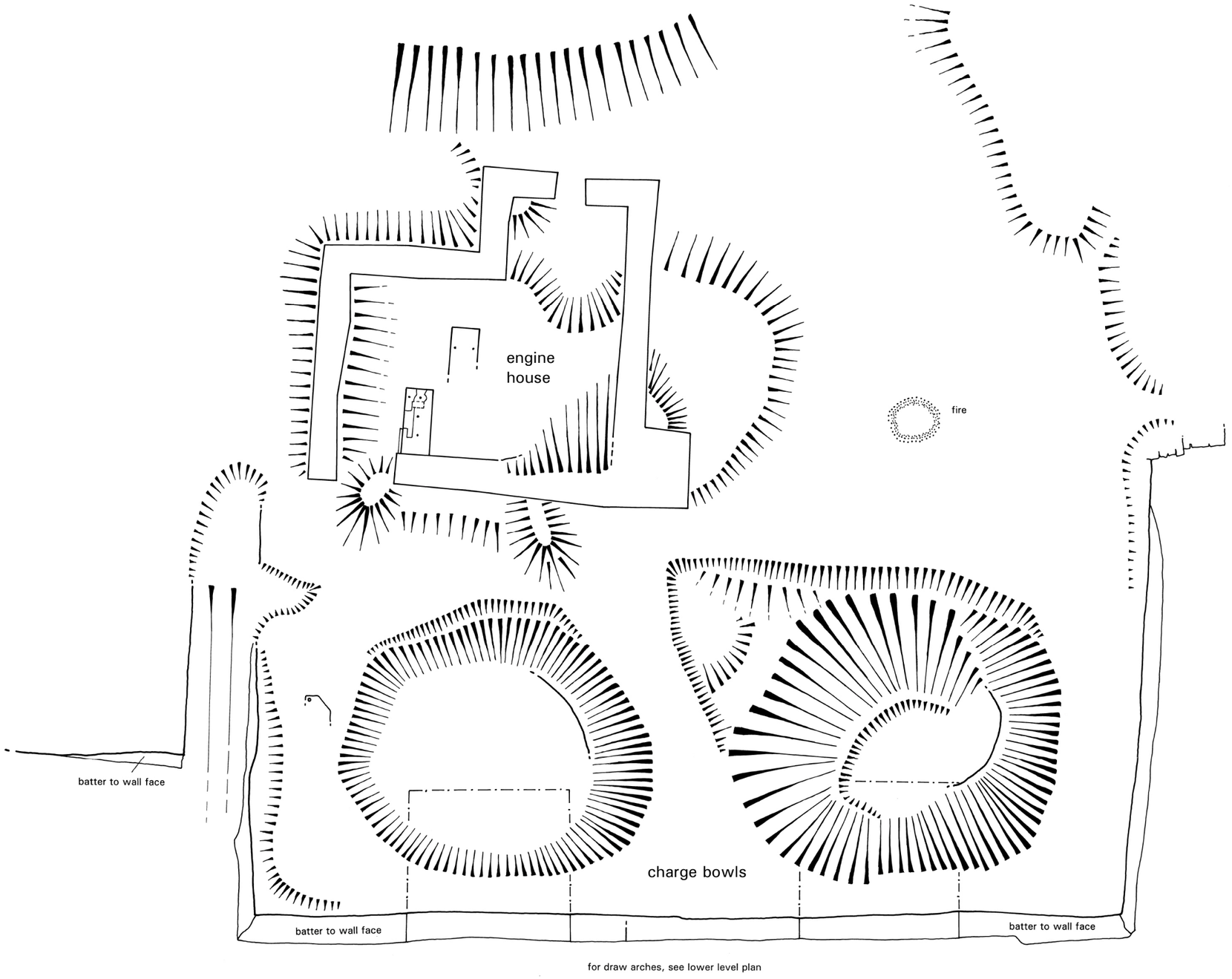
TITLE: SMARDALE KILNS - BASE LEVEL	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 7

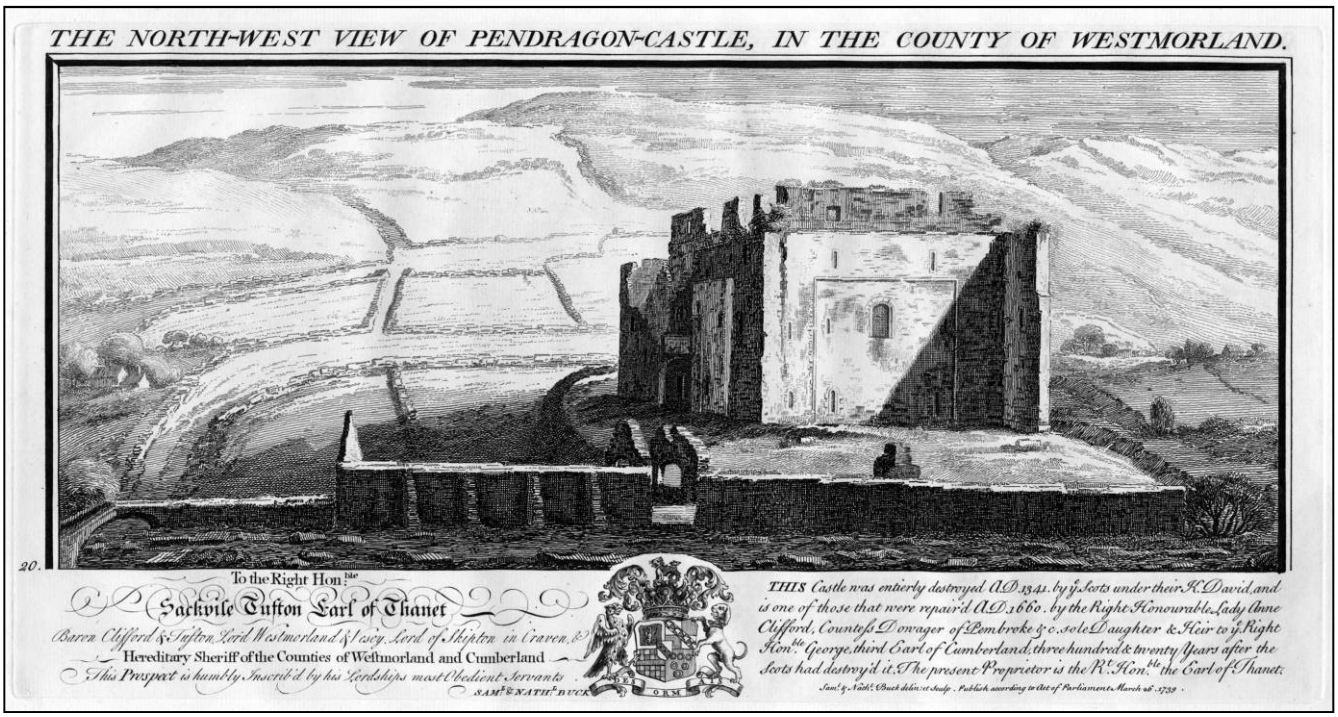


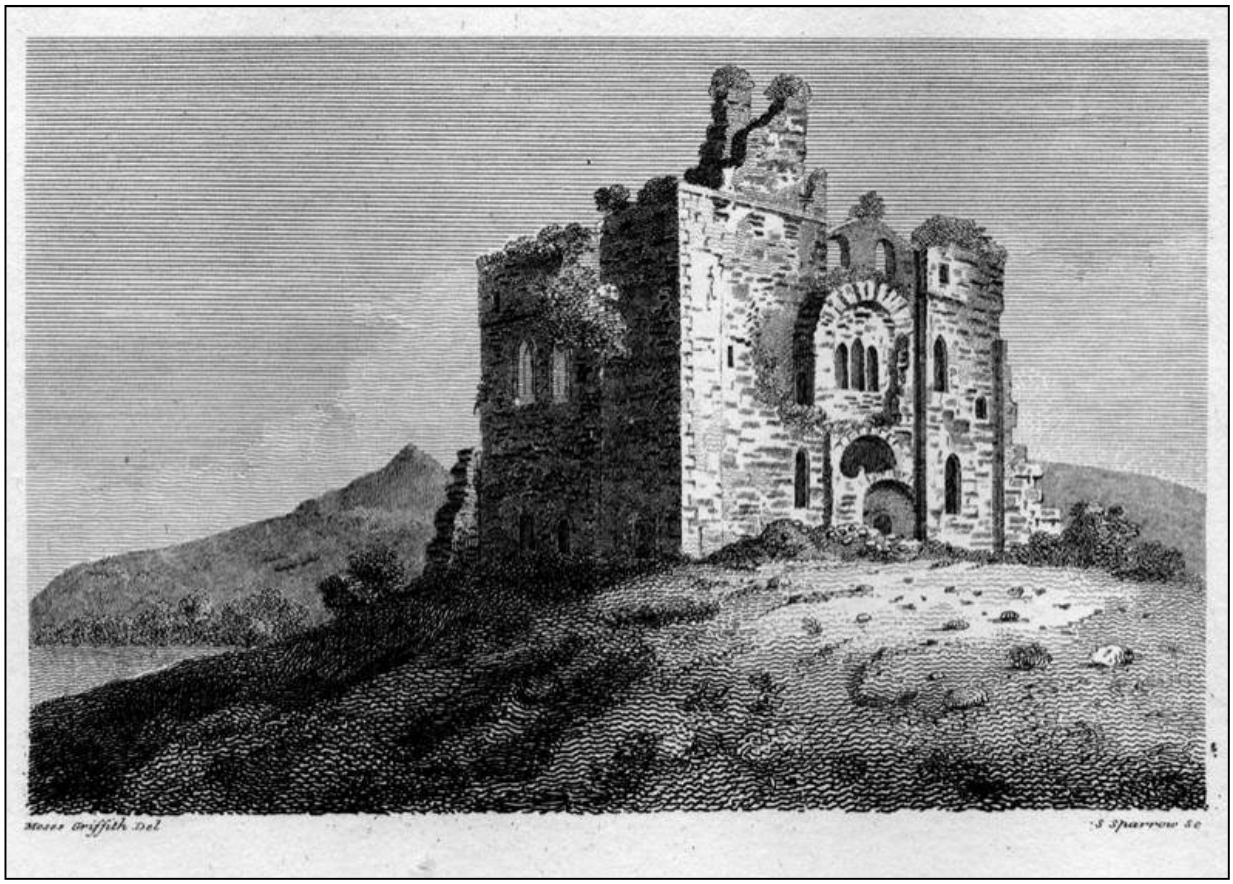
Upper level plan

0 10m

PROJECT: WESTMORLAND MARS	
TITLE: SMARDALE KILNS - UPPER LEVEL	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 8

PROJECT: WESTMORLAND MARS	
TITLE: SMARDALE QUARRY SITE PLAN	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 9

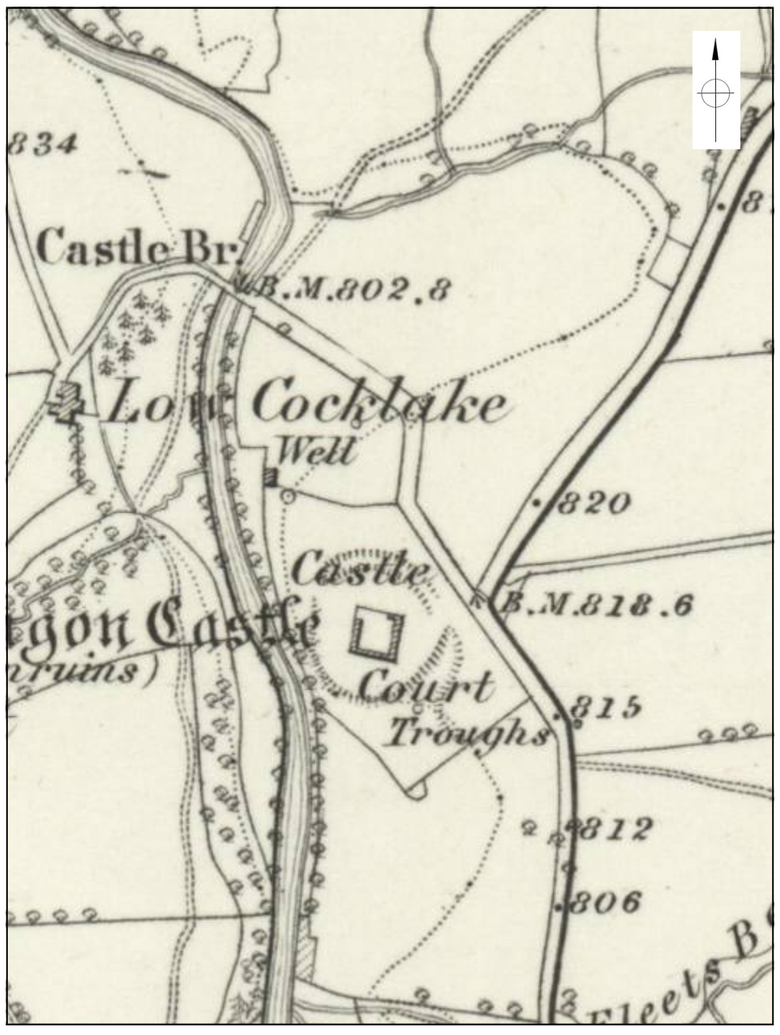




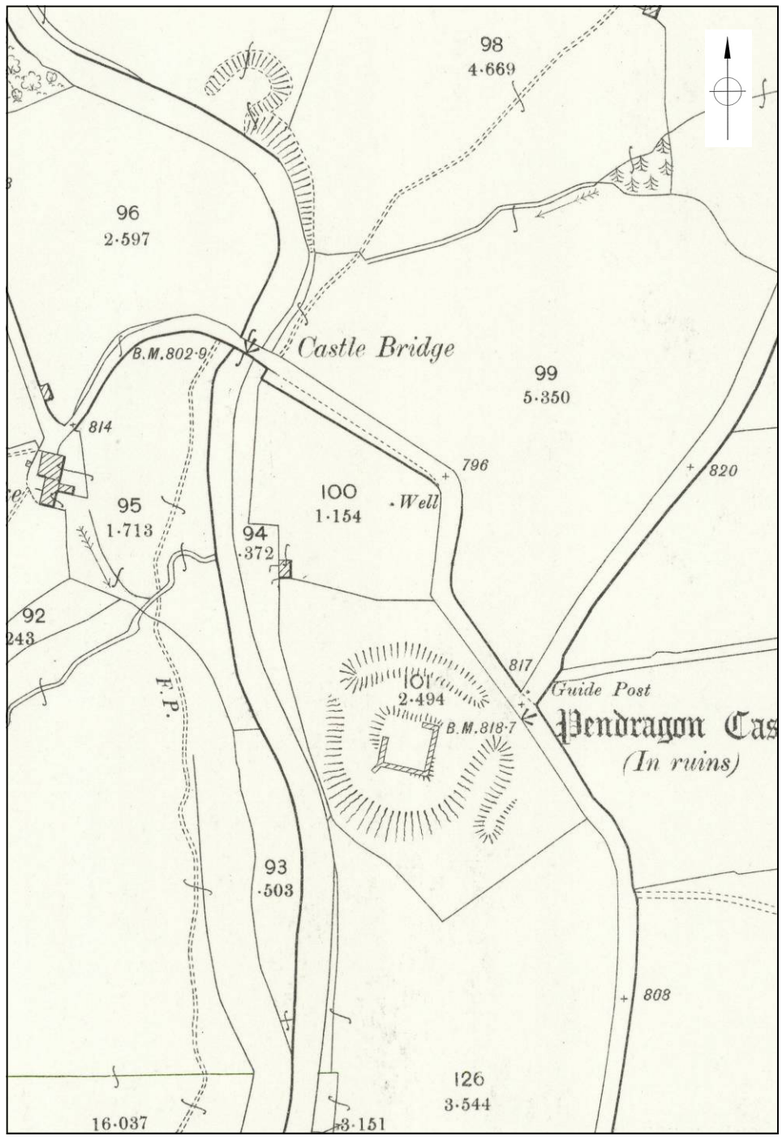
Top: 1739 'The North-West View of Pendragon Castle, in the County of Westmorland': engraving by Nathaniel and Samuel Buck (RIBA Library).

Bottom: 1801 'Pendragon Castle': engraving by Moses Griffith (reproduced in Perriam, D & Robinson, J 1998 *The Medieval Fortified Buildings of Cumbria: An Illustrated Gazetteer and Research Guide*, 300).

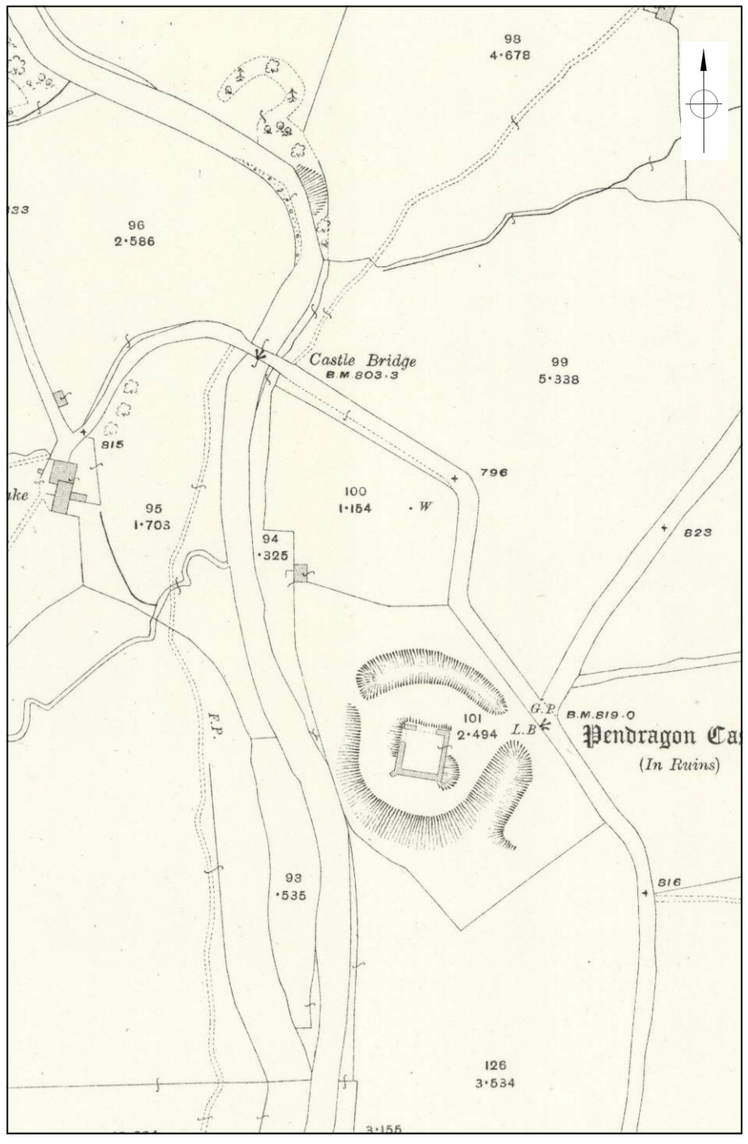
PROJECT	
WESTMORLAND MARS	
TITLE	
PENDRAGON CASTLE ENGRAVINGS	
SCALE	DATE
NTS	JUL 2018
EDAS	FIGURE 10



A: Ordnance Survey 1862 6" map
Westmorland sheet 30, surveyed 1857.



B: Ordnance Survey 1898 25" map
Westmorland sheet 30/11, surveyed 1897.

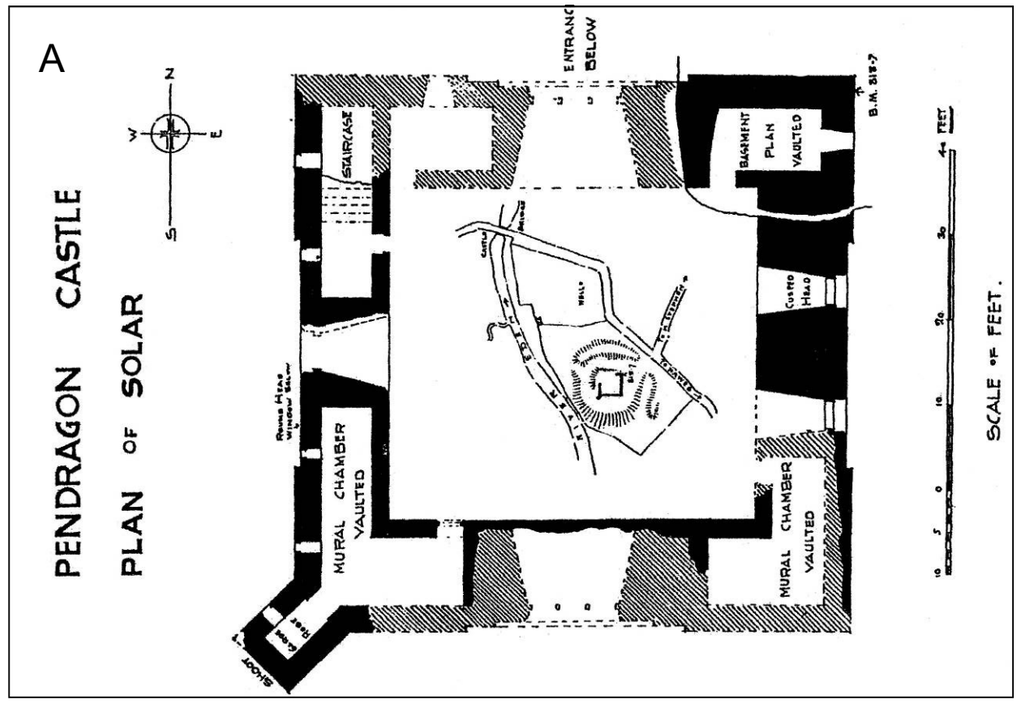


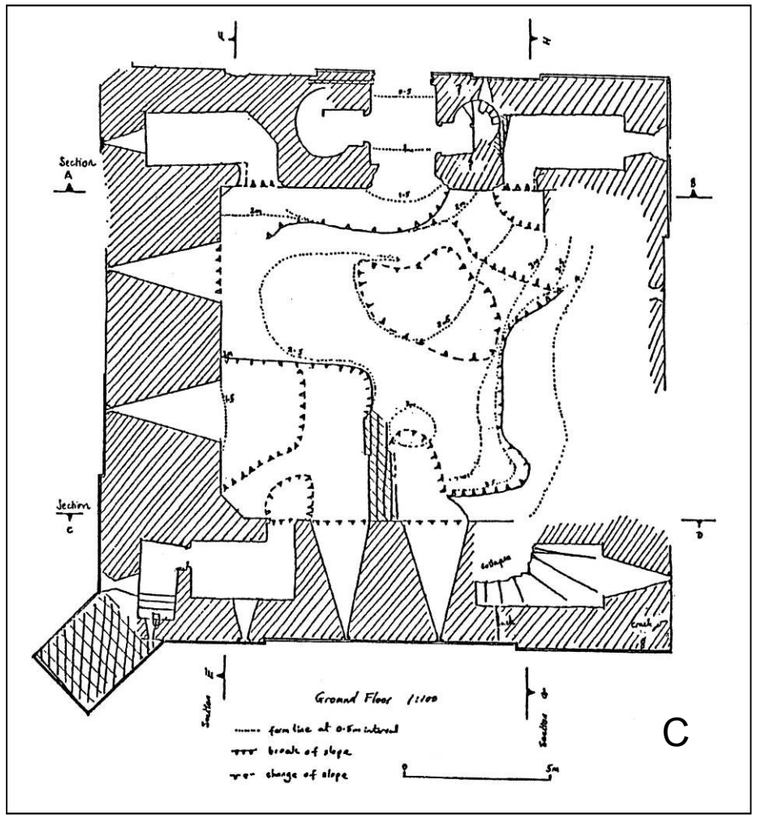
C: Ordnance Survey 1915 25"
map Westmorland sheet 30/11,
revised 1913.

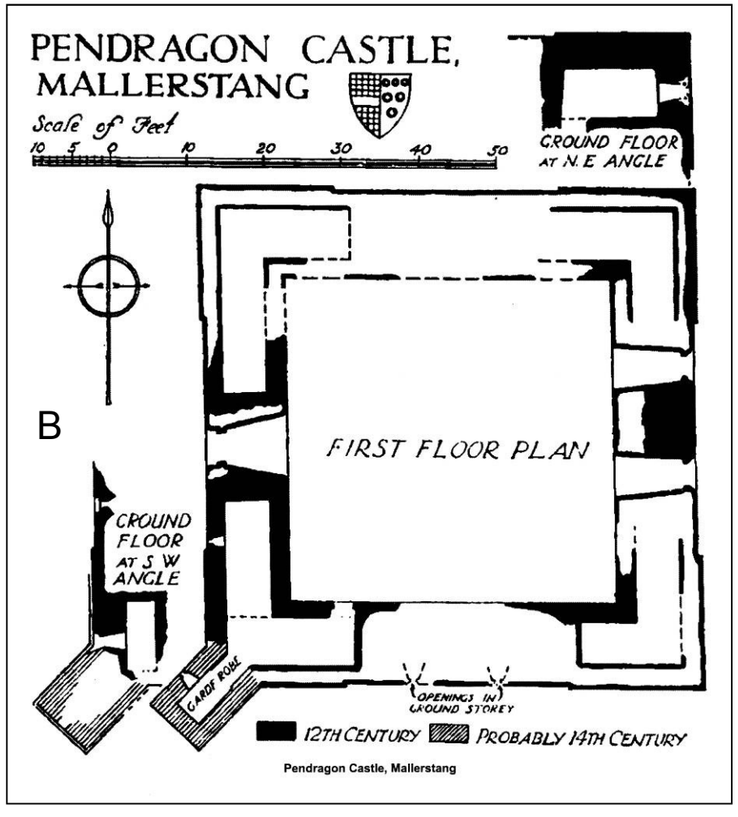
PROJECT	
WESTMORLAND MARS	
TITLE	
PENDRAGON CASTLE OS MAPS	
SCALE: NTS	DATE: JUL 2018
EDAS	FIGURE: 11

Black and white photographs of Pendragon Castle, taken by Herbert Bell in 1897 (top) and 1894 (bottom) (*http://www.lakesguides.co.uk/html/lgaz/lgazfram.htm*).

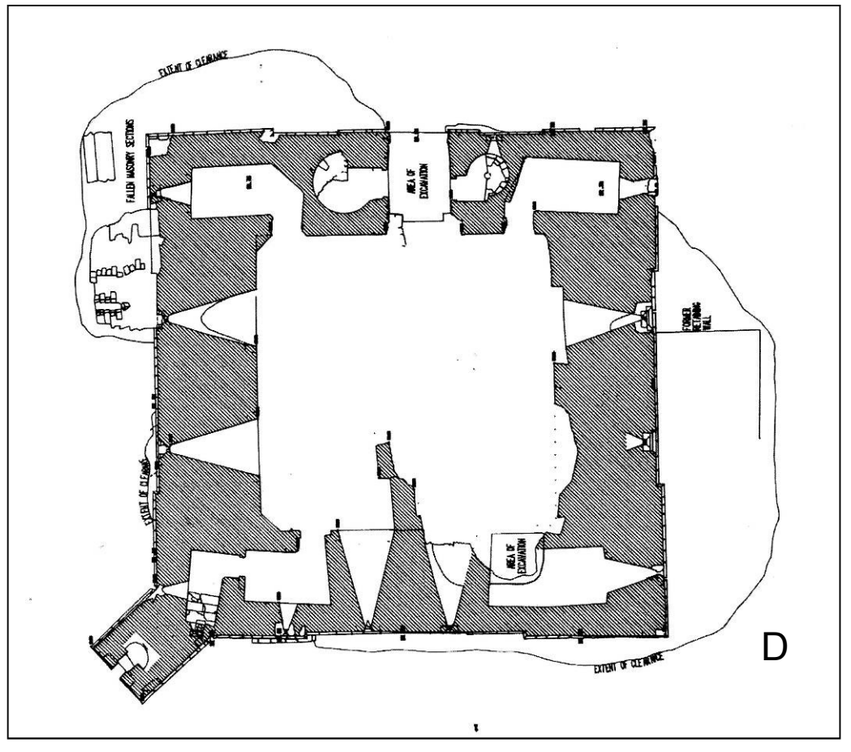
PROJECT	
WESTMORLAND MARS	
TITLE	
PENDRAGON CASTLE 1890s PHOTOS	
SCALE	DATE
NTS	JUL 2018
EDAS	FIGURE
	12

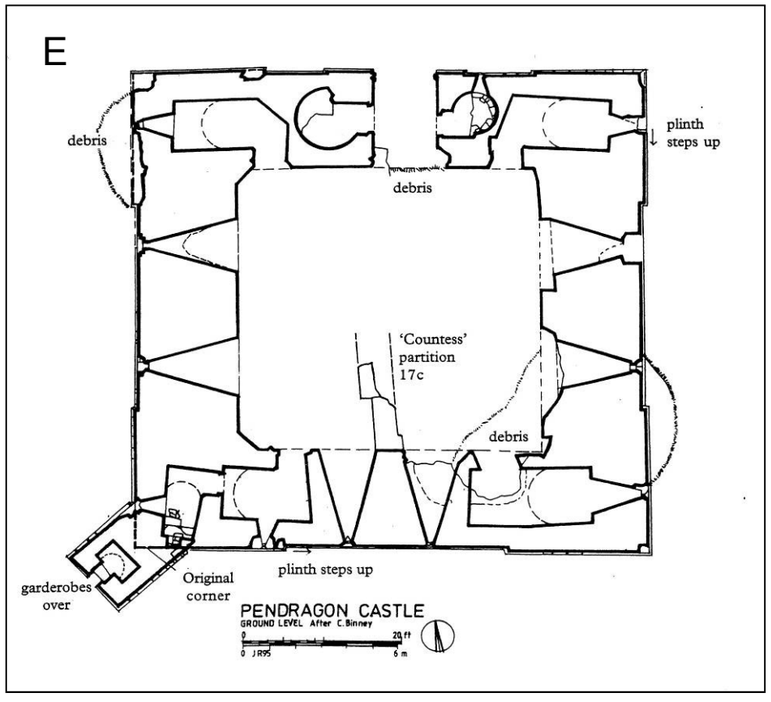






Note: plans orientated with consistent north.





PROJECT	WESTMORLAND MARS
TITLE	PENDRAGON CASTLE PLANS
SCALE: NTS	DATE: JUL 2018
EDAS	FIGURE: 13

KEY

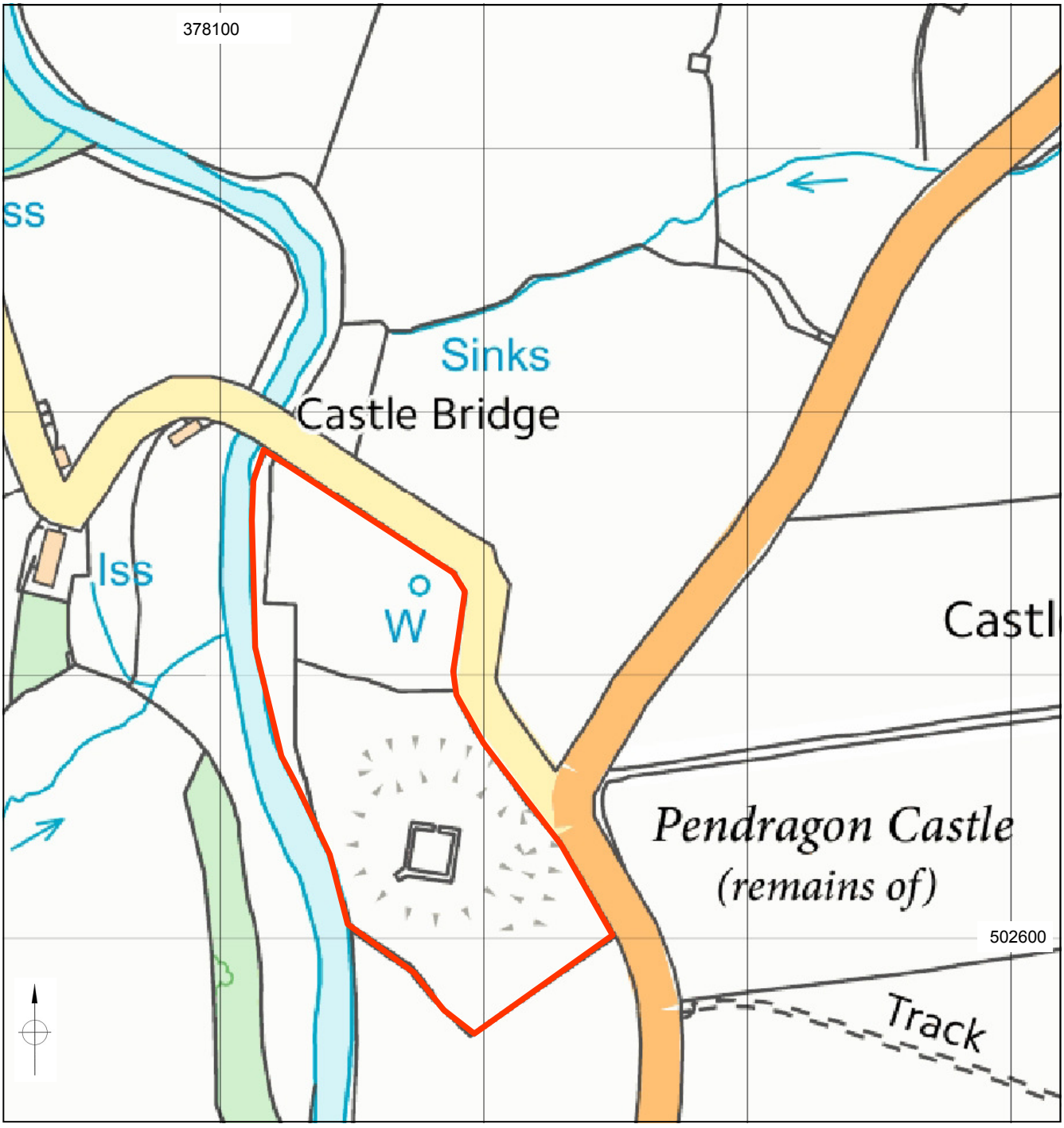
A: Curwen's 1913 ground floor plan (from Curwen, J 1913 *Castles and Fortified Towers of Cumberland and Westmorland,* 120).

B: RCHME 1936 ground floor plan (from RCHME 1936 *An Inventory of the Historical Monuments in Westmorland*).

C: Tom Clare's 1984 ground floor plan (from Fiorato, V 1990 *Pendragon Castle: An Archaeological and Historical Perspective,* Appendix B).

D: LUAU 1994-95 ground floor plan after excavation and clearance (from Lancaster University Archaeological Unit 1996 *Pendragon Castle, Cumbria: Excavation and Clearance 1994-1995*).

E: 1998 ground plan (from Perriam, D & Robinson, J 1998 *The Medieval Fortified Buildings of Cumbria: An Illustrated Gazetteer and Research Guide* (Cumberland and Westmorland Antiquarian and Archaeological Society Extra Series Volume 29), 301.



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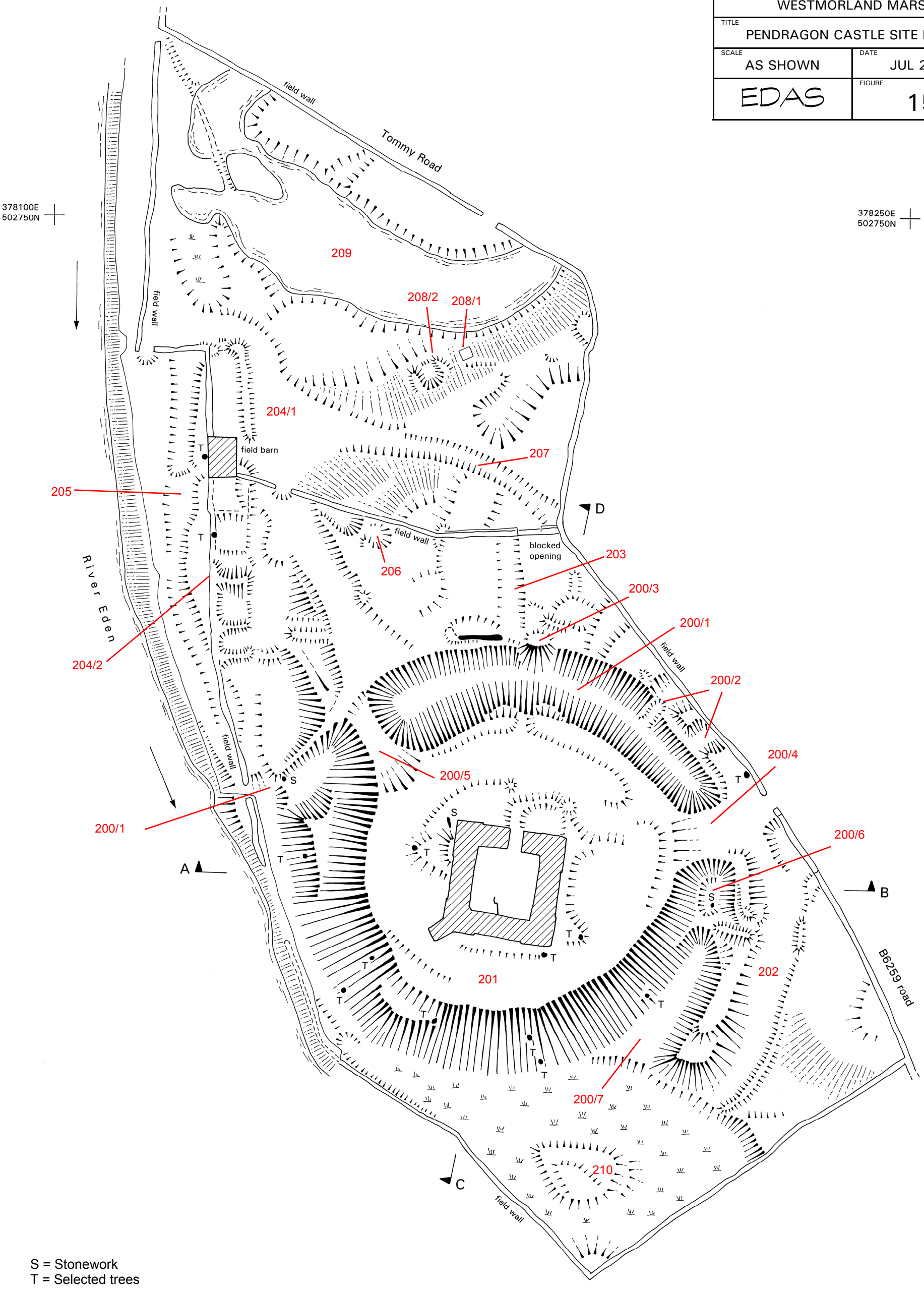
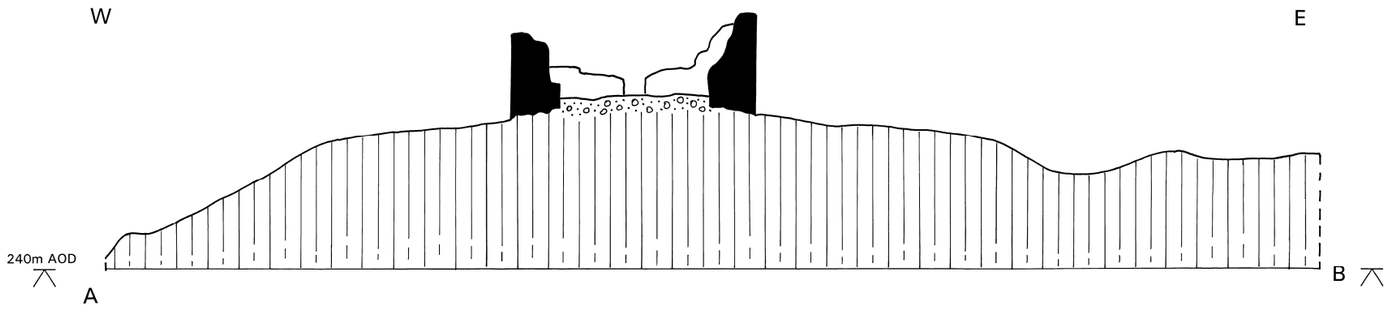
PROJECT: WESTMORLAND MARS	
TITLE: PENDRAGON CASTLE AREA OF SURVEY	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 14

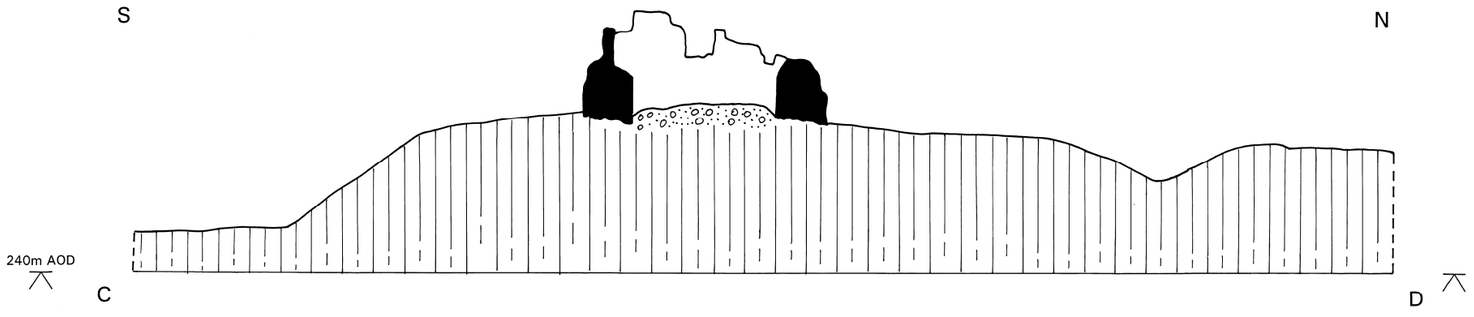
PROJECT	WESTMORLAND MARS
TITLE	PENDRAGON CASTLE SITE PLAN
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 15



PROJECT	WESTMORLAND MARS
TITLE	PENDRAGON CASTLE PROFILES AND KILN PLAN
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 16

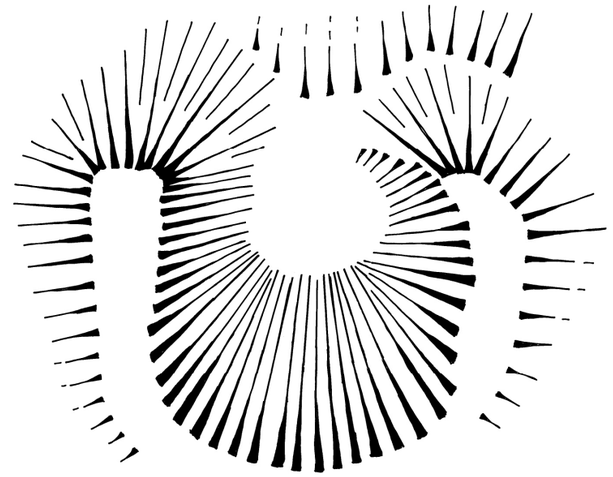


Profile A-B, north facing



Profile C-D, west facing

0 50m



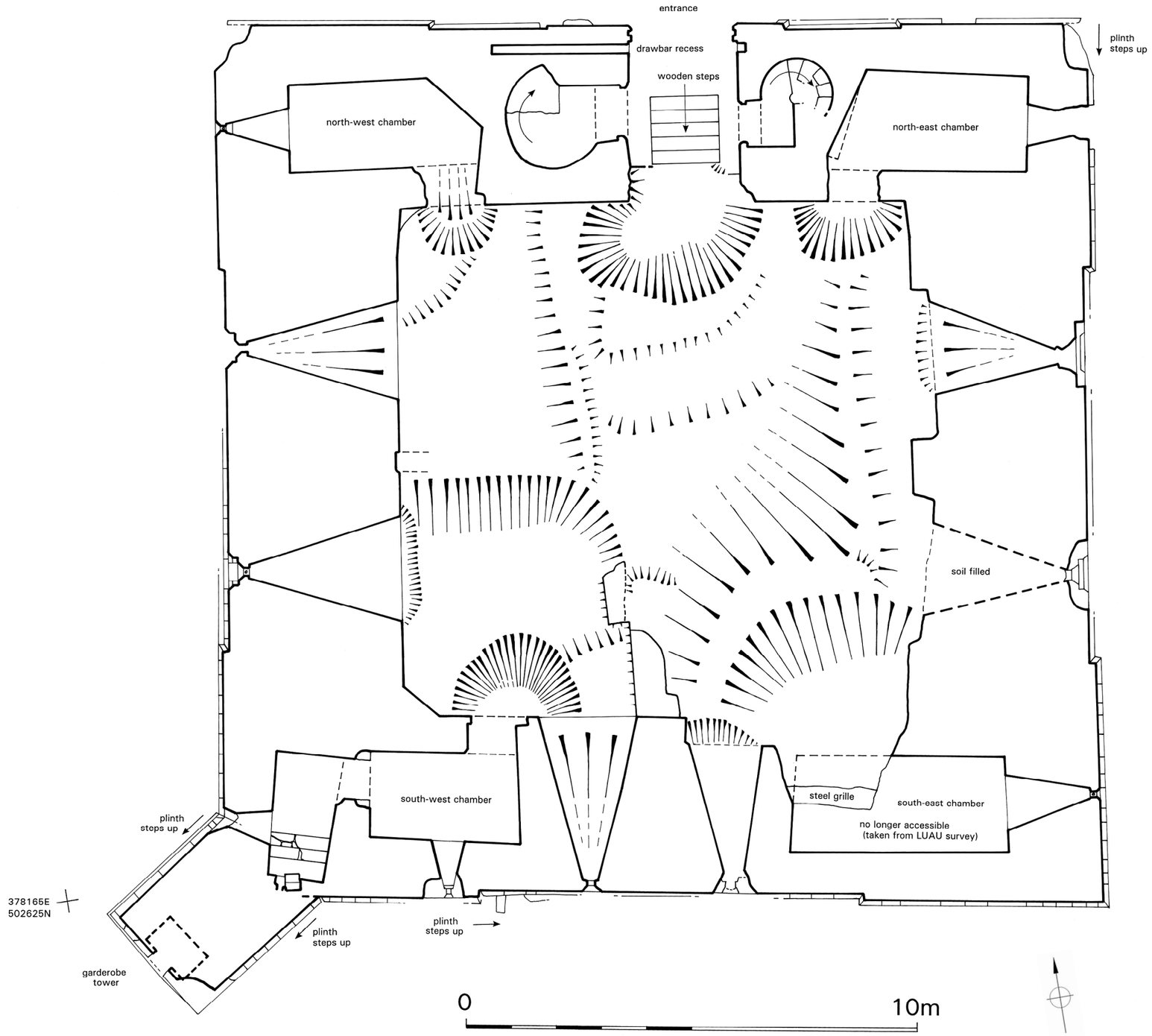
0 5m

Site 208/2

PROJECT	WESTMORLAND MARS
TITLE	PENDRAGON CASTLE GROUND PLAN
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 17

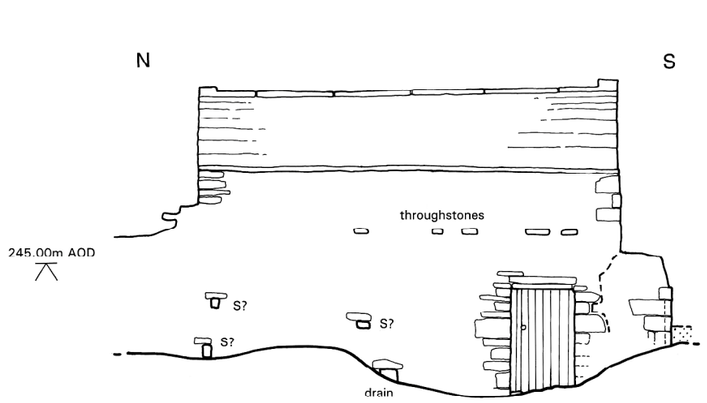
378165E
502645N

378190E
502645N

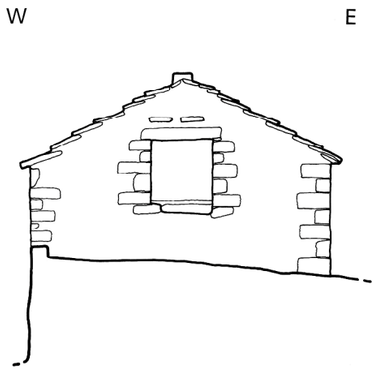


378165E
502625N

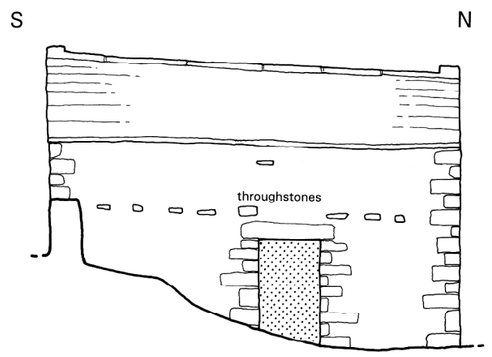
378190E
502625N



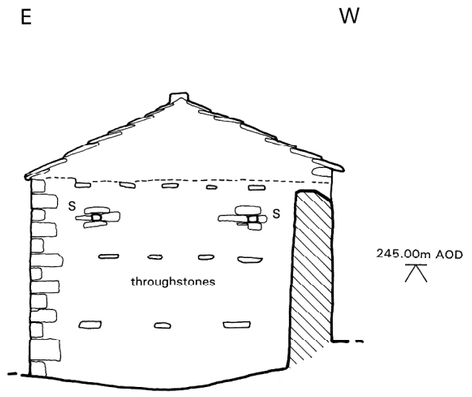
West elevation



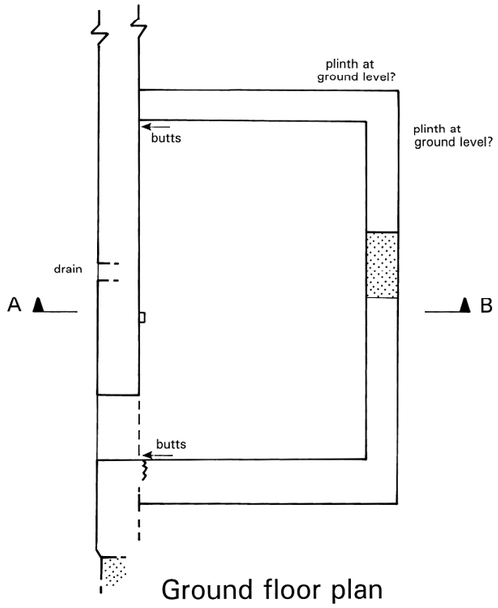
South gable



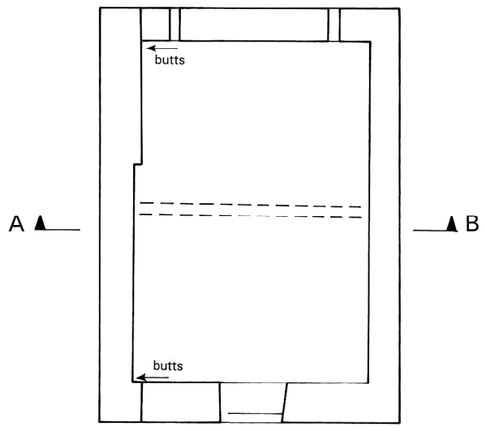
East elevation



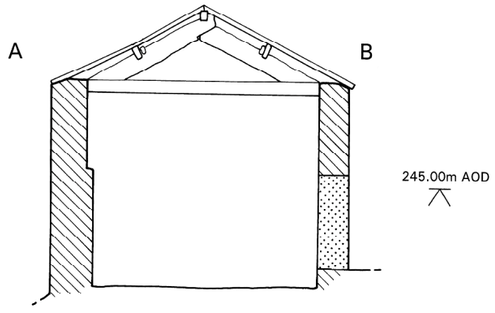
North gable



Ground floor plan



First floor plan



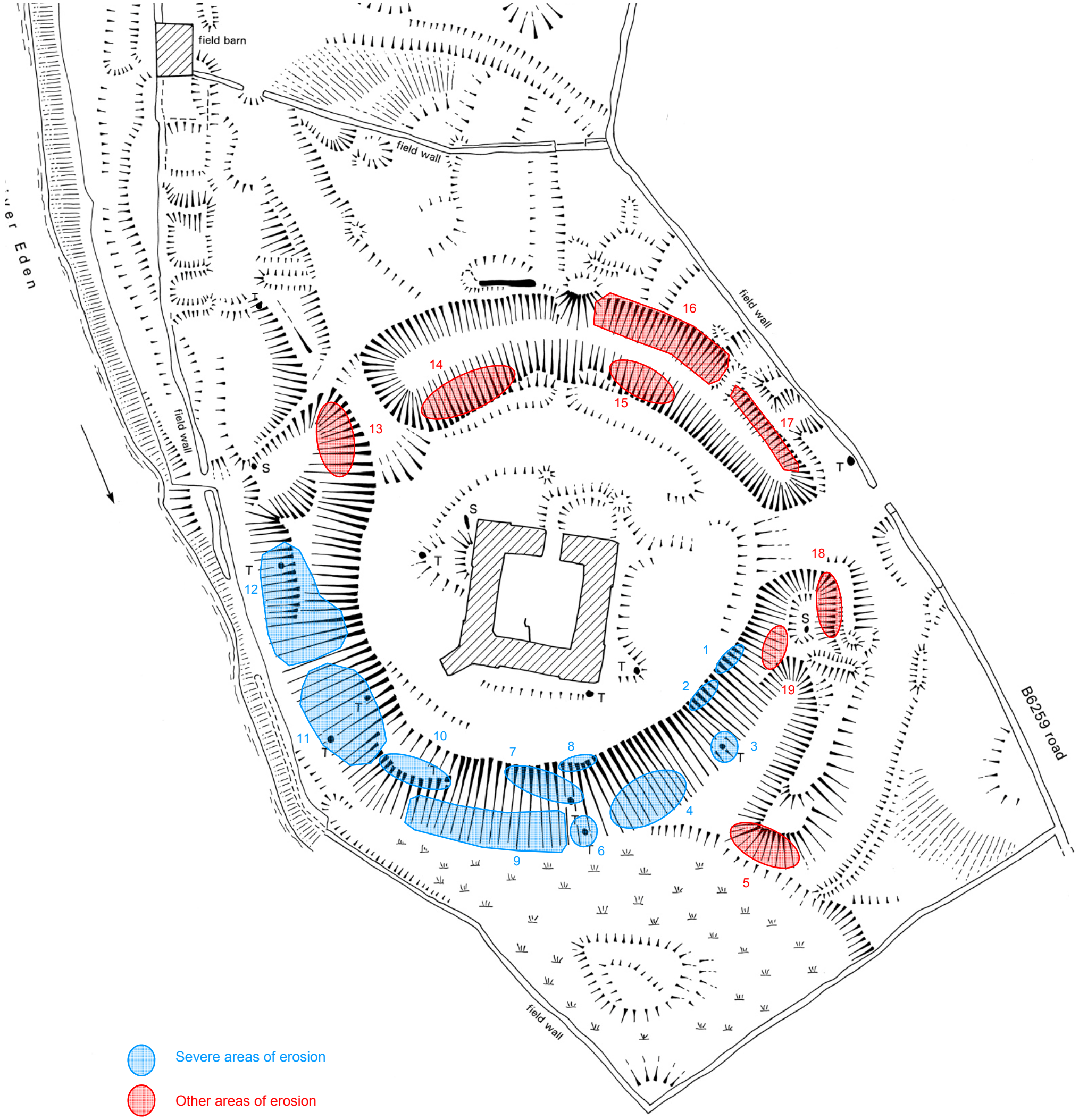
Section A-B

BLOCKING

0 10m

PROJECT: WESTMORLAND MARS	
TITLE: PENDRAGON CASTLE FIELD BARN	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 18

PROJECT	WESTMORLAND MARS
TITLE	PENDRAGON CASTLE SITE EROSION
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 19



PROJECT	WESTMORLAND MARS
TITLE	PENDRAGON CASTLE INTERIOR EROSION
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 20

378190E
502645N

Excavate and level off floor, and allow public access

Control stock access

entrance

drawbar recess

wooden steps

plinth steps up

north-west chamber

north-east chamber

Control stock and public access

Create stone steps

Create stone steps

Prevent stock access

Create new fence?

Clear loose rubble from window openings

Infill openings?

soil filled

378190E
502625N

south-west chamber

steel grille

south-east chamber

no longer accessible
(taken from LUAU survey)

plinth steps up

378165E
502625N

plinth steps up

plinth steps up

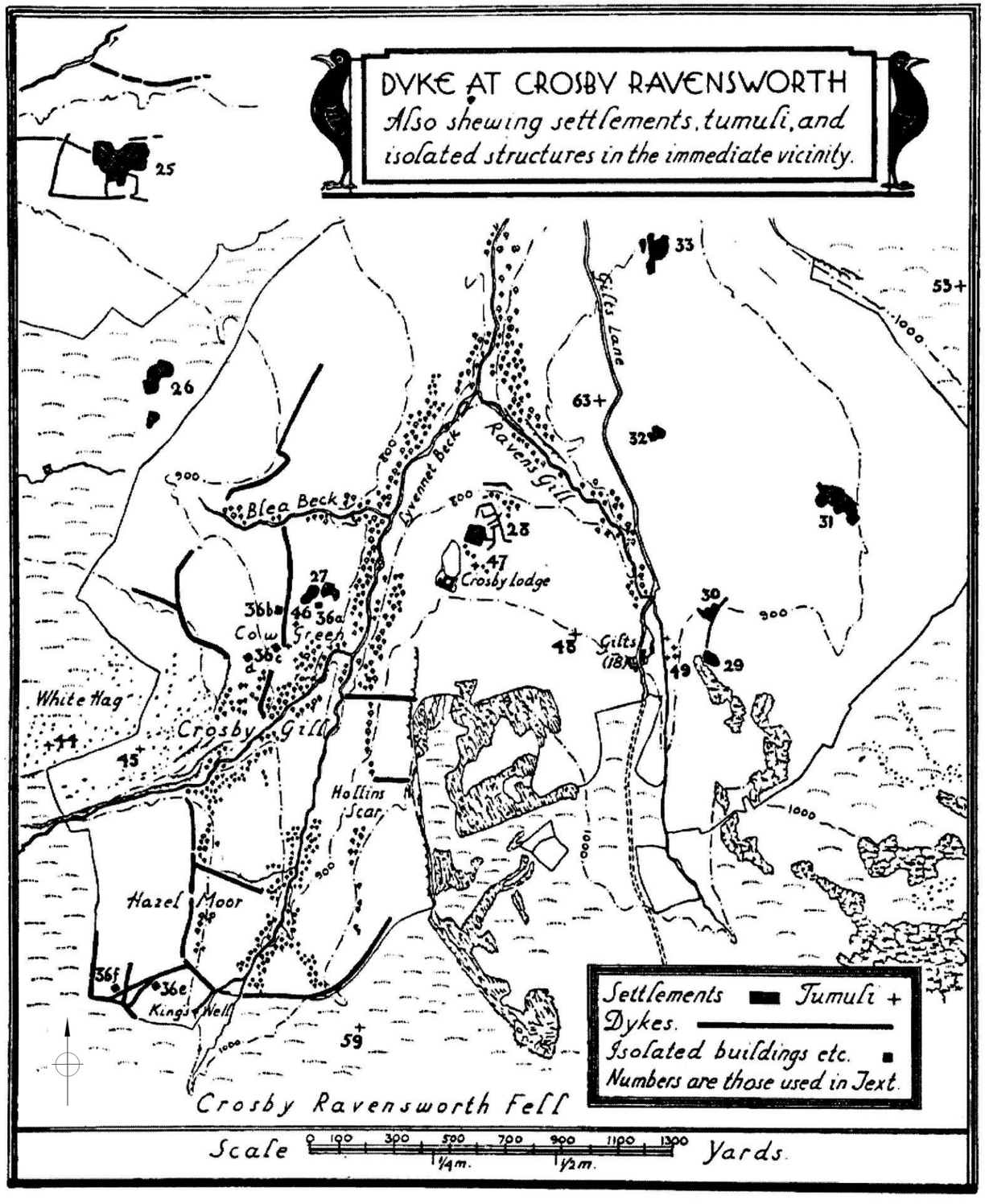
garderobe tower

0

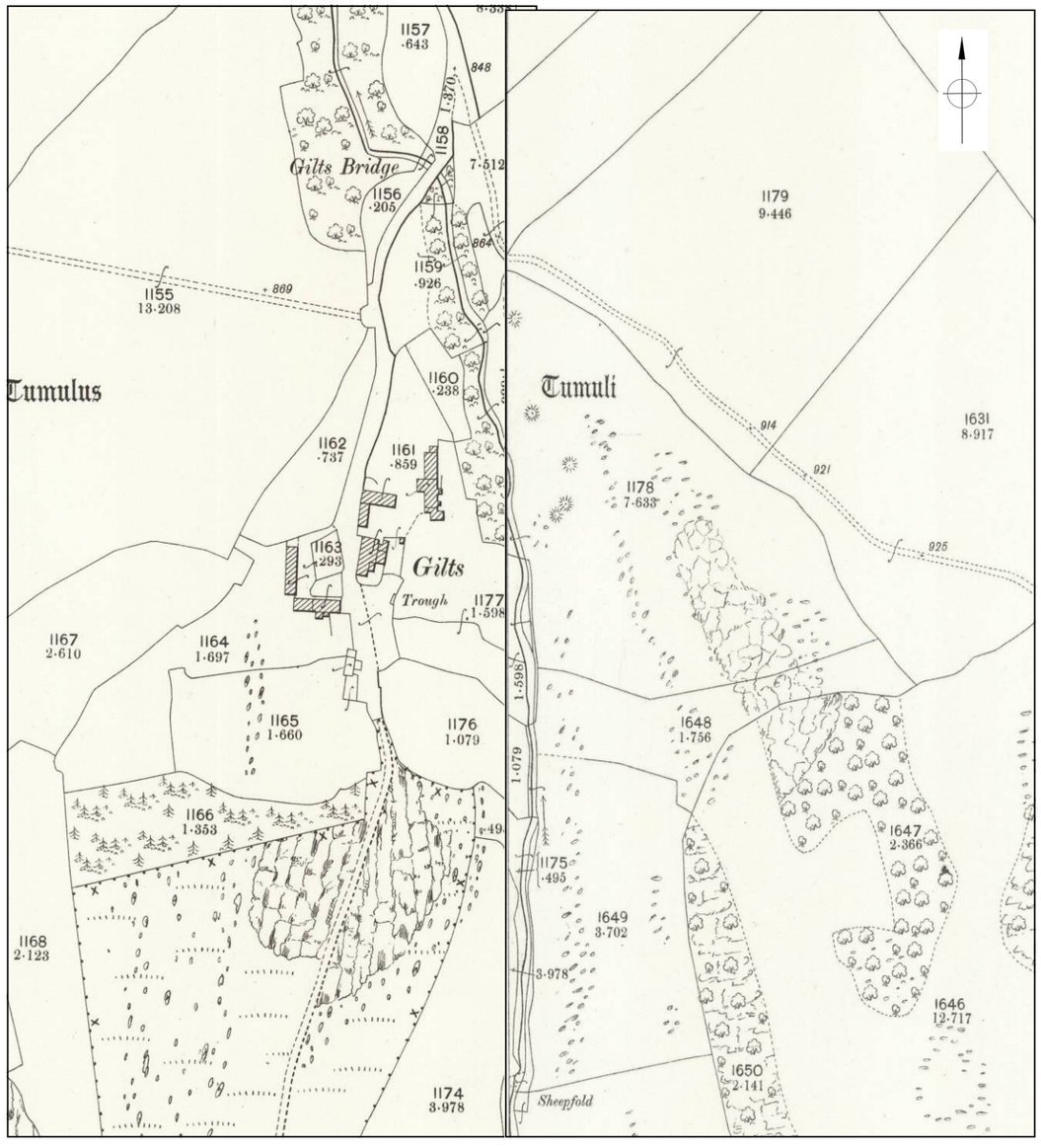
10m

378165E
502645N

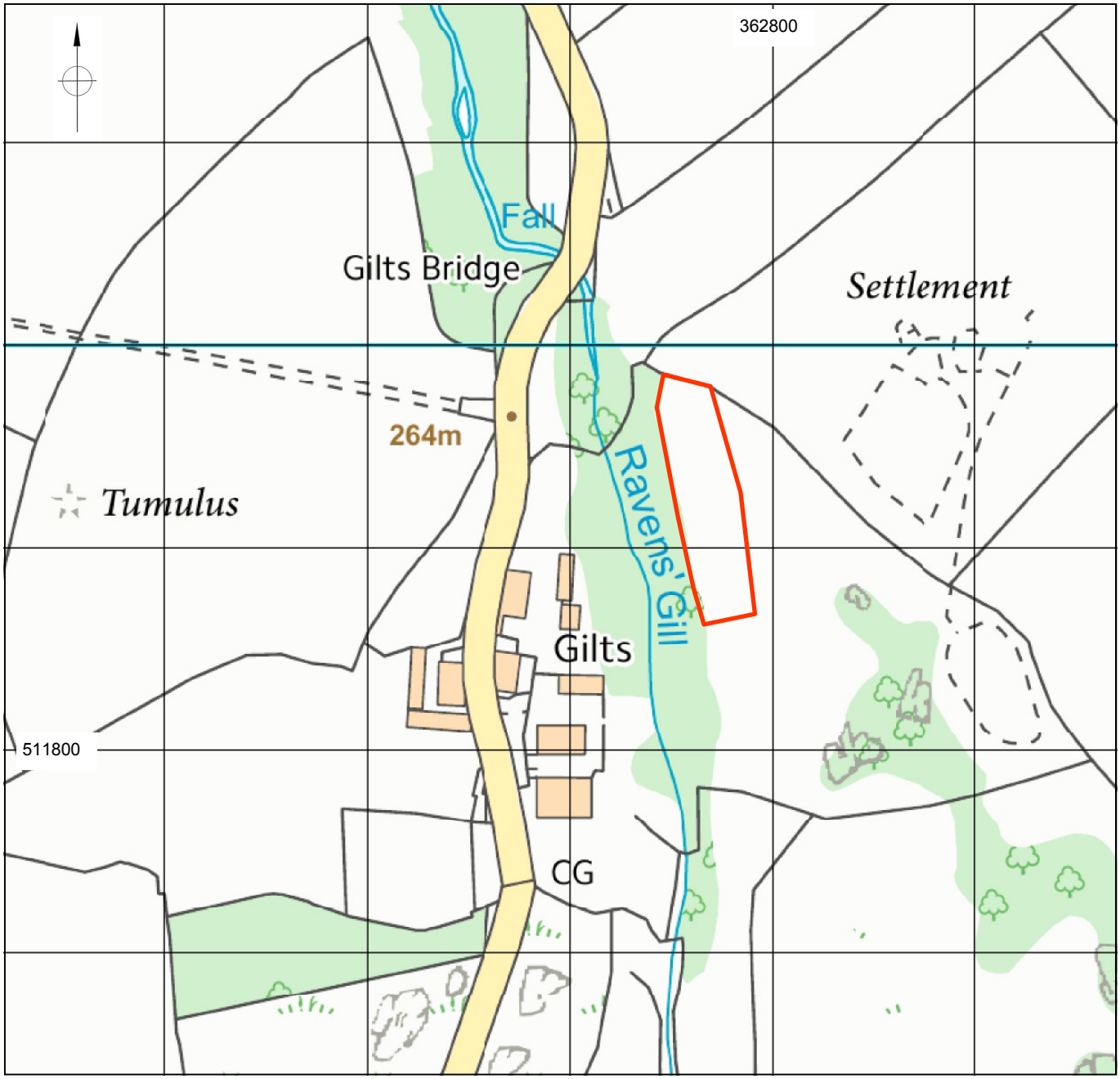
PROJECT	WESTMORLAND MARS
TITLE	RAVENS' GILL BARROWS DEPICTIONS
SCALE: NTS	DATE: JUL 2018
EDAS	FIGURE: 21



A: RCHME 1936 plan of sites in Crosby Ravensworth (RCHME 1936 *An Inventory of the Historical Monuments in Westmorland*, 89-90). Ravens' Gill barrows are Site 49, Crosby Lodge shielings are Sites 36c and 36d.

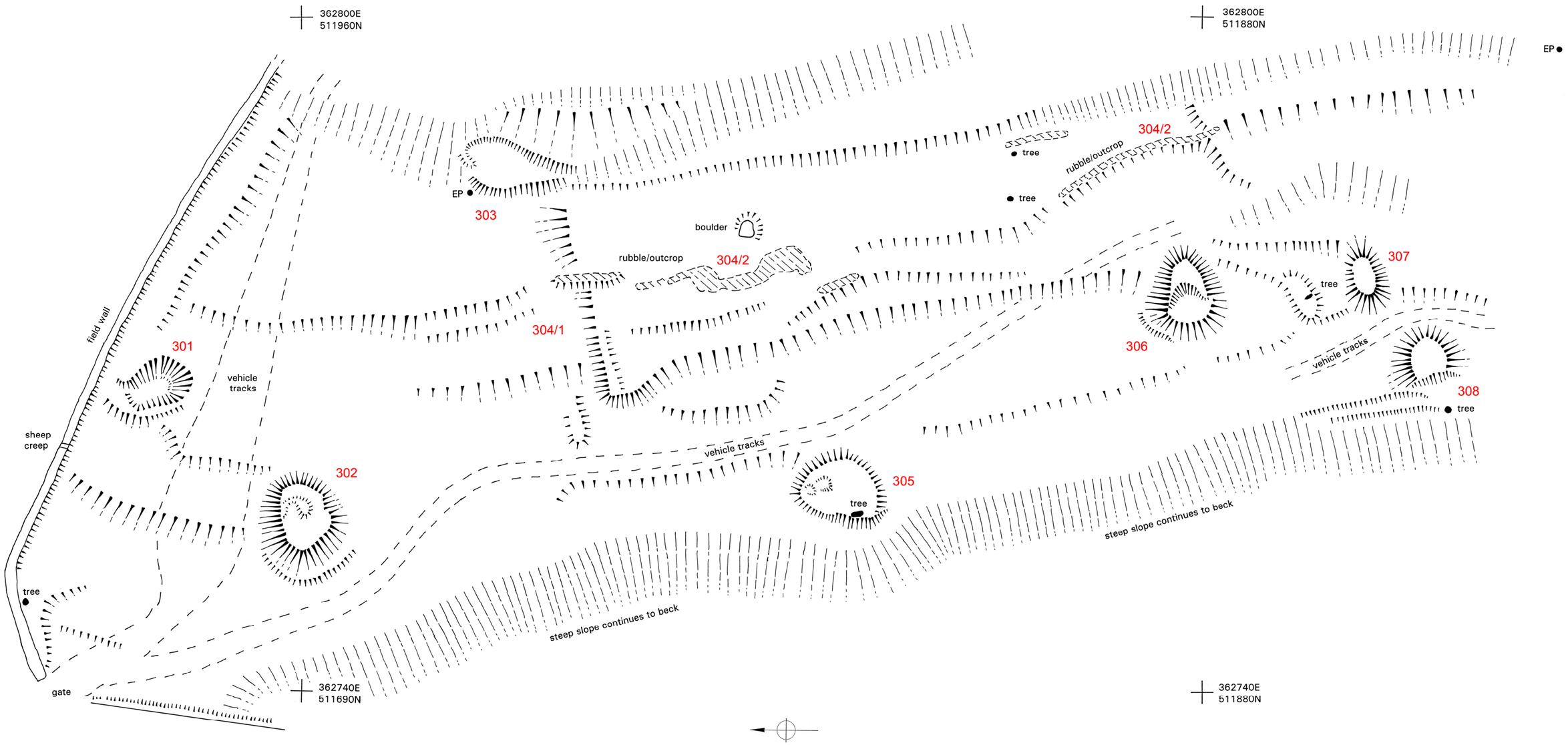


B: Ordnance Survey 1898 25" map Westmorland sheets 21/8 & 22/5, surveyed 1897.

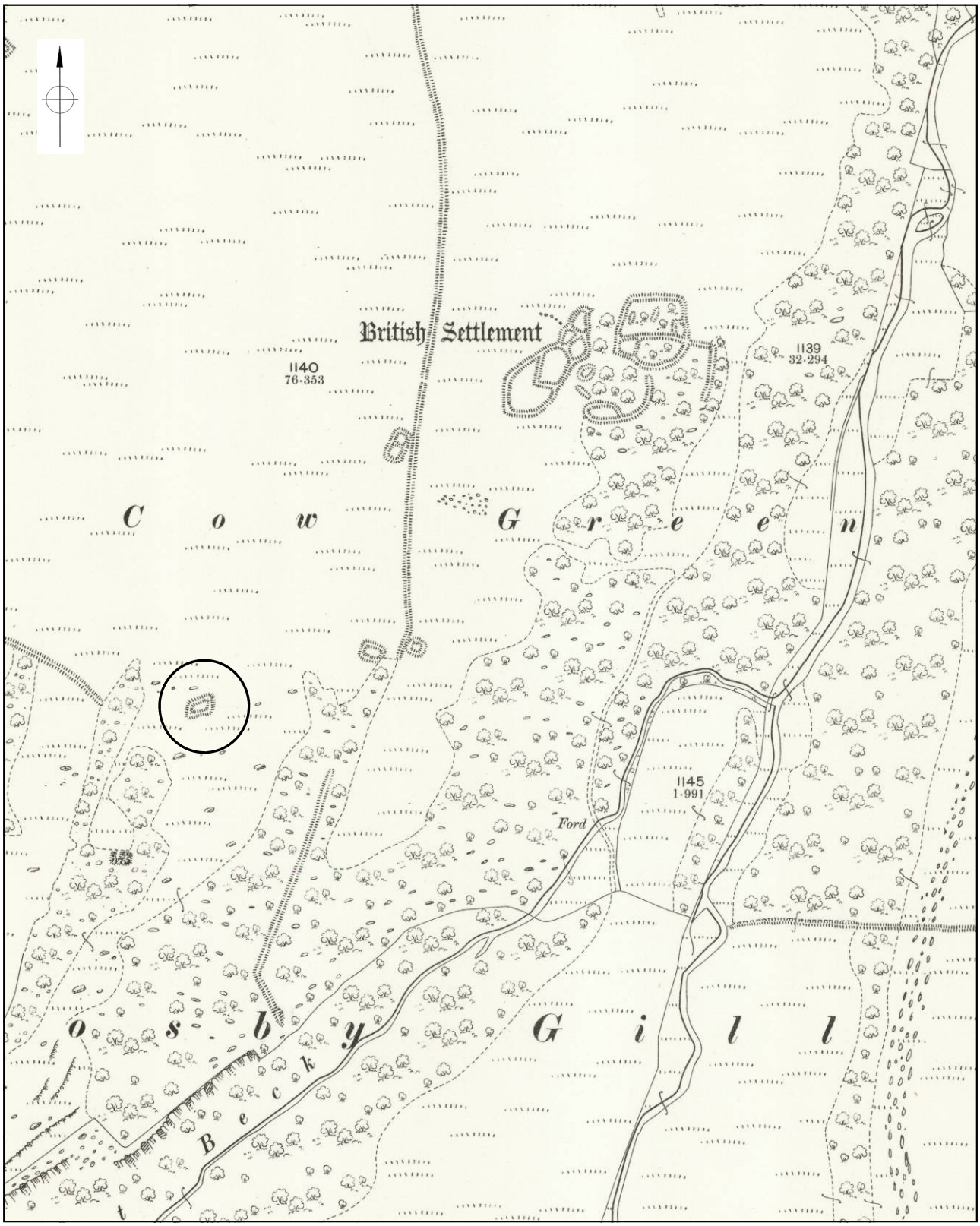


0 200m

PROJECT: WESTMORLAND MARS	
TITLE: RAVENS' GILL BARROWS AREA OF SURVEY	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 22



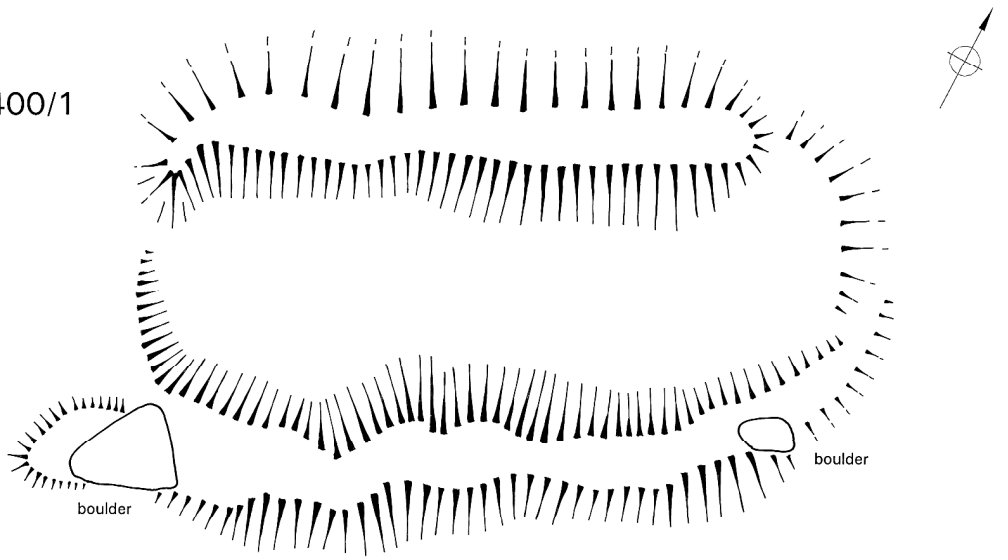
PROJECT	WESTMORLAND MARS
TITLE	RAVENS' GILL BARROWS SITE PLAN
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 23



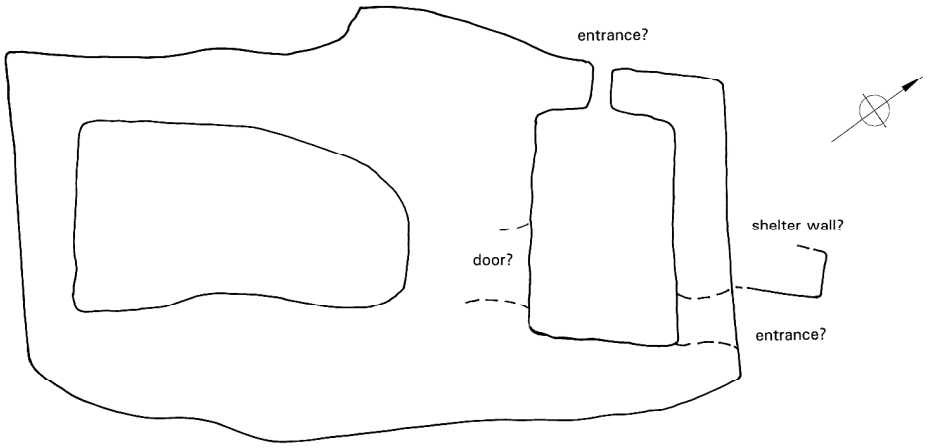
Ordnance Survey 1898 25" map Westmorland sheet 21/8, surveyed 1897.

PROJECT	
WESTMORLAND MARS	
TITLE	
CROSBY LODGE SHIELING 1898 MAP	
SCALE	DATE
NTS	JUL 2018
EDAS	FIGURE 24

Site 400/1



Site 400/2



0 5m

PROJECT: WESTMORLAND MARS	
TITLE: CROSBY LODGE SHIELINGS SITE PLANS	
SCALE: AS SHOWN	DATE: JUL 2018
EDAS	FIGURE: 25

Plate 1: East elevation of Smardale kilns with railway track bed, looking NW (photo 1/004).

Plate 2: Smardale kilns, sockets beneath south draw arch in east elevation, looking W (photo 1/008).

Plate 3: Smardale kilns, north elevation, looking S (photo 1/060).

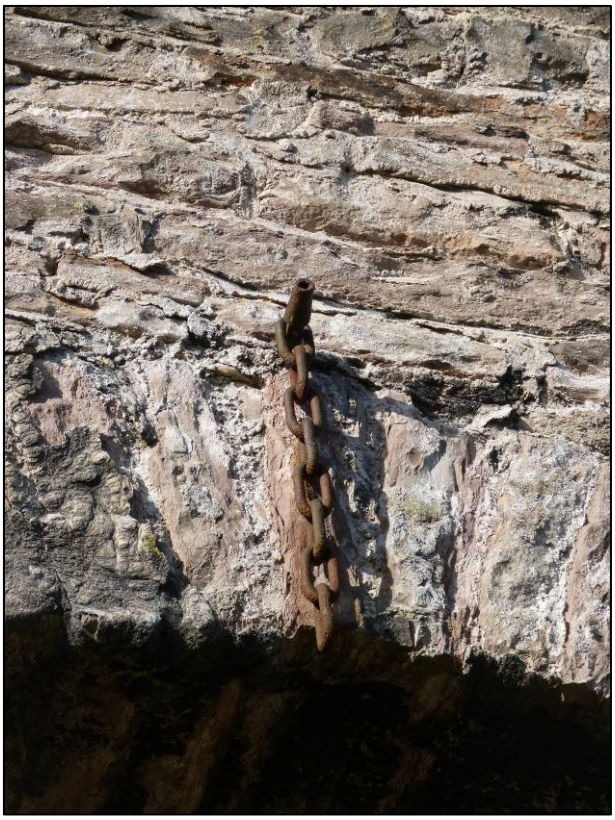


Plate 4: Smardale kilns, bolt and chain over south draw arch on east elevation, looking W (photo 1/009).

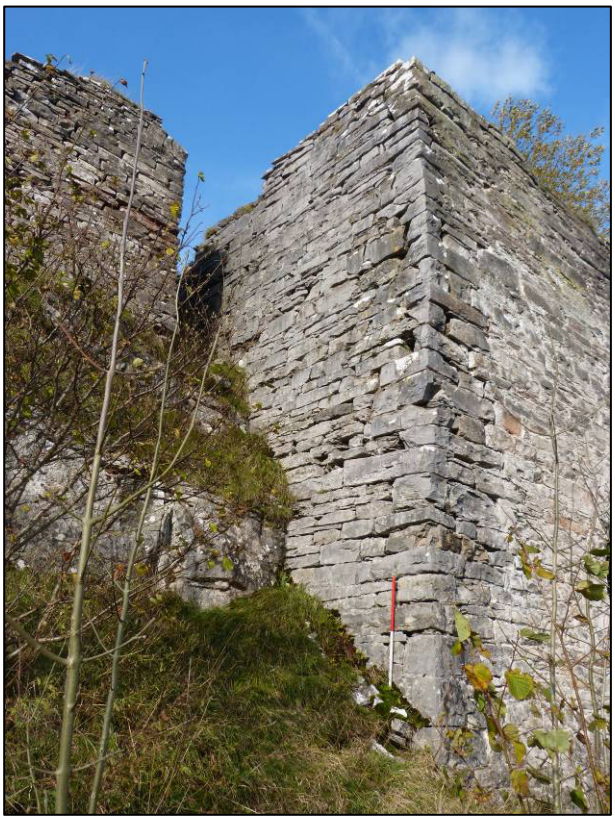


Plate 5: Smardale kilns, south elevation, looking NW (photo 1/010).

Plate 6: Smardale kilns, west wall of south draw arch, looking W (photo 1/028).

Plate 7: Smardale kilns, west wall of north draw arch, looking W (photo 1/016).

Plate 8: Smardale kilns, general view of upper level showing engine house, looking SE (photo 2/171).

Plate 9: Smardale kilns, remains of engine house, looking SE (photo 1/039).

Plate 10: Smardale kilns, buttress-like projection on north end of engine house, looking S (photo 1/042).

Plate 11: Smardale kilns, engine bed to interior of engine house, looking E (photo 1/049).

Plate 12: Smardale kilns, top of north charge bowl, looking E (photo 1/040).

Plate 13: Smardale kilns, top of south charge bowl, looking N (photo 1/054).

Plate 14: General view of Smardale quarry and kilns, from east side of Smardale Gill, looking NW (photo 2/181).

Plate 15: Smardale quarry, retaining walls (Sites 101/1 and 101/2), looking NW (photo 2/111).

Plate 16: Smardale quarry, upper level of retaining wall (Site 101/1), looking NW (photo 2/108).

Plate 17: Smardale quarry, north end of trackside structure (Site 102),
looking SW (photo 2/113).

Plate 18: Smardale quarry, south end of trackside structure (Site 102), looking NW (photo 2/117).

Plate 19: Smardale quarry, quarry (Site 103), looking SW (photo 2/119).

Plate 20: Smardale quarry, retaining wall at north end of quarry (Site 103), looking W (photo 2/120).

Plate 21: Smardale quarry, linear spoil heap (Site 104), looking NE (photo 2/135).

Plate 22: Smardale quarry, general view (Site 105), looking NW (photo 2/128).

Plate 23: Smardale quarry, jumper in main quarry face (Site 105), looking N (photo 2/141).

Plate 24: Smardale quarry, general view of main tramway alignment (Site 106/1), looking S (photo 2/131).

Plate 25: Smardale quarry, branch off main tramway (Site 106/3), looking SW (photo 2/143).

Plate 26: Smardale quarry, possible tramway branch (Site 106/7), looking W (photo 2/151).

Plate 27: Smardale quarry, view down incline (Site 107), looking SW (photo 2/153).

Plate 28: Smardale quarry, view up incline (Site 107), with socket stone, looking NE (photo 2/156).

Plate 29: Smardale quarry, tramway (Site 108), looking E (photo 2/164).

Plate 30: Pendragon Castle, general view of castle mound (Site 201), looking N (photo 7/451).

Plate 31: Pendragon Castle, north ditch (Site 200/1), looking NW (photo 7/433).

Plate 32: Pendragon Castle, possible bridge site to north ditch (Site 200/3), looking NW (photo 7/460).

Plate 33: Pendragon Castle, west end of north ditch (Site 200/1), looking E (photo 7/462).

Plate 34: Pendragon Castle, depression (Site 200/6) in east end of south-east ditch (Site 200/7), looking S (photo 7/434).

Plate 35: Pendragon Castle, west end of south-east ditch (Site 200/7), looking SW (photo 7/438).

Plate 36: Bank forming south-east side of south-east ditch (Site 200/7), looking N (photo 7/449).

Plate 37: Pendragon Castle, view across eastern causeway (Site 200/4), looking W (photo 7/432).

Plate 38: Pendragon Castle, view across western causeway (Site 200/5), looking SE (photo 7/469).

Plate 39: Pendragon Castle, west-facing scarp forming possible entrance (Site 203), looking E (photo 7/466).

Plate 40: Pendragon Castle, south part of building range (Site 204/2), looking NW (photo 7/473).

Plate 41: Pendragon Castle, north part of building range (Site 204/1),
looking NW (photo 7/481).

Plate 42: Pendragon Castle, south part of building range (Site 204/2), looking NW (photo 7/474).

Plate 43: Pendragon Castle, trackway (Site 207), looking NW (photo 9/559).

Plate 44: Pendragon Castle, kiln (Site 208/2), looking SE (photo 7/487).

Plate 45: Pendragon Castle, seen from possible viewing mount, west side of River Eden, looking E (photo 7/499).

Plate 46: Pendragon Castle, west side of north external elevation of castle, looking SW (photo 9/572).

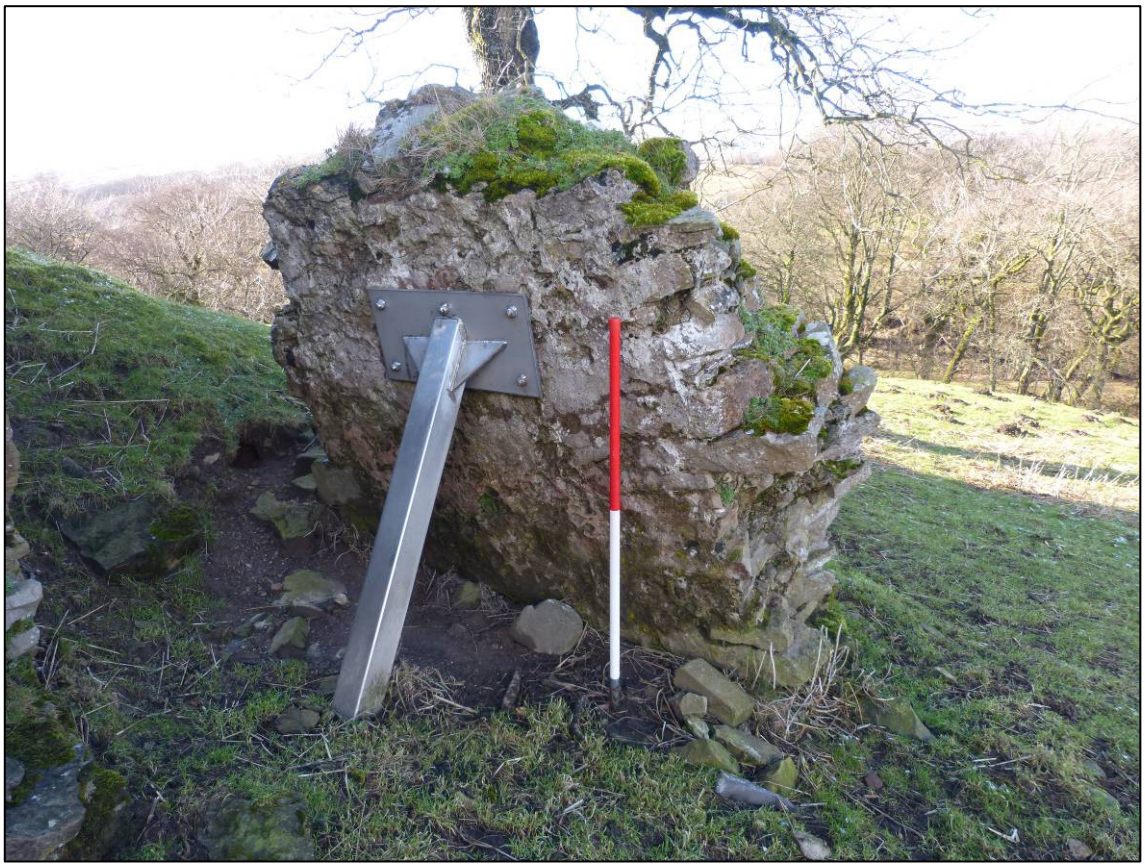


Plate 47: Pendragon Castle, propped masonry at north-west corner of castle, looking SW (photo 9/574).

Plate 48: Pendragon Castle, east external elevation, looking W (photo 7/512).

Plate 49: Pendragon Castle, south external elevation, looking NE (photo 6/318).

Plate 50: Pendragon Castle, south-west garderobe tower, looking NW (photo 7/506).

Plate 51: Pendragon Castle, south-west garderobe tower, looking NE (photo 9/582).

Plate 52: Pendragon Castle, west external elevation, looking E (photo 6/314).

Plate 53: Pendragon Castle, entrance passage, door to east newel stair, looking NE (photo 9/542).

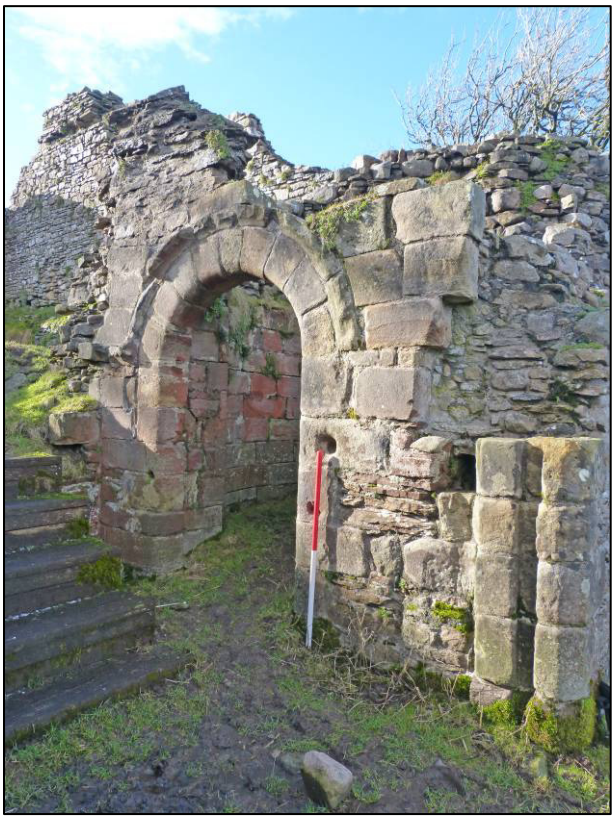


Plate 54: Pendragon Castle, entrance passage, door to west newel stair, looking SW (photo 9/536).

Plate 55: Pendragon Castle, west internal wall, looking W (photo 9/549).

Plate 56: Pendragon Castle, cross wall to south side of interior, looking E (photo 9/554).

Plate 57: Pendragon Castle, interior of north-east chamber, looking E (photo 9/603).

Plate 58: Pendragon Castle, interior of south-east chamber, looking W (photo 9/600).

Plate 59: Pendragon Castle, interior of north-west chamber showing angled wall, looking E (photo 9/584).

Plate 60: Pendragon Castle, interior of south-east chamber, garderobe doorway, looking W (photo 9/593).

Plate 61: Pendragon Castle, interior of south-west chamber, garderobe, looking S (photo 9/591).

Plate 62: Pendragon Castle, interior, looking SW (photo 9/550).

Plate 63: Pendragon Castle, interior, looking NE (photo 9/558).

Plate 64: Pendragon Castle barn, south and west elevations, looking NE (photo 3/205).

Plate 65: Pendragon Castle barn, south gable, looking N (photo 3/187).

Plate 66: Pendragon Castle barn, west elevation, looking E (photo 3/197).

Plate 67: Pendragon Castle, wall to south of barn (Site 204/2), looking S (photo 3/207).

Plate 68: Pendragon Castle barn, north gable, looking S (photo 3/193).

Plate 69: Pendragon Castle barn, east elevation, looking W (photo 3/191).

Plate 70: Pendragon Castle barn, interior showing east wall and stored stonework, looking NE (photo 4/228).

Plate 71: Pendragon Castle, sheep tracks on north slope of north ditch (200/1) (Area 16), looking N (December 2017) (photo 6/312).

Plate 72: Pendragon Castle, sheep tracks on north slope of north ditch (200/1) (Area 16), looking N (June 2018) (photo 10/158).

Plate 73: Pendragon Castle, slumping scar (Area 7), on south side of castle mound (Site 201), looking NW (photo 10/132).

Plate 74: Pendragon Castle, grassed over ground slips/sheep tracks (Area 9), on south side of castle mound (201), looking NE (photo 10/138).

Plate 75: Pendragon Castle, slumping scar and slippage below (Areas 7 and 9) on south side of castle mound (201), looking NW (photo 10/174).

Plate 76: Pendragon Castle, slumping/sheep tracks (Area 4) on south side of castle mound (201), looking W (photo 10/124).

Plate 77: Pendragon Castle, slumping scars (Areas 1 and 2) on south-east side of castle mound (201), looking NW (photo 10/114).

Plate 78: Pendragon Castle, slumping scar with exposed stone (Area 11) on south-west side of castle mound (201), looking NW (photo 10/143).

Plate 79: Pendragon Castle, ground slip/sheep tracks (Area 12) on west side of castle mound (201), looking NW (photo 10/146).

Plate 80: Pendragon Castle, entrance passage, modern wooden steps, looking S (photo 9/546).

Plate 81: Pendragon Castle, interior, entrance to north-west chamber, looking S (photo 10/183).

Plate 82: Pendragon Castle, interior, fallen voussoirs to west window of south wall, looking SW (photo 10/179).

Plate 83: Pendragon Castle, interior, repaired roof of SE chamber, looking SE (photo 9/555).

Plate 84: Pendragon Castle, west end of south internal wall, looking S (photo 9/553).

Plate 85: Pendragon Castle, interior, rubble in south window of west wall, looking W (photo 10/180).

Plate 86: Ravens' Gill barrows, general view with barrow (Site 302) in foreground, looking S (photo 5/239).

Plate 87: Ravens' Gill barrows, barrow (Site 302), looking SW (photo 5/245).

Plate 88: Ravens' Gill barrows, disturbance to top of barrow (Site 302), looking E (photo 5/246).

Plate 89: Ravens' Gill barrows, scooped platform (Site 303), looking S (photo 5/278).

Plate 90: Ravens' Gill barrows: boulder and boundary (304/2), looking S (photo 10/208).

Plate 91: Ravens' Gill barrows: boundary (304/2), looking S (photo 10/201).

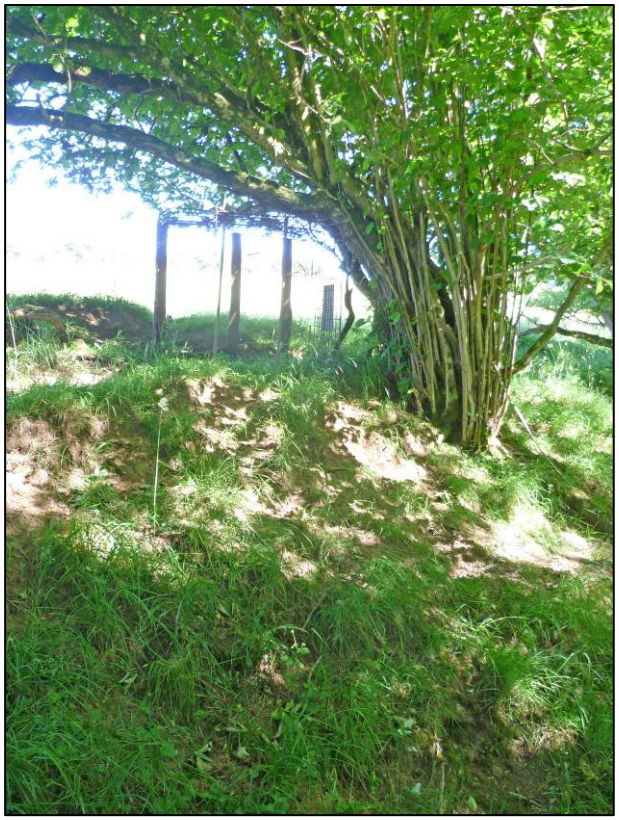


Plate 92: Ravens' Gill barrows: erosion on west side of barrow (308), looking S (photo 10/205).

Plate 93: Ravens' Gill barrows, barrow (Site 305), showing rabbit disturbance, looking SW (photo 5/256).

Plate 94: Ravens' Gill barrows, barrow (Site 305), rabbit and stock erosion, looking NE (photo 5/259).

Plate 95: Ravens' Gill barrows, barrow (Site 306), looking S (photo 5/262).

Plate 96: Ravens' Gill barrows, erosion scar in barrow (Site 306), looking E (photo 5/263).

Plate 97: Ravens' Gill barrows, southern part of barrow (Site 307), looking N (photo 5/270).

Plate 98: Ravens' Gill barrows, barrow (Site 308), looking S (photo 5/267).

Plate 99: Crosby Lodge shieling (Site 400/1), looking SW (February 2018) (photo 8/519).

Plate 100: Crosby Lodge shieling (Site 400/1), general area in dense bracken (July 2018), looking SW (photo 11/216).

Plate 101: Crosby Lodge shieling (Site 400/2), looking N (February 2018) (photo 8/526).

Plate 102: Crosby Lodge shieling (Site 400/2), looking SW July 2018) (photo 11/211).

APPENDIX 1
EDAS PHOTOGRAPHIC RECORD

WESTMORLAND MARS PROJECT PHOTO CATALOGUE

Film 1: Colour digital photographs 25th October 2017 (Smardale kilns)
Film 2: Colour digital photographs 9th November 2017 (Smardale quarry)
Film 3: Colour digital photographs 9th November 2017 (Pendragon barn exterior)
Film 4: Colour digital photographs 24th November 2017 (Pendragon barn interior)
Film 5: Colour digital photographs 7th December 2017 (Ravens' Gill barrows)
Film 6: Colour digital photographs 8th December 2017 (Pendragon Castle)
Film 7: Colour digital photographs 26th January 2018 (Pendragon Castle)
Film 8: Colour digital photographs 7th February 2018 (Crosby Lodge shieling)
Film 9: Colour digital photographs 9th February 2018 (Pendragon Castle)
Film 10: Colour digital photographs 28th June 2018 (Pendragon Castle and Ravens' Gill barrows erosion)
Film 11: Colour digital photographs 29th June 2018 (Crosby Lodge shieling erosion)

EDAS site numbers in brackets, e.g. (303)

New film	*Frame*	*Subject*	*Scale*
1	998	Smardale kilns: E elevation, looking NW	1m
1	999	Smardale kilns: E elevation, showing outcropping limestone to S, looking W	-
1	001	Smardale kilns: E elevation, looking W	1m
1	002	Smardale kilns: E elevation, looking W	1m
1	003	Smardale kilns: E elevation, looking SW	1m
1	004	Smardale kilns: E elevation with railway track bed, looking NW	1m
1	005	Smardale kilns: E elevation with railway track bed, looking SW	1m
1	006	Smardale kilns: E elevation with railway track bed, looking SW	1m
1	007	Smardale kilns: E elevation, sockets beneath N draw arch, looking W	1m
1	008	Smardale kilns: E elevation, sockets beneath S draw arch, looking W	1m
1	009	Smardale kilns: E elevation, bolt and chain over S draw arch, looking W	-
1	010	Smardale kilns: S elevation, looking NW	1m
1	011	Smardale kilns: N elevation, possible sockets, looking SE	1m
1	012	Smardale kilns: N elevation, looking S	1m
1	013	Smardale kilns: N elevation, possible socket, looking S	1m
1	014	Smardale kilns: N elevation, protruding rod, looking E	-
1	015	Smardale kilns: N elevation, protruding bolt, looking E	-
1	016	Smardale kilns: N draw arch, W wall, looking W	-
1	017	Smardale kilns: N draw arch, W wall, looking W	1m
1	018	Smardale kilns: N draw arch, W wall, looking W	1m
1	019	Smardale kilns: N draw arch, W wall, looking SW	1m
1	020	Smardale kilns: N draw arch, W wall, looking SW	1m
1	021	Smardale kilns: N draw arch, W wall, detail of grate to draw opening, looking SW	-
1	022	Smardale kilns: N draw arch, W wall, detail of iron rail to draw opening, looking W	-
1	023	Smardale kilns: N draw arch, S wall, looking S	1m
1	024	Smardale kilns: N draw arch, N wall, looking N	1m
1	025	Smardale kilns: N draw arch, N wall, looking N	1m
1	026	Smardale kilns: N draw arch, flagstones, looking SE	1m
1	027	Smardale kilns: S draw arch, W wall, looking W	1m
1	028	Smardale kilns: S draw arch, W wall, looking W	1m
1	029	Smardale kilns: S draw arch, W wall, looking SW	1m
1	030	Smardale kilns: S draw arch, W wall, looking SW	1m
1	031	Smardale kilns: S draw arch, W wall, detail of grate to draw opening, looking W	1m

1	032	Smardale kilns: S draw arch, S wall, looking S	1m
1	033	Smardale kilns: S draw arch, S wall, looking S	1m
1	034	Smardale kilns: S draw arch, N wall, looking N	1m
1	035	Smardale kilns: S draw arch, N wall, looking N	1m
1	036	Smardale kilns: S draw arch, flagstones, looking SE	1m
1	037	Smardale kilns: upper level, looking W	1m
1	038	Smardale kilns: upper level, looking W	1m
1	039	Smardale kilns: upper level, engine house, looking SE	1m
1	040	Smardale kilns: upper level, top of N charge bowl, looking E	-
1	041	Smardale kilns: upper level, top of N charge bowl, looking NE	-
1	042	Smardale kilns: upper level, engine house, projection at N end, looking S	1m
1	043	Smardale kilns: upper level, top of S charge bowl, looking SE	-
1	044	Smardale kilns: upper level, engine house, looking NE	1m
1	045	Smardale kilns: upper level, looking NE	1m
1	046	Smardale kilns: upper level, engine house, looking N	1m
1	047	Smardale kilns: upper level, engine house, NW part interior, looking NW	1m
1	048	Smardale kilns: upper level, engine house, engine bed to interior, looking E	1m
1	049	Smardale kilns: upper level, engine house, engine bed to interior, looking E	1m
1	050	Smardale kilns: upper level, engine house, engine bed to interior, detail	1m
1	051	Smardale kilns: upper level, engine house, engine bed to interior, detail	1m
1	052	Smardale kilns: upper level, engine house, engine bed to interior, detail	-
1	053	Smardale kilns: S elevation, looking E	-
1	054	Smardale kilns: upper level, top of S charge bowl, looking N	-
1	055	Smardale kilns: upper level, engine house, looking NW	1m
1	056	Smardale kilns: N elevation, looking S	-
1	057	Smardale kilns: N elevation, looking S	-
1	058	Smardale kilns: N elevation, looking S	-
1	059	Smardale kilns: kilns and quarry, looking S	-
1	060	Smardale kilns: N elevation, looking S	-
2	107	Smardale quarry: upper level retaining wall (101/1) and kilns, looking NW	-
2	108	Smardale quarry: upper level retaining wall (101/1), looking NW	-
2	109	Smardale quarry: upper level retaining wall (101/1), looking W	-
2	110	Smardale quarry: retaining walls (101/1 and 101/2), looking SW	-
2	111	Smardale quarry: retaining walls (101/1 and 101/2), looking NW	-
2	112	Smardale quarry: lower level retaining wall (101/2), looking NW	-
2	113	Smardale quarry: structure (102), N end, looking SW	1m
2	114	Smardale quarry: structure (102), looking SW	1m
2	115	Smardale quarry: structure (102), looking W	1m
2	116	Smardale quarry: structure (102), looking SW	-
2	117	Smardale quarry: structure (102), S end, looking NW	1m
2	118	Smardale quarry: quarry (103), retaining wall at S end, looking W	1m
2	119	Smardale quarry: quarry (103), looking SW	1m
2	120	Smardale quarry: quarry (103), retaining wall at N end, looking W	-
2	121	Smardale quarry: retaining wall to end of gully by railway siding (111), looking SW	1m
2	122	Smardale quarry: retaining wall to end of gully by railway siding (111), looking S	1m
2	123	Smardale quarry: railway siding (111), looking SW	1m
2	124	Smardale quarry: track from house (112), looking SW	1m
2	125	Smardale quarry: sheep creep and blocked gate in field wall, marking track from house (112), looking S	1m
2	126	Smardale quarry: general view of SW part of survey area, looking N	-
2	127	Smardale quarry: spoil heap (104), looking NE	-
2	128	Smardale quarry: quarry face (105), looking NW	-
2	129	Smardale quarry: general view of SW part of survey area, looking NE	-

2	130	Smardale quarry: spoil heap (104), looking SW	-
2	131	Smardale quarry: main tramway (106/1), looking N	-
2	132	Smardale quarry: quarry face (105), looking W	-
2	133	Smardale quarry: possible structure to top of spoil heap (104), looking N	-
2	134	Smardale quarry: spoil heap (104), looking NE	-
2	135	Smardale quarry: spoil heap (104), looking NE	-
2	137	Smardale quarry: track from house (112), looking SW	-
2	138	Smardale quarry: spoil heap by side of tramway branch (106/2), looking NE	1m
2	139	Smardale quarry: W end of tramway branch (106/2), looking SW	1m
2	140	Smardale quarry: W end of tramway branch (106/2), looking SW	1m
2	141	Smardale quarry: jumper in quarry face (105), looking N	1m
2	143	Smardale quarry: tramway branch (106/3), looking SW	1m
2	144	Smardale quarry: tramway branch (106/3), possible structure, looking N	1m
2	145	Smardale quarry: main tramway (106/1), looking N	1m
2	146	Smardale quarry: junction of main tramway (106/1) and branch (106/3), looking SW	1m
2	147	Smardale quarry: tramway branch (106/4), looking SW	1m
2	148	Smardale quarry: main tramway (106/1) and tramway branch (106/4), looking SW	1m
2	149	Smardale quarry: tramway branch (106/6), looking W	1m
2	150	Smardale quarry: tramway branch (106/6), modern structure at W end, looking N	1m
2	151	Smardale quarry: possible tramway branch (106/7), looking W	1m
2	152	Smardale quarry: quarry face (105) and other earthworks (110), looking NE	1m
2	153	Smardale quarry: looking down incline (107), looking SW	1m
2	154	Smardale quarry: incline (107), ruined structure, looking SW	1m
2	155	Smardale quarry: incline (107), ruined structure, looking NE	1m
2	156	Smardale quarry: looking up incline (107) with socket stone, looking NE	1m
2	157	Smardale quarry: south end of incline (107) and socket stone, looking SW	1m
2	158	Smardale quarry: incline (107), revetment wall, looking SW	1m
2	159	Smardale quarry: tramway branch (106/2), looking SW	1m
2	160	Smardale quarry: tramway (108), revetment wall, looking SE	1m
2	162	Smardale quarry: tramway (108), rail	-
2	163	Smardale quarry: tramway (108), revetment wall, looking NE	1m
2	164	Smardale quarry: tramway (108), looking E	-
2	165	Smardale quarry: main tramway (106/1), wall, looking SW	1m
2	166	Smardale quarry: main tramway (106/1), wall, looking NW	1m
2	167	Smardale quarry: typical boundary wall to upper (W) side of walkover survey area, looking N	1m
2	168	Smardale quarry: view to top of limekilns and engine house (100), looking S	-
2	169	Smardale quarry: view to top of limekilns and engine house (100), looking S	-
2	170	Smardale quarry: view to top of limekilns and engine house (100), looking S	-
2	171	Smardale quarry: view to top of limekilns and engine house (100), looking SE	-
2	172	Smardale quarry: view of tramways (106) and spoil heaps, looking S	-
2	173	Smardale quarry: earthworks (110), looking NW	1m
2	174	Smardale quarry: earthworks (110), looking S	1m
2	175	Smardale quarry: base of NE part of quarry face (1055), looking SW	-
2	181	Smardale quarry: general view from E side of gill, looking NW	-
2	182	Smardale quarry: general view from E side of gill, looking NW	-
2	183	Smardale quarry: general view from E side of gill, looking NW	-
2	185	Smardale quarry: general view from E side of gill, looking NW	-

2	186	Smardale quarry: general view from E side of gill, looking NW	-
3	187	Pendragon Castle barn: S gable, looking N	1m
3	189	Pendragon Castle barn: S gable, looking N	1m
3	190	Pendragon Castle barn: re-used stone, N face of drystone wall to immediate E of barn, looking S	1m
3	191	Pendragon Castle barn: E elevation, looking W	1m
3	192	Pendragon Castle barn: E elevation, doorway, looking W	1m
3	193	Pendragon Castle barn: N gable, looking S	1m
3	194	Pendragon Castle barn: chamfered doorway, W side of wall to S of barn, looking E	1m
3	195	Pendragon Castle barn: chamfered doorway, W side of wall to S of barn, looking E	1m
3	196	Pendragon Castle barn: W elevation, looking E	1m
3	197	Pendragon Castle barn: W elevation, looking E	1m
3	198	Pendragon Castle barn: W elevation, doorway, looking E	1m
3	199	Pendragon Castle barn: W elevation, drain, looking E	1m
3	200	Pendragon Castle barn: W elevation, looking SE	1m
3	201	Pendragon Castle barn: W elevation, looking SE	1m
3	202	Pendragon Castle barn: wall N of barn, looking E	1m
3	203	Pendragon Castle barn: wall N of barn, looking E	1m
3	204	Pendragon Castle barn: wall N of barn, looking NE	1m
3	205	Pendragon Castle barn: S & W elevations, looking NE	-
3	206	Pendragon Castle barn: capping to S gable, looking NE	-
3	207	Pendragon Castle barn: wall S of barn (204/2), looking SE	1m
3	208	Pendragon Castle barn: wall S of barn (204/2), looking E	1m
3	217	Pendragon Castle barn: roof truss, looking N	-
4	222	Pendragon Castle barn: door to W wall, looking W	1m
4	223	Pendragon Castle barn: W wall, looking NW	1m
4	224	Pendragon Castle barn: W wall, looking W	1m
4	225	Pendragon Castle barn: N wall, looking N	1m
4	226	Pendragon Castle barn: N wall, looking N	1m
4	227	Pendragon Castle barn: E wall and stored stonework, looking NE	1m
4	228	Pendragon Castle barn: E wall and stored stonework, looking NE	1m
4	229	Pendragon Castle barn: S wall, looking S	1m
4	230	Pendragon Castle barn: S wall, looking S	1m
4	231	Pendragon Castle barn: projecting timber in W wall, looking W	-
4	232	Pendragon Castle barn: stored stonework, looking N	-
4	233	Pendragon Castle barn: stored cusped window head, looking E	-
4	235	Pendragon Castle barn: roof truss, looking N	-
4	236	Pendragon Castle barn: roof truss, looking S	-
4	238	Pendragon Castle barn: channel at S end of interior, looking E	1m
5	239	Ravens' Gill barrows: general view of survey area from N end, looking S	-
5	240	Ravens' Gill barrows: drystone wall, looking SE	1m
5	241	Ravens' Gill barrows: typical section of drystone wall, looking N	1m
5	242	Ravens' Gill barrows: depression (301), looking SW	1m
5	243	Ravens' Gill barrows: vehicle tracks N of barrow (302), looking W	1m
5	244	Ravens' Gill barrows: E edge of Ravens Gill, looking SW	1m
5	245	Ravens' Gill barrows: barrow (302), looking SW	1m
5	246	Ravens' Gill barrows: barrow (302), surface, looking E	1m
5	247	Ravens' Gill barrows: barrow (302), surface, looking NW	1m
5	248	Ravens' Gill barrows: barrow (302), looking NW	1m
5	249	Ravens' Gill barrows: scooped platform (303), looking NW	1m
5	250	Ravens' Gill barrows: terrace, E of boundary (304/2), looking S	1m
5	251	Ravens' Gill barrows: boundary (304/1), looking W	1m
5	252	Ravens' Gill barrows: boundary (304/1), looking S	1m

5	253	Ravens' Gill barrows: boundary (304/2) and boulder, looking S	1m
5	254	Ravens' Gill barrows: terrace and boulder, E of boundary (304/2), looking N	1m
5	255	Ravens' Gill barrows: boulder adjacent to boundary (304/2), looking E	1m
5	256	Ravens' Gill barrows: barrow (305), looking SW	1m
5	257	Ravens' Gill barrows: barrow (305), rabbit erosion, looking SW	1m
5	258	Ravens' Gill barrows: barrow (305), rabbit erosion, looking S	1m
5	259	Ravens' Gill barrows: barrow (305), rabbit and stock erosion, looking NE	1m
5	260	Ravens' Gill barrows: natural W-facing scarps in central part of survey area, looking N	-
5	261	Ravens' Gill barrows: barrow (306), looking S	1m
5	262	Ravens' Gill barrows: barrow (306), looking S	1m
5	263	Ravens' Gill barrows: barrow (306), erosion, looking E	1m
5	264	Ravens' Gill barrows: barrow (307), N part, looking S	1m
5	265	Ravens' Gill barrows: barrow (307), S part, looking E	1m
5	266	Ravens' Gill barrows: vehicle tracks E of barrow (308), looking S	1m
5	267	Ravens' Gill barrows: barrow (308), looking S	1m
5	268	Ravens' Gill barrows: barrow (308), looking S	1m
5	269	Ravens' Gill barrows: barrow (308), looking N	1m
5	270	Ravens' Gill barrows: barrow (307), S part, looking N	1m
5	271	Ravens' Gill barrows: vehicle tracks between barrows (307 and 308), looking N	1m
5	272	Ravens' Gill barrows: central part of survey area, looking N	1m
5	273	Ravens' Gill barrows: central part of survey area, looking NW	1m
5	274	Ravens' Gill barrows: N part of survey area, looking NW	-
5	276	Ravens' Gill barrows: central part of survey area, looking SW	-
5	277	Ravens' Gill barrows: S part of survey area, looking SW	-
5	278	Ravens' Gill barrows: scooped platform (303), looking S	1m
6	292	Pendragon Castle: moon over castle, looking W	-
6	301	Pendragon Castle: Cocklake (209), looking NW	-
6	309	Pendragon Castle: depression (200/6) in SE ditch (200/7), looking S	1m
6	310	Pendragon Castle: depression (200/6) in SE ditch (200/7), looking SE	1m
6	311	Pendragon Castle: depression (200/6) in SE ditch (200/7), looking N	1m
6	312	Pendragon Castle: N ditch (200/1), sheep tracks (Area 16), looking N	1m
6	314	Pendragon Castle: W elevation, looking E	1m
6	315	Pendragon Castle: W elevation, central part, looking E	-
6	316	Pendragon Castle: W elevation, SW garderobe tower, looking SE	-
6	317	Pendragon Castle: S elevation, SW garderobe tower, looking NW	-
6	318	Pendragon Castle: S elevation, looking NE	-
6	321	Pendragon Castle: W elevation, looking NW	-
7	430	Pendragon Castle: gateway from main road, looking W	1m
7	432	Pendragon Castle: E causeway (200/4) onto castle mound, looking W	2 x 1m
7	433	Pendragon Castle: N ditch (200/1), looking NW	2 x 1m
7	434	Pendragon Castle: depression (200/6) in SE ditch (200/7), looking S	2 x 1m
7	435	Pendragon Castle: depression (200/6) in SE ditch (200/7), possible excavation trench, looking SE	2 x 1m
7	436	Pendragon Castle: depression (200/6) in SE ditch (200/7), possible excavation trench, looking SE	2 x 1m
7	437	Pendragon Castle: depression (200/6) in SE ditch (200/7), looking NE	2 x 1m
7	438	Pendragon Castle: SE ditch (200/7), W end, looking SW	2 x 1m
7	440	Pendragon Castle: slumping scar (Area 2) to S side of castle mound (201), looking N	1m
7	442	Pendragon Castle: trackway (202), SE of castle mound, looking S	2 x 1m
7	443	Pendragon Castle: trackway (202), SE of castle mound, looking NE	2 x 1m
7	446	Pendragon Castle: slumping/sheep tracks (Area 4) to S side of castle mound (201), looking W	-

7	448	Pendragon Castle: bank forming SE side of SE ditch (200/7), looking N	2 x 1m
7	449	Pendragon Castle: bank forming SE side of SE ditch (200/7), looking N	2 x 1m
7	450	Pendragon Castle: SE ditch (200/7), looking N	2 x 1m
7	451	Pendragon Castle: castle mound (201), looking N	-
7	453	Pendragon Castle: slumping erosion scar (Area 7) to S side of castle mound (201), looking N	1m
7	454	Pendragon Castle: slumping erosion scar (Area 7) to S side of castle mound (201), looking N	1m
7	455	Pendragon Castle: slumping erosion scar (Area 7) to S side of castle mound (201), looking N	1m
7	456	Pendragon Castle: earthwork to E end of N elevation of castle (201), looking S	2 x 1m
7	457	Pendragon Castle: earthwork to E end of N elevation of castle (201), looking SE	2 x 1m
7	458	Pendragon Castle: possible bridge site to N ditch (200/3), looking N	1m
7	460	Pendragon Castle: possible bridge site to N ditch (200/3), looking NW	2 x 1m
7	461	Pendragon Castle: possible bridge site to N ditch (200/3), looking E	2 x 1m
7	462	Pendragon Castle: N ditch (200/1), W end, looking E	2 x 1m
7	463	Pendragon Castle: possible bridge site to N ditch (200/3), looking E	2 x 1m
7	464	Pendragon Castle: possible bridge site to N ditch (200/3), looking E	2 x 1m
7	465	Pendragon Castle: possible structure (203), looking NE	2 x 1m
7	466	Pendragon Castle: W facing scarp of possible entrance way (203), looking E	2 x 1m
7	467	Pendragon Castle: possible structure (203), looking E	2 x 1m
7	468	Pendragon Castle: W causeway (200/5) onto castle mound, looking SE	2 x 1m
7	469	Pendragon Castle: W causeway (200/5) onto castle mound, looking SE	2 x 1m
7	470	Pendragon Castle: continuation of N ditch (200/1), looking SW	2 x 1m
7	471	Pendragon Castle: continuation of N ditch (200/1), looking SW	2 x 1m
7	472	Pendragon Castle: W side of castle mound (201), looking S	1m
7	473	Pendragon Castle: S part of building range (204/2), looking NW	2 x 1m
7	474	Pendragon Castle: S part of building range (204/2), S end, looking NW	2 x 1m
7	475	Pendragon Castle: S part of building range (204/2), S end, looking W	1m
7	476	Pendragon Castle: S part of building range (204/2), S end, looking W	1m
7	477	Pendragon Castle: S part of building range (204/2), central part, looking W	1m
7	478	Pendragon Castle: S part of building range (204/2), central part, looking SW	1m
7	480	Pendragon Castle: scoops (206), looking SE	1m
7	481	Pendragon Castle: N part of building range (204/1), looking NW	1m
7	483	Pendragon Castle: trackway (207), looking E	2 x 1m
7	484	Pendragon Castle: trackway (207), looking E	2 x 1m
7	485	Pendragon Castle: kiln (208/2), looking NW	2 x 1m
7	486	Pendragon Castle: kiln (208/2), looking W	2 x 1m
7	487	Pendragon Castle: kiln (208/2), looking SE	2 x 1m
7	488	Pendragon Castle: kiln (208/2), looking SE	2 x 1m
7	489	Pendragon Castle: well (208/1), looking SE	1m
7	490	Pendragon Castle: Tommy Road, carved stone to NE boundary wall, looking NE	1m
7	491	Pendragon Castle: Tommy Road, carved stone to NE boundary wall, looking NE	1m
7	492	Pendragon Castle: Tommy Road crossing Cocklake (209), looking NW	-
7	493	Pendragon Castle: surface of enclosed area (209), NE of Tommy Road, looking NE	-
7	494	Pendragon Castle: surface of enclosed area (209), NE of Tommy Road, looking E	-
7	496	Pendragon Castle: Tommy Road crossing Cocklake (209), looking SE	-
7	497	Pendragon Castle: possible viewing mount, W side of Eden, looking NE	-

7	498	Pendragon Castle: linear depression near possible viewing mount, W side of Eden, looking N	-
7	499	Pendragon Castle: seen from possible viewing mount, W side of Eden, looking E	-
7	505	Pendragon Castle: SW garderobe tower, looking NW	1m
7	506	Pendragon Castle: SW garderobe tower, looking NW	1m
7	508	Pendragon Castle: S elevation, looking N	2 x 1m
7	509	Pendragon Castle: S elevation, looking NE	2 x 1m
7	510	Pendragon Castle: S elevation, looking NW	2 x 1m
7	511	Pendragon Castle: S elevation, step up in plinth, looking N	1m
7	512	Pendragon Castle: E elevation, looking W	2 x 1m
7	513	Pendragon Castle: E elevation, S end, looking SW	1m
7	514	Pendragon Castle: E elevation, N end, looking W	1m
8	518	Crosby Lodge shieling (400/1), looking SW	4 x 1m
8	519	Crosby Lodge shieling (400/1), looking SW	4 x 1m
8	520	Crosby Lodge shieling (400/1), looking SW	4 x 1m
8	521	Crosby Lodge shieling (400/1), looking NE	4 x 1m
8	522	Crosby Lodge shieling (400/1), looking SE	4 x 1m
8	523	Crosby Lodge shieling (400/1), looking NE	4 x 1m
8	524	Crosby Lodge shieling (400/1), looking NE	4 x 1m
8	525	Crosby Lodge shieling (400/1), looking N	4 x 1m
8	526	Crosby Lodge shieling (400/2), looking N	4 x 1m
8	527	Crosby Lodge shieling (400/2), looking NE	4 x 1m
8	528	Crosby Lodge shieling (400/2), looking SE	4 x 1m
8	529	Crosby Lodge shieling (400/2), looking E	4 x 1m
8	530	Crosby Lodge shieling (400/2), looking SE	4 x 1m
8	531	Crosby Lodge shieling (400/2), looking NW	4 x 1m
9	536	Pendragon Castle: entrance passage, looking SW	1m
9	537	Pendragon Castle: entrance passage, door to W newel stair, looking W	1m
9	538	Pendragon Castle: entrance passage, looking NW	1m
9	539	Pendragon Castle: N internal wall, looking NW	1m
9	540	Pendragon Castle: entrance passage, W newel stair, looking W	1m
9	541	Pendragon Castle: entrance passage, door to E newel stair, looking SE	1m
9	542	Pendragon Castle: entrance passage, door to E newel stair, looking NE	1m
9	543	Pendragon Castle: N internal wall, looking NE	1m
9	544	Pendragon Castle: entrance passage, door to E newel stair, looking E	1m
9	545	Pendragon Castle: entrance passage, E newel stair, looking E	1m
9	546	Pendragon Castle: entrance passage, modern wooden steps, looking S	1m
9	547	Pendragon Castle: entrance passage, door to W newel stair, drip mould return, looking SW	-
9	548	Pendragon Castle: interior, looking NW	1m
9	549	Pendragon Castle: W internal wall, looking W	1m
9	550	Pendragon Castle: interior, looking SW	1m
9	553	Pendragon Castle: S internal wall, W part, looking S	1m
9	554	Pendragon Castle: interior, cross-wall, looking E	1m
9	555	Pendragon Castle: interior, repaired roof of SE chamber, looking SE	1m
9	556	Pendragon Castle: N internal wall, entrance passage, looking N	-
9	557	Pendragon Castle: N internal wall, entrance passage, looking N	-
9	558	Pendragon Castle: interior, looking NE	1m
9	559	Pendragon Castle: trackway (207), looking NW	1m
9	560	Pendragon Castle: blocked gateway in field wall, W side, N face (203), looking S	1m
9	562	Pendragon Castle: wall footings to W side of field wall, N face (203), looking W	1m
9	563	Pendragon Castle: blocked gateway in field wall, E side, N face (203), looking S	1m

9	564	Pendragon Castle: blocked gateway in field wall, wall footings to E side, N face (203), looking S	1m
9	565	Pendragon Castle: N part of building range (204/1), looking SW	-
9	566	Pendragon Castle: reflection in Cocklake (209), looking S	-
9	567	Pendragon Castle: reflection in Cocklake (209), looking S	-
9	568	Pendragon Castle: reflection in Cocklake (209), looking S	-
9	569	Pendragon Castle: Lady Anne's bridge, looking NW	-
9	570	Pendragon Castle: trackway (207), looking SE	-
9	571	Pendragon Castle: N external elevation, E side, looking S	1m
9	572	Pendragon Castle: N external elevation, W side, looking SW	1m
9	573	Pendragon Castle: N external elevation, W side, looking SE	1m
9	574	Pendragon Castle: propped section of masonry at NW corner, looking SW	1m
9	575	Pendragon Castle: W external elevation, central part, looking E	1m
9	576	Pendragon Castle: W external elevation, N part, looking E	-
9	577	Pendragon Castle: W external elevation and SW garderobe tower, looking S	1m
9	578	Pendragon Castle: W external elevation, central window, looking E	1m
9	579	Pendragon Castle: W external elevation, recessed panel in central part, looking SE	-
9	581	Pendragon Castle: SW garderobe tower, looking S	1m
9	582	Pendragon Castle: SW garderobe tower, looking NE	1m
9	583	Pendragon Castle: base of SW garderobe tower, looking NE	1m
9	584	Pendragon Castle: interior of NW chamber, looking E	1m
9	585	Pendragon Castle: interior of NW chamber, roof, looking E	1m
9	586	Pendragon Castle: interior of NW chamber, W window, looking W	1m
9	587	Pendragon Castle: interior of SW chamber, garderobe, looking S	1m
9	588	Pendragon Castle: interior of SW chamber, garderobe, looking N	-
9	589	Pendragon Castle: interior of SW chamber, garderobe window, looking W	-
9	591	Pendragon Castle: interior of SW chamber, garderobe, looking S	-
9	592	Pendragon Castle: interior of SW chamber, garderobe doorway, looking E	1m
9	593	Pendragon Castle: interior of SW chamber, garderobe doorway, looking W	1m
9	594	Pendragon Castle: interior of SW chamber, garderobe doorway, looking S	1m
9	598	Pendragon Castle: interior of SW chamber, entrance, looking NE	1m
9	599	Pendragon Castle: interior of SW chamber, looking E	1m
9	600	Pendragon Castle: interior of SE chamber, steel cage at E end, looking W	-
9	601	Pendragon Castle: interior of NE chamber, looking W	1m
9	602	Pendragon Castle: interior of NE chamber, looking W	1m
9	603	Pendragon Castle: interior of NE chamber, window, looking E	1m
10	112	Pendragon Castle: castle mound (201), SE side, slumping scar around tree (Area 1), looking NW	1m
10	114	Pendragon Castle: castle mound (201), SE side, slumping scars (Areas 1 and 2), looking NW	1m
10	115	Pendragon Castle: castle mound (201), SE side, slumping scar (Area 2), looking NW	1m
10	116	Pendragon Castle: castle mound (201), SE side, slumping scar (Area 2), looking NW	1m
10	117	Pendragon Castle: castle mound (201), SE side, slumping scar around tree (Area 3), looking NW	-
10	118	Pendragon Castle: castle mound (201), SE side, slumping scar around tree (Area 3), looking NW	-
10	119	Pendragon Castle: castle mound (201), SE side, slumping scar (Area 2), looking NW	1m

10	120	Pendragon Castle: castle mound (201), SE side, slumping scar around tree (Area 3), looking NW	-
10	121	Pendragon Castle: castle mound (201), SE side, slumping/sheep tracks and tree (Area 3), looking N	-
10	122	Pendragon Castle: castle mound (201), S side, slumping/sheep tracks (Area 4), looking NW	1m
10	123	Pendragon Castle: castle mound (201), S side, scar and slumping around tree (Area 6), looking NW	1m
10	124	Pendragon Castle: castle mound (201), S side, slumping/sheep tracks (Area 4), looking W	1m
10	125	Pendragon Castle: rabbit burrows in S end of bank to SE ditch (200/7), looking NE	1m
10	126	Pendragon Castle: sheep tracks in S end of bank to SE ditch (200/7), looking NE	1m
10	127	Pendragon Castle: castle mound (201), S side, scar and slumping around tree (Area 6), looking N	1m
10	128	Pendragon Castle: castle mound (201), S side, scar and slumping around tree (Area 6), looking NW	1m
10	129	Pendragon Castle: castle mound (201), S side, scar and slumping around tree (Area 6), looking W	1m
10	131	Pendragon Castle: castle mound (201), S side, slumping scar (Area 7), looking NW	1m
10	132	Pendragon Castle: castle mound (201), S side, slumping scar (Area 7), looking NW	1m
10	133	Pendragon Castle: castle mound (201), S side, slumping scar (Area 7), looking NW	-
10	134	Pendragon Castle: castle mound (201), S side, slumping scar (Area 7), looking NE	-
10	135	Pendragon Castle: castle mound (201), S side, slumping scar (Area 7), looking NE	-
10	136	Pendragon Castle: castle mound (201), S side, grassed over slumping scar (Area 8), looking NE	1m
10	137	Pendragon Castle: castle mound (201), S side, grassed over slumping scar (Area 8), looking NE	1m
10	138	Pendragon Castle: castle mound (201), S side, grassed over ground slips/sheep tracks (Area 9), looking NE	1m
10	139	Pendragon Castle: castle mound (201), S side, grassed over ground slips/ sheep tracks (Area 9), looking NE	1m
10	140	Pendragon Castle: castle mound (201), S side, fallen stone below slumping scar (Area 7), looking NE	1m
10	141	Pendragon Castle: castle mound (201), SW side, grassed over slumping scar (Area 10), looking NE	-
10	142	Pendragon Castle: castle mound (201), SW side, partially dead tree W of slumping scar (Area 10), looking NE	-
10	143	Pendragon Castle: castle mound (201), SW side, slumping scar with exposed stone (Area 11), looking NW	-
10	144	Pendragon Castle: castle mound (201), SW side, slumping scar with exposed stone (Area 11), looking SE	-
10	145	Pendragon Castle: castle mound (201), SW side, slumping and erosion (Area 11), looking SE	-
10	146	Pendragon Castle: castle mound (201), W side, ground slip/sheep tracks (Area 12), looking NW	1m
10	147	Pendragon Castle: castle mound (201), W side, ground slip/sheep tracks (Area 12), looking NW	1m
10	148	Pendragon Castle: castle mound (201), W side, ground slip/sheep tracks (Area 12), looking SE	1m
10	149	Pendragon Castle: castle mound (201), W side, fallen masonry around tree (Area 12), looking S	1m
10	150	Pendragon Castle: castle ditch (200/1), W end, fallen masonry, looking N	1m

10	151	Pendragon Castle: castle ditch (200/1), W end, fallen masonry, looking N	1m
10	152	Pendragon Castle: castle ditch (200/1), sheep tracks (Area 14), looking SE	-
10	153	Pendragon Castle: castle ditch (200/1), sheep tracks (Area 14), looking E	-
10	154	Pendragon Castle: castle ditch (200/1), W end, grassed over sheep tracks (Area 13), looking S	1m
10	155	Pendragon Castle: castle ditch (200/1), sheep tracks (Area 17), looking NE	1m
10	156	Pendragon Castle: castle ditch (200/1), sheep tracks (Area 16), looking N	1m
10	157	Pendragon Castle: castle ditch (200/1), sheep tracks (Area 16), looking N	1m
10	158	Pendragon Castle: castle ditch (200/1), sheep tracks (Area 16), looking N	1m
10	159	Pendragon Castle: mole activity, E of building range (204/1), looking W	1m
10	160	Pendragon Castle: mole activity, E of building range (204/1), looking W	1m
10	161	Pendragon Castle: kiln (208/2), looking SE	1m
10	162	Pendragon Castle: E elevation, central window, looking W	-
10	163	Pendragon Castle: castle mound (201), mole activity on E causeway (200/4), looking N	1m
10	164	Pendragon Castle: castle ditch (200/1), rabbit activity between Areas 16 and 17, looking NE	-
10	165	Pendragon Castle: castle mound (201), mole activity on E causeway (200/4), looking E	-
10	166	Pendragon Castle: castle mound (201), mole activity on N side, looking E	1m
10	167	Pendragon Castle: castle mound (201), rabbit burrow next to propped masonry, looking N	-
10	168	Pendragon Castle: castle mound (201), mole activity in SW corner, looking E	1m
10	169	Pendragon Castle: rabbit activity in bank of depression (200/6), looking E	-
10	170	Pendragon Castle: castle mound (201), E side, sheep tracks (Area 19), looking W	-
10	171	Pendragon Castle: castle mound (201), SE side, slumping scar around tree (Area 1), looking NW	-
10	172	Pendragon Castle: castle mound (201), SE side, slumping scar (Area 2), looking NW	-
10	173	Pendragon Castle: castle mound (201), S side, slumping scar and slippage below (Areas 7 and 9), looking NW	-
10	174	Pendragon Castle: castle mound (201), S side, slumping scar and slippage below (Areas 7 and 9), looking NW	-
10	175	Pendragon Castle: raised earthwork (210), looking SW	-
10	176	Pendragon Castle: castle mound (201), S side, slumping/sheep tracks (Area 4), looking NW	-
10	177	Pendragon Castle: interior, sheep erosion around entrance to SW chamber, looking SW	-
10	178	Pendragon Castle: interior, S wall, fallen voussoirs to W window, looking SW	-
10	179	Pendragon Castle: interior, S wall, fallen voussoirs to W window, looking SW	-
10	180	Pendragon Castle: interior, W wall, rubble in S window, looking W	-
10	181	Pendragon Castle: interior, W wall, ferns growing above entrance to SW chamber, looking S	-
10	182	Pendragon Castle: interior, entrance to NW chamber, looking N	-
10	183	Pendragon Castle: interior, entrance to NW chamber, looking S	-
10	184	Pendragon Castle: interior, window to NW chamber, looking W	-
10	185	Pendragon Castle: interior, looking NW	-
10	186	Pendragon Castle: interior, looking NE	-
10	187	Pendragon Castle: interior, looking SW	-
10	188	Pendragon Castle: interior, looking SE	-
10	189	Ravens' Gill barrows: rabbit activity on top of barrow (305), looking SW	1m
10	190	Ravens' Gill barrows: rabbit activity on top of barrow (305), looking SW	1m

10	191	Ravens' Gill barrows: rabbit activity on top of barrow (305), looking W	1m
10	192	Ravens' Gill barrows: rabbit activity on top of barrow (305), looking N	1m
10	193	Ravens' Gill barrows: rabbit activity around tree on barrow (305), looking E	1m
10	194	Ravens' Gill barrows: rabbit activity around tree on barrow (305), looking E	1m
10	195	Ravens' Gill barrows: rabbit activity around tree and sheep track on barrow (305), looking NW	1m
10	196	Ravens' Gill barrows: rabbit activity around tree on barrow (305), looking S	1m
10	199	Ravens' Gill barrows: mole activity on barrow (306), looking S	1m
10	200	Ravens' Gill barrows: lying-in hollow on barrow (306), looking NE	1m
10	201	Ravens' Gill barrows: boundary (304/2), looking S	1m
10	202	Ravens' Gill barrows: old rabbit activity on barrow (307), looking W	1m
10	203	Ravens' Gill barrows: lying-in hollow on barrow (308), looking E	1m
10	204	Ravens' Gill barrows: general erosion on barrow (308), looking NE	-
10	205	Ravens' Gill barrows: erosion on W side of barrow (308), looking S	-
10	206	Ravens' Gill barrows: view of barrow (306) showing lying-in hollow, looking NE	-
10	207	Ravens' Gill barrows: boulder adjacent to boundary (304/2), looking S	1m
10	208	Ravens' Gill barrows: boulder and boundary (304/2), looking S	1m
10	209	Ravens' Gill barrows: scooped platform (303), looking NE	1m
10	210	Ravens' Gill barrows: barrow (302), looking NW	1m
11	211	Crosby Lodge shieling (400/2), looking SW	1m
11	212	Crosby Lodge shieling (400/2), looking W	1m
11	213	Crosby Lodge shieling (400/2), looking N	1m
11	214	Crosby Lodge shieling (400/2), looking E	1m
11	215	Crosby Lodge shieling (400/2), looking SW	1m
11	216	Crosby Lodge shieling (400/1), general view in bracken, looking SW	-

APPENDIX 2
YDNPA PROJECT BRIEF

Monuments at Risk Survey Brief

1.Overview

The Yorkshire Dales National Park Authority wishes to appoint specialist archaeological and architectural support to input into the Monuments at Risk project within the Westmorland Dales Hidden Landscapes Partnership scheme which is being led by Friends of the Lake District. The support will provide survey specifications for four projects identified by the Partnership. This work will contribute towards the preparation of a second round application to Heritage Lottery Fund, including a Landscape Conservation Action Plan and project to conserve the identified monuments during the delivery phase of the scheme.

2. Background

In late 2016, the Friends of the Lake District and a partnership of organisations successfully secured a first round Landscape Partnership Scheme grant from Heritage Lottery Fund to enable it to develop a detailed second round application for submission in July 2018.

Despite being a spectacular landscape of national importance, these Westmorland Dales are often overlooked. The partnership will focus on unveiling and protecting the hidden qualities within this unique place.

Many significant archaeological sites in the project area have been designated as scheduled monuments. Four of these (three identified within this project) are currently characterised as 'At Risk' by Historic England because of their condition or lack of appropriate management. The three at Risk monuments are: Smardale limekilns (part of NHLE:1021107), Crosby Barrow (NHLE:1007603) and Crosby Sheiling (NHLE:1007596). A fourth monument, Pendragon Castle (NHLE:1007156), while not at high risk, is causing some concern in relation to visitor erosion and the safety of parts of the monument to visitors.

Pendragon Castle and the Smardale kilns in particular are visually prominent features and highly important as local landmarks. They have good existing access, and in the case of Pendragon, the survey would facilitate future plans to improve public access.

The project will involve differing degrees of survey of the monuments, and develop detailed management recommendations, with specifications to undertake conservation work at three of the four sites. For the structural remains at Smardale Gill, these will require additional specialist input from an appropriately accredited conservation architect.

Information about the projects will be made available through various media and in conjunction with the Friends of the Lake District and YDNPA. Provision of enhanced

public access will be provided where possible and where not intellectual access will be improved by appropriate means. The appointed contractor will need to identify opportunities for volunteers to be involved in survey work. Both the Friends of the Lake District and YDNPA are willing to facilitate contacts for this element of the project. It is envisaged that both earthwork complexes (Crosby Barrow (NHLE:1007603) and Crosby Sheiling (NHLE:1007596)) will provide the best opportunities for these.

3. Scope of Services Required

- As outlined in the specification below, the successful consultant will carry out and publish detailed surveys of the four sites providing archaeological and photographic surveys and written records of condition together with detailed management recommendations for all four sites.
- The consultant will be expected to maximise opportunities for volunteers to be involved in survey work, some suggestions are included within this specification.
- A close working relationship with the Yorkshire Dales National Park's Senior Historic Environment Officer will be required and also with the project Community Engagement Officer and Historic England.
- The consultant will be required to obtain all consents necessary for the survey work.
- The Heritage Lottery Fund must be acknowledged in accordance with their guidance at all the activities and exhibitions, and on any outputs or publicity material. Any digital outputs must comply with HLF's requirements which can be found on their website. Key requirements include use of the HLF logo on public-facing documentation or promotion material, and mention of the HLF as funding source in generated reports.

4. Budget and Schedule

- Up to £14,500 is allowed for all archaeological survey work agreed with the successful contractor. This fee to include mileage, materials, venue and other expenses associated with the project.
- Up to £3,500 is allowed for consulting a conservation architect and the development of detailed consolidation specifications.
- Payment will be allocated X:Y:Z across three phases of work to be agreed with the successful contractor.
- Payment will be made upon completion of each phase.
- The completion date for the contract is 31st December 2017.

5. Available Materials

- General information about the landscape partnership can be found at: https://www.friendsofthelakedistrict.org.uk/news/unveiling-the-westmorland-dales
- The first round application is attached:

6. Specification

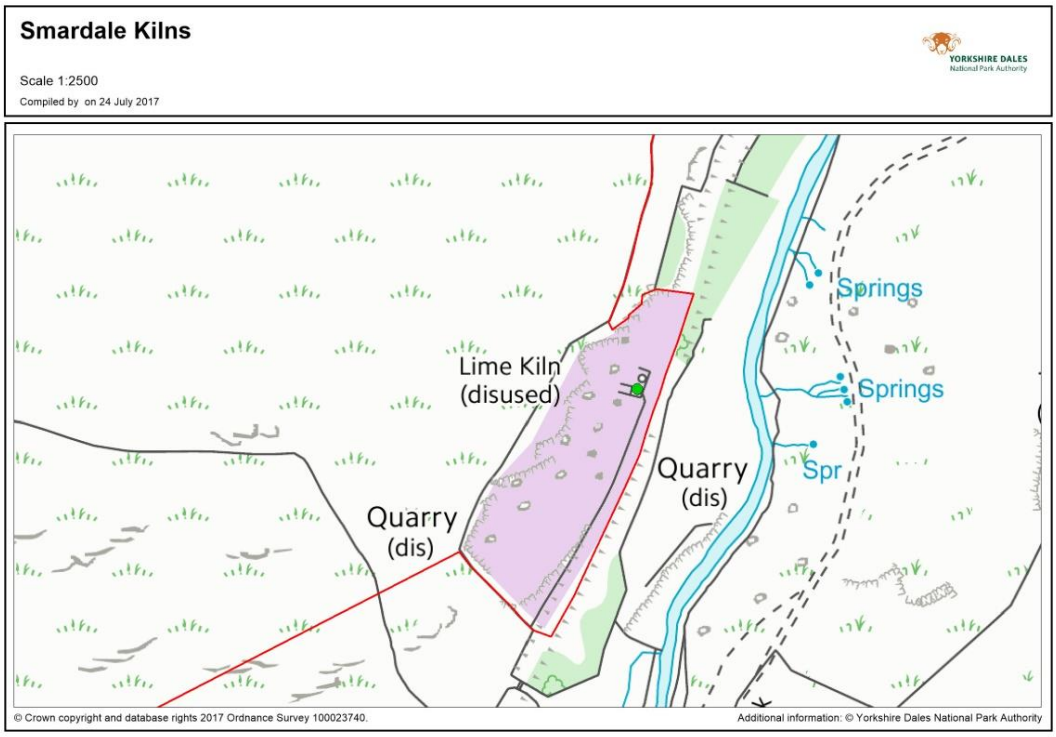
Site Details

Smardale Lime Kilns NY724065 NHLE:1021107 (SM) the kilns are separately listed (GII) as NHLE:1145018

Ownership - The kilns are in the ownership of Cumbria Wildlife Trust, and fall within the Smardale Gill National Nature Reserve. The total area of survey is approximately 1.6 ha, and should encompass the kilns, adjacent quarry, and railway track bed. The kilns form one part of a significantly larger scheduled monument that includes an extensive earthwork settlement and field system complex on the higher ground to the west. Survey of the wider earthwork complex is not required as part of this project.

Vehicular access is possible along the track bed from Smardale, and with the prior permission of the Cumbria Wildlife Trust.

Structural issues have been identified with some areas of the kilns and there is some risk to the structural remains through intrusive vegetation growing on parts of the complex.

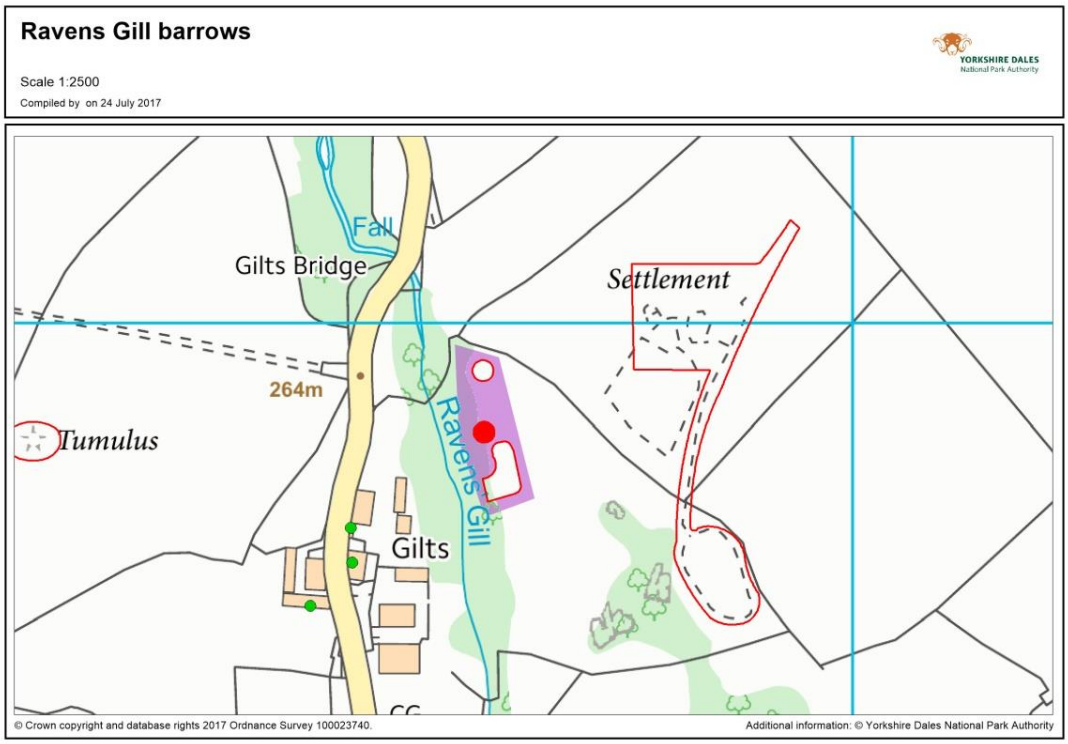


A level three survey is required of the structural remains of the kilns, and this should include drawn elevations at 1:50. There are a number of adjacent features, including inclined planes, the remains of an engine house, railway track bed and other earthworks. These can be surveyed with a level two photographic and descriptive record, and should be included on a 1:2,500 plan and gazetteer of the quarry site.

An accompanying report by a conservation architect/structural engineer should identify a detailed methodology to stabilise and repair the fabric of the kilns, and identify areas of problematic intrusive vegetation. The complex contains a number of revetment and enclosure walls, and the structural report should consider any such areas that are structurally unsound or pose a clear risk to health and safety.

Crosby Barrow NY627119 NHLE:1007603 (SM)

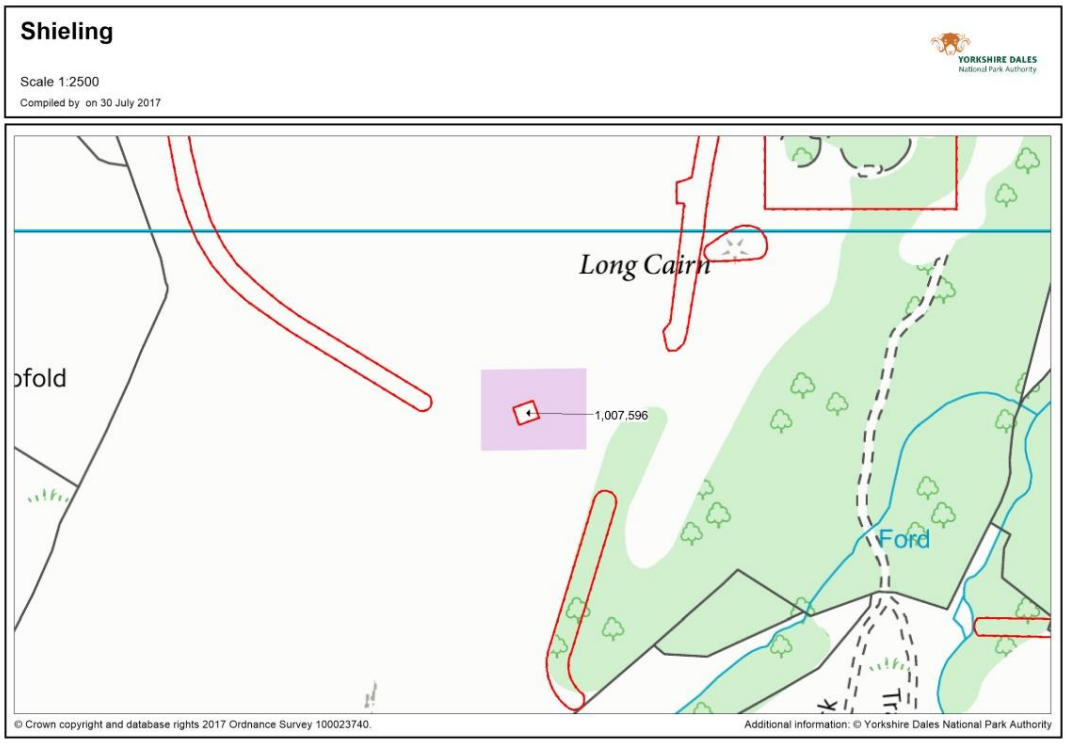
The barrow forms part of a group of five closely located bowl barrows overlooking Raven's Gill, and lying within an area of less than 0.5 ha. The four adjacent scheduled barrows are covered within NHLE:1007604 and NHLE:1007602.
Access to the complex is likely to be via the nearby Gilts Farm and will require prior negotiation with the landowner.



A level three earthwork survey should be undertaken to cover the group of barrows – bidding contractors should allow one day for supervision of volunteers at this site. The report and survey plans should identify areas of erosion, and propose a detailed and appropriate methodology for reinstating damaged areas of the monument. Long vegetation may mean that this site is better to survey late in 2017.

Crosby Shieling NY61391187 NHLE:1007596 (SM)

This small earthwork complex lies some 650m south west of Crosby Lodge. It is described withn the HER as a "rectangular single roomed shieling measuring c 11m x 4m and is of boulder construction standing one course high above ground level. It is one of five shielings located in close proximity to a medieval deerpark which was enclosed in 1336 by the Threlkeld family of Crosby Lodge". The surrounding area contains a number of scheduled monuments, including prehistoric earthworks and the remains of deer park boundaries. It is likely that bracken is now encroaching into this area, and it may be appropriate to complete this element of the project later in 2017.



Earthwork survey of the complex should be at level three – the practical outdoor element of the project should be suitable for the involvement of volunteers, and bidding contractors should allow one day for supervision of volunteers at this site.

The report and survey plans should identify areas of erosion and intrusive vegetation, and propose an appropriate methodology for reinstating damaged areas of the monument.

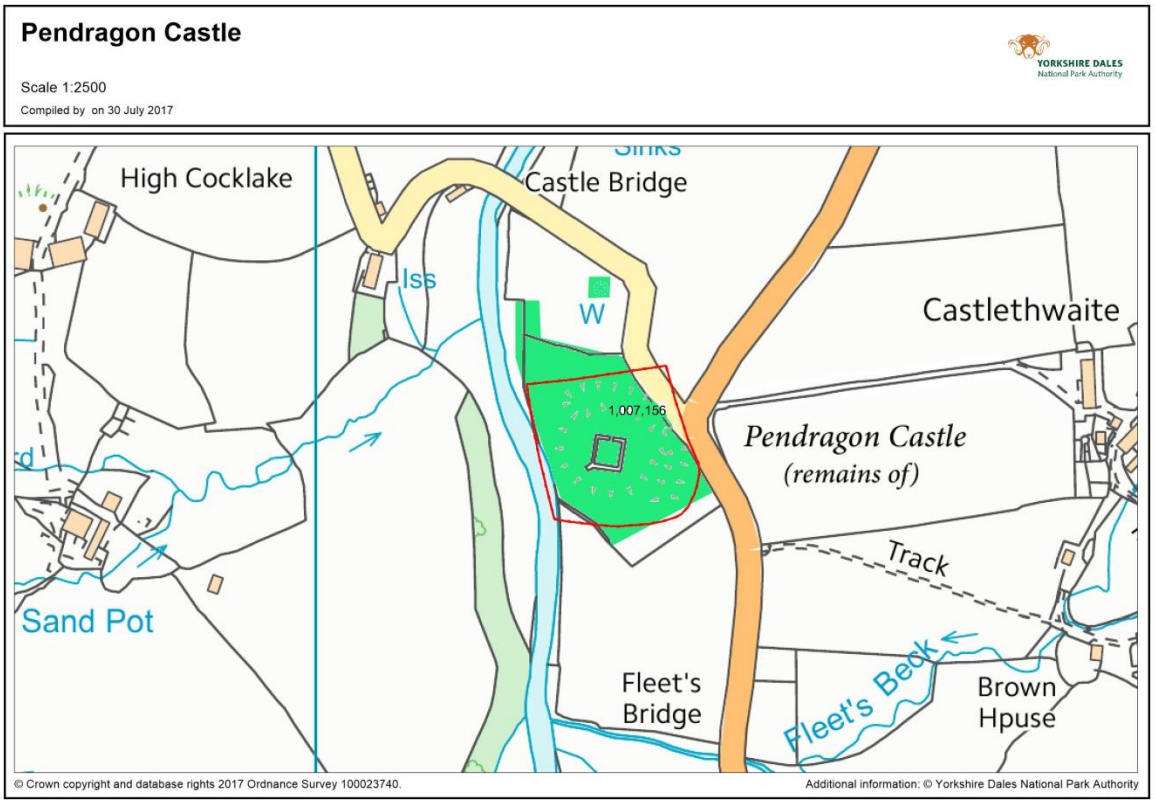
Pendragon Castle NY78180263 NHLE: 1007156 (SM), NHLE: 1144890 (LB)

Pendragon Castle is a well known 12th Century fortified tower house originally associated with Sir Hugh de Morville, and thought to have been constructed circa 1180. It was burnt during Scots raids during the 14th and 16th Centuries, and restored for Lady Anne Clifford during the 17th Century. The Complex has been subject to archaeological survey works and documentary research in the recent past and was recently the subject of a Conservation Scoping Report (2017). It is proposed to resurvey areas of the monument for the purposes of improving archaeological understanding and detailing the present condition of the monument in relation to potential future works both to conserve earthwork and structural remains and enhance access to the monument.

1. A plan of earthwork remains to the interior of the tower, formed by a combination of collapse of the former structure, and surviving internal cross walls etc (circa 0.03ha). There are presently some issues caused by public access over the uneven ground within the tower and areas of related erosion and damage to stonework arising. Beyond depicting the earthworks and limits

of masonry, the survey needs to highlight any areas of bare or eroding ground. Because of the potential for future works to the interior, it is suggested that the internal earthworks are recorded at 1:50, and that the survey makes recommendations as to the archaeological sensitivity and risk to areas suffering erosion and provides broad recommendations (not specifications) about ways of mitigating both erosion and health and safety issues relating to the interior earthworks.

2. The surrounding earthworks of the castle mound and ditch, which have been subject to previous survey, but warrant more detailed attention following episodes of slumping over recent winters. These should be surveyed at 1:500, and need to identify areas of erosion in detail.
3. A nearby field barn (NY78130270 - close to the north western limit of the SM) and area of surrounding earthwork remains of former stables, currently used as storage for masonry from the complex. The building is being considered as a potential site for change of use in interpreting the complex.
4. Survey at 1:50 of a probable sow kiln (erroneously marked on the OS plan as a well.



All survey work is required to level three.

Project results will be made available to feed into a wider conservation management plan being developed for the SM by the owner Mr J Bucknall (Pendragon Estate).

There is direct access to the site from the main Mallerstang Road. The successful contractor will need to liaise with John Bucknall of the Pendragon Estate over survey arrangements.

7. Aim of works

Generic aims of survey projects are to:

i) Identify and gather sufficient information to establish the extent, nature, character, condition, quality, date and significance of the surviving archaeological and historical features within each survey area;
ii) Where required, (Smardale Kilns) provide a detailed structural assessment of the standing remains.
iii) Provide detailed consolidation specifications for the Smardale kilns, while considering the needs of any protected species that may be present upon the complex, (note that the wildlife survey is being separately provided, and results will be provided to the successful contractor).
iv) Examine and document any evidence for damage to the complex that relates to either; natural erosion, structural decay or current land management, drawing up a list of recommendations towards the 'ideal management' of each site.
v) Provide an accessible version of the report, suitable for publication in an appropriate academic publication.
vi) Tenders should contain an outline method statement for developing a new instrument survey of the archaeological and historical features together with a detailed description and photographic record and report and preparation of structural report and consolidation specifications.
vii) Reference to the 'Level' of survey within this brief explicitly means to the survey levels identified within (formerly) English Heritage documents 'Understanding the Archaeology of Landscapes' (2007) and 'Understanding Historic Buildings' (2006).
viii) The extent and complexity of the sites may mean that survey is required at a variety of levels. It is recommended that contractors make a preliminary visual inspection of the areas to familiarise themselves with the extent of the archaeological remains and the scope of the work.
ix) All aspects of archaeological work should meet appropriate CIfA standards.

8. SCOPE OF WORK

8.1 Topographic survey – generic requirements.

I. A new, detailed instrument survey, accurate at 1:250 scale (or at other scale as identified above), is required of the principal survey areas, together with detailed plans, accurate at 1:50 scale, of individual key structures and built features.

II. This should be reproduced as a general, hachured, site plan or plans at 1:500 scale showing the archaeological remains, together with sufficient topography to enable them to be readily located. This is to include the mapping (although not detailed survey) of boundary walls and coarse vegetation differences which may reflect previous activity on the site. A detailed vegetation survey is not required.
III. Phased elevation drawings of the built structures are required at 1:50 scale. Elevations can be based on rectified photographs or photogrammetric imagery where appropriate. (Note – elevations of Pendragon Castle are not required, although will be for the nearby storage barn).
IV. Elevations should show significant architectural and structural features, but stone by stone drawings are not required.
V. It is possible that the survey may identify other features requiring more detailed survey and consolidation; a decision on this will be made at the progress meetings, or through contacting the Senior Historic environment Officer as required.
VI. Drawn records should be presented as wet ink plots on standard 'A' size matt surface stable polyester film sheets (Minimum thickness 75 microns) with appropriate grid marks, height values, compass points and information panel incorporating title, drawing number, keys, credits, date etc. Line thicknesses and point sizes should be chosen to allow for ease of duplication and reduction. Where appropriate drawing conventions should follow the general guidelines given in *Understanding historic buildings: a guide to good recording practice* (English Heritage (RCHME 2006) and *With Alidade and Tape* (English Heritage 2002) as appropriate.
VII. Scanned versions of survey drawings are acceptable instead of wet ink plots but no use should be made of CAD methods for the generation of repetitive architectural features or detail.

7.2 Structural Survey

I. A suitably qualified and experienced conservation architect or structural engineer will inspect and report on the structural condition of the kilns at Smardale Gill. The inspection will be both internal and external and will include the bowls, draw arches, walls, and any other relevant elements of the structures. It will also include the immediate surroundings in case there are adjacent factors which could indicate a risk to the foundations.
II. The quarry complex contains a number of revetment and enclosure walls, and the structural report should consider any such areas that are structurally unsound or pose a clear risk to health and safety.

8.3 Photographic Survey

I. An external photographic record should be made of all elevations of the structures, and of earthwork features from vantage points (within the constraints of the site), together with close up photography of significant detail.

II. The contractor should ensure that all visible elements of each elevation are recorded photographically; this may require photographs from a number of vantage points.
III. A general external photographic record should also be made which includes oblique general views of the structures and earthworks showing them in their setting.
IV. The general photographic guidelines given in *Understanding historic buildings: a guide to good recording practice* (English Heritage 2006) should be followed.
V. Each photograph should normally be provided with a scale, and the use of an identifier is recommended for detailed views.
VI. Photographs should be used to show not only the structures' appearance but also to record the evidence on which the analysis of their historic development is based.
VII. Digital imagery, rather than conventional film photography, is acceptable for the photographic recording although medium resolution images (of 5mb file size) are required as a minimum. Unedited images should be archived as tiff files, as well as any processed images.
VIII. A full image catalogue is required as part of the archive.

8.4 Written Accounts

I. A structured gazetteer of numbered site components should be made to include a summary description and preliminary interpretation of extant remains (e.g. location, dimensions, plan, form, function, date, sequence of development), mention of relevant documentary evidence and assessment of current condition and threats.
II. Proforma record formats should be used: examples of the proposed format should be submitted with the method statement.

8.5 Samples and Loose Finds

I. No sampling work is intended as part of this project. Any loose finds should be reported to the Senior Historic Environment Officer at the Yorkshire Dales National Park Authority at the earliest opportunity.
II. Any recommendations for sampling and material analysis should be made in the report.

8.6 Documentary Research

I. New documentary research has not been included in this Project Brief, however, an appraisal of existing historical and documentary research is required, and contractors should allow three days to undertake this.
II. Such information as is known to the Yorkshire Dales National Park Authority will be made available and provision should be made, and identified in the project design, for the incorporation of that information.
III. The Yorkshire Dales National Park Authority has Digital vertical aerial imagery, historic OS mapping and a number of oblique aerial photographs,

which can be made available to view, some of which are available to reproduce under a contractors licence.

8.7 Wildlife Survey

I. The National Park Authority is separately commissioning an appropriate wildlife survey of both the Smardale kilns and Pendragon Castle survey areas. The results of these surveys will be made available to include alongside the management plan reports.

9 PRODUCTS

9.1 Archaeological Survey Report

I. A copy of an illustrated and typed report should be provided to the YDNPA HER and to the Friends of the Lake District no later than eight weeks after the end of on-site work or such longer period as may be agreed in writing with the National Park Authority.
II. Four additional copies should be provided to each of the landowners.
III. Reports should be bound and A4 in format, unless otherwise agreed. A pdf copy of the final report should also be supplied.
IV. The report should assemble and summarise the available evidence for the monuments in an ordered form, synthesise the data, comment on the quality and reliability of the evidence and how it might need to be supplemented by further work. It should include the following (as appropriate to each monument/complex) based on the processes outlined in 8.1 - 8.6.

- Executive summary
- Name of client.
- Contents list
- An outline of the project plan and research objectives.
- A brief summary of any previous works on the site and immediate background.
- Hachured earthwork survey
- Detailed drawn sections, plans and, where appropriate, drawings and photographs of artefacts and other detail.
- Written and graphic descriptions of stratigraphic units stating data acquisition levels.
- An inventory of any finds.
- Copies of appropriate archive drawings and photographs of the sites.
- Statement of methods used with reasoned explanation of any departure from standard procedures and details of any particular constraints under which the work was carried out.
- An account of the overall form and development of the sites and of the evidence supporting interpretation (including any specialist contributions)
- Summary of significance of findings.
- Notes and bibliography.
- List and key to drawings and photographs.

- Copy of the brief and the approved project design or method statement as well as an indication of any departure from this.
- Names of staff involved and the parts played by each with the dates of fieldwork.
- Acknowledgements.
- A summary of the results should be prepared for publication in an appropriate local journal, or other appropriate journal or monograph as agreed with the Senior Historic Environment Officer at the Yorkshire Dales National Park Authority.
- A presentation at a day school on the historic environment of the Yorkshire Dales may be required.

The Yorkshire Dales National Park HER contributes to the *Online Access to Index of Archaeological Investigations* (OASIS) project. The archaeological contractor must therefore complete the online OASIS form at http://ads.ahds.ac.uk/project/oasis/. Contractors are advised to contact the YDNPA HER prior to completing the form. The successful contractor is to license the Friends of the Lake District and the Yorkshire Dales National Park Authority for unrestricted use of all survey material, drawings, photographs and other products of the project on payment of the final invoice. Information and plans etc resulting from the project (suitably acknowledged) may be used by these organizations in research reports, or any similar publications, for use in any interpretative or publicity material as well as being made available through the HER and its derivatives. The originators will retain the right to be identified as authors of all project documentation and reports as specified in the Copyright design and Patents Act 1988 (chapter IV, section 79).

9.2 Structural Survey Report

I. The report will detail the structural condition and adequacy of all the load-bearing elements at the Smardale kilns, and will identify in detail any structural problems or concerns, their probable cause, current active status, continuing threat and level of urgency. The report should include a complete photographic record of the structural defects.
II. The report will then recommend appropriate measures to rectify any structural problem/s.
III. Where repairs/remedial works, or further investigations are recommended these recommendations should, where appropriate, include a range of alternative options with a ‘best’ option based upon good conservation principles and sound practicality.

9.3 Wildlife survey report (to be provided to the successful contractor by the YDNPA)

I. The report will indicate the presence of any protected or otherwise significant species using the complex, and will outline where there is a need for any mitigation or particular measures required to protect species in the course of consolidation works.
II. Any legal requirements or relevant standard guidance will be highlighted.
III. The Wildlife Survey report will be used by the successful contractor to inform the consolidation specifications.

9.4 Consolidation Specifications

I. These should identify all work necessary within the site to protect, secure and consolidate the kilns and enable surviving features to withstand natural erosion, a low level of agricultural grazing and visitor activity.
II. The concept to be followed for works to built remains is "consolidate as found" rather than restoration and rebuilding. If limited rebuilding is proposed as necessary to ensure the stability of the consolidated monument this should be fully justified. It is anticipated that the proposed works, unless specified otherwise, will require the use of traditional methods of building using traditional materials and should normally be reversible.
III. No intrusive work is to take place prior to consolidation work.
IV. Any proposals for rubble clearance should include archaeological supervision to allow for detailed recording.
V. Specifications should provide for:

- Protection of site and structures
- Rubble clearance
- Any areas of repointing and rough racking
- Replacement, resetting and/or rebuilding
- Treatment of any timber or metal work
- Vegetation management
- Monitoring
- Site reinstatement

Four copies of a detailed document suitable for seeking competitive tenders should be provided. Following verification with the National Park Authority, the owners and Historic England, the consolidation specifications will be confirmed.

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9.5 Survey Archive

The Contractor shall be expected to properly order and index the full archive record (paper, magnetic and plastic media) for the project in line with the standards set by the National Archaeological Record and to deposit the archive with the Yorkshire Dales National Park Authority. The archive should consist of the following:

- Copies of relevant documentary material arranged to date sequence:
- Bibliographic sources
- Cartographic sources
- Pictorial sources
- Survey control information:
- Diagram showing traverses and control network
- List of coordinates of control points and traverse stations
- Digital survey data
- Set of Field and Final Ink Drawings:
- Digital Photographs: Provided on CD or DVD.
- Written accounts/pro formae gazetteers:
- Site components

- Individual contexts
- Structured catalogues and indices:
- Documentary material
- Field and final ink drawings
- Photographs
- Project Management Records:

10 METHODOLOGY

It is the responsibility of the Contractor to select the most appropriate survey methodologies and equipment to provide the required product. A detailed costed method statement is required of the Contractor to be accepted in writing before work commences. This should indicate the proposed methodologies to be adopted; the relevant experience of the organisation, key personnel and any sub-contractors, particularly those chosen for the structural analysis; details of staff resources to be applied to the survey; a breakdown of costs and the proposed timetable for completion of fieldwork and submission of report and archive.

Evidence of compliance with the Health and Safety at Work Act 1974 will be required.

Particular attention should be paid to ensure that the aims and objectives of the project are directly informed by the methodologies employed and that the project team displays the appropriate levels of expertise to carry out the work.

The Contractor, their staff and any sub-contractors will be expected to comply with relevant Codes of Practice of the Chartered Institute for Archaeologists. Contractors should note that the Yorkshire Dales National Park Authority's Standard Conditions of Contract apply.

11 MONITORING

Monitoring of the fieldwork will be carried out by the archaeological staff of the Yorkshire Dales National Park Authority.

Contractors tendering should cost for:

- An appointment/inception meeting with the Senior Historic Environment Officer, likely to be attended by the owner of the Pendragon estate.
- Two short onsite monitoring meetings during survey work at Pendragon and the Smardale kilns.
- A meeting to discuss draft reports and consolidation proposals before final submission.

6. Contract Management

This contract will be managed by the Senior Historic Environment Officer at the Yorkshire Dales National Park Authority. All correspondence and queries relating to the delivery of the contracted work should be directed to

Miles Johnson, Senior Historic Environment Officer, YDNPA. Yoredale, Bainbridge, Leyburn. DL8 3EL.

Between office hours, Monday – Friday 9.30am- 5.30pm only.

Tel: 01969 562361 Miles.Johnson@yorkshiredales.org.uk

between office hours, Monday – Friday 9.30am- 3.30pm only. Phone, email

7. Timetable

MILESTONE	DATE
Submit tenders to YDNPA	*15th September 2017*
Shortlisting	
Selection of preferred contractor	*20th September 2017*
Inception meeting	*(Circa) 22nd September*
Present outline concepts and framework to Steering Group	*Tbc*
Trial proposals and finalise framework and costs	*Tbc*
Present detailed proposals, budget and briefs to Steering Group	*Tbc*
Submit final report with briefs and budgets	*31st December 2017*

8. Tender Submission

Please submit the following information to Richard Burnett by 12 noon 8th September 2017. Shortlisted agencies will be contacted on and asked to take part in a discussion about the work in XX on XXXX Please confirm with the tender submission that you will be available on these dates.

Your tender should include:

- An outline of how you would deliver the work within the timescales and budget and with detailed reference to the brief above,

- Details and relevant experience of the individual(s) who will be delivering the work,
- Examples of similar work completed for other projects including any HLF projects, and references. Contractors bidding should allow for four days of volunteer involvement within the project.
- A budget and timetable broken down into the different components of the work:
    - Total cost for professional services excluding VAT
    - The fee structure for the individuals involved including estimated time allocation
    - Estimated costs for travel and any accommodation or other subsistence
    - Total cost for all work and expenses, excluding VAT
    - VAT status

9. Selection Criteria

Criteria	**Score**	**Weighting**	**Total**
Cost	**1- 5**	**X3**	
Methodology	**1- 5**	**X3**	
Resilience	**1- 5**	**X4**	
Experience of delivering similar studies	**1- 5**	**X4**	
Total			

APPENDIX 3
EDAS PROJECT DESIGN

WESTMORLAND DALES HIDDEN LANDSCAPE PARTNERSHIP: MONUMENTS AT RISK SURVEY

EDAS PROJECT DESIGN

Introduction

Various pieces of survey work are required of four archaeological Scheduled Monuments in Cumbria as part of the Westmorland Dales Hidden Landscapes Project, led by the Friends of the Lake District. The four monuments are currently 'at risk', and the work is required to provide a pre-intervention level of survey prior to undertaking repair and/or management schemes. Details of the four monuments are given below, and three of the sites were visited by EDAS on 22nd August 2017.

The extent of the project is defined by a brief produced by the Yorkshire Dales National Park Authority (YDNPA), and this detailed costed methods statement defines the work that EDAS will undertake if appointed to the project. The project will be funded by the Friends of the Lake District, although contract management will be undertaken by the Senior Historic Environment Officer of the YDNPA.

Background Information

Site Locations and Descriptions

1) Smardale lime kilns (NGR NY 724 065)

The Smardale lime kilns are a Scheduled Monument (NHLE 1021107) as well as Grade II Listed Buildings (NHLE 1145018). They are in the ownership of the Cumbria Wildlife Trust, and fall within the Smardale Gill National Nature Reserve. The kilns form one part of a significantly larger Scheduled Monument that covers an extensive prehistoric and Romano-British earthwork settlement and field system complex in the same area, although these features are not required to be surveyed. Vehicular access to the kilns is possible along the railway track bed from Smardale, with the prior permission of the Cumbria Wildlife Trust.

The kilns date to the mid 19th century and represent a major commercial lime producing operation. They consist of two large co-joined dressed limestone structures up to 10m high, and are of two phases of construction, the kiln to the right being original and the kiln to the left being later. Both kilns have draw holes set within semi-circular draw arches which are set about 2m above ground level - access to the draw holes was originally via steps cut into the face of the wall. The two charge holes above the kilns are now largely infilled, but the original one shows evidence of having been lined with firebricks. Limestone was brought from the adjacent quarry workings in trucks along a tramway or inclined plane to the south of (above) the kilns, hauled by a stationary engine located in an engine house, the ruins of which lie on the top of the kilns.

The area of archaeological survey measures c.1.6 ha, and encompasses the kilns, adjacent quarry and it's elements, and the abandoned railway track bed in front of the kilns. A Level 3 survey, as defined by English Heritage (now Historic England) (2007), is required of the kilns themselves, while the adjacent quarry, railway track bed and other features can be surveyed at Level 2.

Structural issues have been identified with some areas of the kilns, and there is some risk to the structural remains through intrusive vegetation growing on parts of the complex. A report by a conservation architect/structural engineer needs to identify a detailed methodology for stabilisation and repair of the fabric of the kilns, and identify areas of problematic intrusive vegetation.

2) Crosby Barrow (NGR NY 627 119)

This barrow forms part of a group of five closely spaced bowl barrows overlooking Raven's Gill, lying within an area of less than 0.5 ha. It is a Scheduled Monument (NHLE 1007603), as are the four adjacent barrows (NHLE 1007604 and NHLE 1007602). Access to the complex is likely to be via the nearby Gilts Farm and will require prior negotiation with the landowner.

A Level 3 earthwork survey is required of the group of barrows, and elements of the project may be suitable for the involvement of volunteers. The resulting survey report and plans should identify areas of erosion, and propose a detailed and appropriate methodology for reinstating damaged areas of the monument. Long vegetation may mean that this site is better to survey late in 2017.

3) Crosby Shieling (NGR NY 6139 1187)

This small earthwork complex lies some 650m south west of Crosby Lodge, and is a Scheduled Monument (NHLE 1007596). It is described as a rectangular single roomed shieling measuring c.11m by 4m, and is of boulder construction standing to one course high above ground level. It is one of five shielings located in close proximity to a medieval deer park which was enclosed in 1336 by the Threlkeld family of Crosby Lodge. The surrounding area contains a number of scheduled monuments, including prehistoric earthworks and the remains of the deer park boundaries, although these are not required to be surveyed. It is likely that bracken is now encroaching into this area, and it may be appropriate to complete this element of the project later in 2017.

A Level 3 earthwork survey is required of the monument, and elements of the project may be suitable for the involvement of volunteers. The resulting survey report and plans should identify areas of erosion, and propose a detailed and appropriate methodology for reinstating damaged areas of the monument. Bracken encroachment may mean that this site is better to survey late in 2017

4) Pendragon Castle (NGR NY 7818 0263)

Pendragon Castle is a well known 12th century fortified tower house originally associated with Sir Hugh de Morville, and thought to have been constructed around 1180. It was burnt during Scottish raids during the 14th and 16th centuries, and restored for Lady Anne Clifford during the 17th century. The complex has been subject to survey works and documentary research in the recent past and was recently the subject of a Conservation Scoping Report. The ruins are a Scheduled Monument (NHLE 1007156) and a Grade 1 Listed Building (NHLE 1144890). The results of the project will feed into a wider conservation management plan being developed by the owner, Mr J Bucknall of the Pendragon Estate. There is direct access to the site from the main Mallerstang Road, and access arrangements will need to be confirmed with Mr Bucknall.

Several areas of the monument are required to be surveyed for the purposes of improving archaeological understanding in relation to future works to conserve and enhance access to the monument; all surveys are be to Level 3.

1) An earthwork survey is required of the interior of the tower, formed by a combination of collapse of the former structure, and surviving internal cross walls etc (c.0.03ha in extent). There are presently some issues caused by public access over the uneven ground within the tower and areas of related erosion and damage to stonework arising. Beyond depicting the earthworks and limits of surviving masonry, the survey needs to highlight any areas of bare or eroding ground. In view of the potential for future works to the interior, it is suggested that the internal earthworks are recorded at 1:50 scale, and that the survey makes recommendations as to the archaeological sensitivity and risk to areas suffering erosion; broad recommendations are required about ways of mitigating both erosion and health and safety issues relating to the internal earthworks.

2) The surrounding earthworks of the castle mound and ditch, which have been subject to previous survey, warrant more detailed attention following episodes of slumping over recent winters. These should be surveyed at 1:500 scale, and need to identify areas of erosion in detail.

3) A nearby field barn (NGR NY 7813 0270, close to the north-western limit of the Scheduled Monument) and an area of surrounding earthworks (c.0.04ha in extent) representing former stables, is also to be surveyed at a scale of 1:50 (both plan and external elevations). The barn is currently used as storage for masonry from the complex, and it is being considered as a potential site for change of use in interpreting the complex.

4) A probable sow kiln, erroneously marked on OS maps as a well, is required to be surveyed at 1:50 scale.

Aims of the Project

The aims of the project are:

- to identify and gather sufficient information to establish the extent, nature, character, condition, quality, date and significance of the surviving archaeological and historical features within each survey area;

- to provide a detailed structural assessment of the standing remains at the Smardale kilns and the field barn at Pendragon Castle;

- to provide detailed consolidation recommendations for the standing remains at the Smardale kilns and the field barn at Pendragon Castle, while considering the needs of any protected species that may be present within the sites;

- to examine and document any evidence for damage to the four complexes that relates to either natural erosion, structural decay or current land management, drawing up a list of recommendations towards the 'ideal management' of each site;

- to provide an accessible version of the report, suitable for publication in an appropriate academic publication.

Survey Methodologies

The YDNPA survey brief notes that the tenders for this project should contain an outline method statement for a new instrument survey of the archaeological and historical features, together with a detailed description and photographic record and report, and the preparation of structural report and consolidation specifications.

A total of five separate elements are required to be undertaken as part of this project, namely documentary research and collation, topographical survey, building recording, structural assessment, and the production of consolidation recommendations. In many cases, there are cross references and links between the various project elements, with some elements informing and determining the scope and scale of subsequent elements.

Documentary Research and Collation

The YDNPA project brief does not require any new documentary research to be undertaken, although existing readily-available material held by the YDNPA will be provided, and this will need to be incorporated into the survey work and reports. It is likely that this readily-available information will include digital vertical and oblique aerial photographs and historic Ordnance Survey mapping. However, as part of their own researches into castles in the north of England,

EDAS has already obtained copies of previous survey reports relating to Pendragon Castle (Fiorato 1990; LUAU 1996), and these will be used to inform the survey and its results.

Archaeological and Building Surveys

1) Site Survey Work (1:500 scale Level 3 Surveys - Crosby barrows, Pendragon Castle)

Detailed Level 3 divorced archaeological surveys of the various areas defined by the YDNPA survey brief will be carried out to record the position and form of all features considered to be of archaeological and/or historic interest. The survey areas comprise the area of the five Crosby barrows (c.0.5ha) and the surroundings of Pendragon Castle (estimated at c.1.2ha); the Pendragon Castle survey will be carried out at a scale of 1:500 while the Crosby barrows will be at 1:250, the latter considered to be more appropriate to show areas of erosion, animal burrows etc.

These larger area surveys will be carried out using EDM total station equipment. Sufficient information will be gathered to allow the survey areas to be readily located through the use of surviving structures, fences, walls, water courses, trackways and other topographical features; surrounding walls will also be surveyed where they fall within the survey areas.

The surveys will record the position at ground level of all structures, wall remnants and revetments, earthworks, water courses, leats, paths, stone and rubble scatters, ironwork, fences, walls and other boundary features, and any other features considered to be of archaeological or historic interest. At Pendragon, the survey will also survey the external footprint of the castle, and the external footprint of the field barn, so they can be included in the general survey. The surveys will also record any differences in the exposed surface detritus, such as sorted stone and/or rubble scatters, as well as differences in coarse vegetation; these features may aid the functional differentiation and interpretation of the site. The surveys will also record any areas of erosion (both natural, animal and man-made) or other damage.

The site surveys will be integrated into the Ordnance Survey national grid by resection to points of known co-ordinates. Heights AOD will be obtained by reference to the nearest OS benchmark where this is possible, although it is accepted that the isolated nature of the some of the sites mean that no benchmarks will be available; contours will not be plotted across the sites. Survey points will be taken from fixed survey stations on a closed traverse around and through the site. The locations, descriptions and values of the benchmarks and control points will be stated in the final survey data.

On completion of the total station survey, the field data will be plotted and re-checked on site in a separate operation. Any amendments or additions will be surveyed by hand measurement, and the results digitised back into the electronic survey data.

The resulting site survey will be produced at a scale of 1:500/1:250 as appropriate, and presented as an interpretative hachure plan(s) using conventions analogous to those used by Historic England/English Heritage (1999; 2002, 14; 2007, 31-35). It is envisaged that the final survey drawings will comprise one or more standard 'A' size sheets. It should be noted that the final product arising from the site survey will be a series of hand-drawn wet ink hachure plans, although AutoCad (or equivalent) electronic data could also be provided if required. Larger scale plans, at 1:10,000 and 1:2,500 scale, will be used to put the survey area into context (OS map bases to be provided by the YDNPA).

2) Site Survey Work (1:2500 scale Level 2 Survey - Smardale lime kilns)

The wider landscape of the Smardale kilns, comprising the quarry, abandoned railway track bed, inclined planes etc, will be subject to a Level 2 survey. This level of survey is defined as a descriptive and photographic record (English Heritage 2007, 23), although identified site elements, earthworks, quarry faces, lengths of walling, spoil heaps etc will be sketch-plotted onto an

Ordnance Survey 1:2500 map base using a hand-held GPS for accurate location where required (OS map bases to be provided by YDNPA).

3) Site Survey Work (1:50 scale Building Recording - Smardale lime kilns, Crosby shieling, Pendragon Castle interior and field barn)

Detailed plans and phased elevation drawings of the Smardale kilns will be produced at a scale of 1:50 using a combination of hand measurement and reflectorless EDM total station survey; rectified photography will not be used. In addition to the usual ground floor plan, a 'top floor' plan will include the ruined engine house on the top of the kilns as well as the infilled charge holes. The three external elevations of the kilns will be surveyed, but internal surveys (i.e. of the draw hole) will depend on health and safety considerations.

A 1:50 scale plan of the ruined Crosby shieling and its immediate environs will be produced using hand-measurement techniques (tape and offset survey). Given the nature of the remains, it is assumed that phased elevation drawings are not required of this monument.

Using the 1:500 scale footprint survey as a base, a detailed 1:50 scale ground floor plan of the Pendragon field barn will be produced, as well as the external elevations at 1:50 scale, using hand measurement techniques; rectified photography will not be used. It has already been determined following discussions with the YDNPA that the internal elevations of the barn can be recorded photographically.

A detailed 1:50 scale ground floor plan of the interior of Pendragon castle will also be produced by hand measurement. This will be restricted to the internal footprint, wall faces etc, but will not show window or door reveals, underground chambers, mural passages, garderobes etc, unless time allows. Within this footprint, the earthworks of the interior, surviving internal cross walls, areas of collapse and rubble, areas of bare or eroding ground etc, will be surveyed.

The resulting drawings will show all significant detail such as openings (blocked or unblocked), inserted doorways, fittings, sockets etc. The elevations will show all significant architectural and structural features such as construction detail, modifications and differences in fabric, and the stones ("quoins") or dressings around openings and at corners; stone-by-stone drawings are not required. The elevation drawings will be marked with a common datum reduced to levels tied into a temporary site benchmark. All drawings will be produced according to the guidelines established by Historic England/English Heritage (2006, 8-10 & 19-21). The resulting 1:50 scale plans and elevations will also be used as a base for the structural assessment and the production of appropriate recommendations for consolidation (see below).

It is envisaged that the final survey drawings will comprise one or more standard 'A' size sheets. It should be noted that the final product arising from the site survey will be a series of hand-drawn wet ink hachure plans. Larger scale plans, at 1:10,000 and 1:2,500 scale, will be used to put the survey areas into context (OS map bases to be provided by the YDNPA).

4) Site Survey Work (1:50 scale Level 3 survey - Pendragon sow kiln)

Using the 1:500 scale footprint survey as a base, a detailed 1:50 scale ground plan of the Pendragon sow kiln will be produced, using hand measurement techniques.

5) Additional Site Survey Work

Additional surveys (either walkover, EDM topographical, earthwork and/or building survey work) may be undertaken of specific areas within or outside the defined survey areas if required and thought beneficial to the project. This might, for example, include the completion of a 1:50 scale ground plan of Pendagron Castle, the production of one or more sections through the castle

mound and ditch, or the survey of any additional earthworks (e.g. garden features) currently outside the area of survey. Any such work would be discussed and agreed with the YDNPA and the Friends of the Lake District in advance, and would be subject to additional funding. Contingency day rates have therefore been included in the project costings should it be decided that such work would be useful.

Photographic Surveys

A detailed photographic record will be made of all four surveyed sites, to include both earthwork and structural elements. For the structural elements, external and internal elevations of the Pendragon field barn and external elevations of the Smardale kilns will be taken both parallel to the elevation (within the constraints of the site) as well as from other vantage points to include oblique general views of the structures and showing them in their settings. Close-up photographs will also be taken of significant detail, as appropriate. The photographs will be used to show not only the structures' and earthworks' present appearance but also to record the evidence on which the analysis of their historic development is based.

Other photographs will be taken to illustrate specific well-preserved site elements, details of specific sites and/or areas of erosion etc. More general photographs will also be taken showing the landscape context of the survey areas and of specific sites within them.

The colour photographs will be produced using a digital camera with 12 mega-pixel resolution. English Heritage/Historic England photographic guidelines will be followed (English Heritage 2006, 10-12) and each photograph will be provided with a scale (subject to access). All photographs will be clearly numbered and labelled with the subject, orientation, date taken and photographer's name, and will be cross-referenced to digital files etc in a photographic catalogue (see Products below).

Written Accounts

Each identified individual site or component identified by the archaeological topographical surveys within each survey area will be given a unique identifier number, and a detailed written description provided based on notes taken in the field. Pro forma record sheets compiled from an Access database will be used (see attached appendix). The description will include a preliminary interpretation of extant remains (e.g. dimensions, plan, form, function, date, sequence of development), locational information (including ten figure grid references obtained from the topographical survey, OS map bases or hand-held GPS systems), and mention of relevant documentary, cartographic or other evidence, and management details such as an assessment of current condition and threats.

Use of Volunteers

EDAS will identify any opportunities for volunteers to be involved in the field survey work. This may, for example occur during the surveys of the Crosby barrows and Crosby shieling, although some opportunity may arise during the larger area survey of Pendragon Castle. The YDNPA brief notes that both the Friends of the Lake District and the YDNPA are willing to facilitate contacts for this, and the brief suggests two survey days are allocated to this element of the project.

Samples and Loose Finds

No sampling work is intended as part of this project. Any loose finds will be reported to the Senior Historic Environment Officer at the YDNPA at the earliest opportunity. Any recommendations for sampling and material analysis should be made in the project report.

Structural Assessment

A detailed structural assessment of the Smardale lime kilns will be made. This will be a visual assessment only, although it is possible that some close inspection may be hampered by health and safety considerations. No trial pits will be dug.

Subject to safe access, the assessment will examine all of the load-bearing elements of each structure. The inspection will be both internal and external, and will include surviving floors, walls, lintels, timberwork, charge holes and draw arches etc. It will also include the immediate surroundings in case there are any adjacent factors which could indicate a risk to the foundations. Survey drawings at 1:50 scale produced by the archaeological survey (see above) will be utilised for this work, although additional survey drawings may be produced as appropriate. Any recommendations made by the structural assessment will be incorporated into the recommendations for consolidation as appropriate (see below).

An inspection will also be made of the surrounding area, specifically the revetment and enclosure walls, to consider whether these are structurally unsound or pose a clear risk to health and safety.

Survey Products

A number of separate products are required to be produced as part of this project.

Archaeological Survey Report

A single EDAS archive archaeological survey report for the surveyed sites will be produced, based on the results of the documentary research, the topographical surveys and building recording, and the structured gazetteer of identified numbered components. The report will be a standard A4 typed and bound document, which will assemble and summarise the available evidence for each survey area in an ordered form, synthesise the data, comment on the quality and reliability of the evidence, and how it might need to be supplemented by further site work or desk-based research.

It is expected that the report will include (as appropriate):

- a contents list;
- acknowledgements;
- a non-technical executive summary;
- name of client/commissioning body;
- site code/project number;
- dates of fieldwork visits;
- national grid reference and address;
- overall site plan;
- statutory designations;
- an outline of the project plan, research objectives, survey methodology, procedures and equipment used;
- details of the historical and archaeological background to the sites, including a summary of any previous works on the sites;
- an account of the overall form and development of the sites and of the evidence supporting any interpretation;
- inventories of any finds;
- appropriate information from wildlife surveys (undertaken by separate contractor);
- preliminary conclusions, including an assessment of the importance of the findings in relation to the other remains on the sites and in the region as a whole;
- a bibliography and list of sources consulted;
- selected colour digital images, at no less than 6” by 4”;
- selected figures e.g. historic maps and plans, reduced to A4 or A3 size;

- final survey drawings, reduced to A4 or A3 size, comprising hachured earthwork surveys, detailed drawn plans, sections and elevations (as appropriate);
- acknowledgements.

The survey report will also contain various appendices, including the structured gazetteer of sites/components, photographic registers and catalogues, and a copy of this Methods Statement, together with the details of any departures from that design.

One draft copy of the report will be made available for discussion with the YDNPA and other interested parties prior to completion. Six copies of the final approved survey report will then be provided in hard copy format (comb bound reports), for the YDNPA, the Friends of the Lake District and relevant landowners, no later than eight weeks after the end of the on-site work unless otherwise agreed with the YDNPA. A CD containing an electronic copy of the report (as pdf files) and digital copies of the Access database and photographs will also be provided.

A summary of the results of the archaeological surveys will be prepared for publication in an appropriate journal or monograph as agreed with the YDNPA. It is also noted that a presentation at a day school on the historic environment of the Yorkshire Dales may also be required.

EDAS will license the YDNPA and the Friends of the Lake District for unrestricted use of all survey material, drawings, photographs and other products resulting from the project on payment of final invoices. Information and plans etc resulting from the project (suitably acknowledged) may be used by these organisations in research reports, or any similar publications, and in any interpretative or publicity material, as well as being made available through the YDNPA HER and its derivatives. Nevertheless, the originators will retain the right to be identified as authors of all project documentation and reports as specified in the Copyright Design and Patents Act 1988 (chapter IV, section 79).

Archaeological Survey Archive

A properly ordered and indexed project archive (paper, magnetic and plastic media) will be deposited with the YDNPA at the end of the project. It is expected that the archive will contain the following:

- copies of relevant documentary material, bibliographic, cartographic and pictorial sources, arranged in date sequence;
- survey control information, including a diagram showing traverses and control networks, coordinates of control points and survey stations, and digital survey data;
- field and final ink drawings (any drawn records will be presented as wet ink plots on standard “A” size matt surface stable polyester film sheets);
- written accounts and pro forma gazetteers;
- structured catalogues and indices;
- copies of digital photographs on CD/DVD, both processed and unedited images, as jpeg and tiff files;
- project management records;
- electronic copies of all reports, as pdf files.

Structural Assessment Report

This stand-alone standard A4 typed and bound document will report on the results of the structural assessment of the Smardale kilns, and will describe the structural condition and adequacy of all the load-bearing elements inspected. It will identify any structural problems or concerns, their probable cause, current active status, continuing threat and level of urgency. The report will also include a complete photographic record of the structural defects as well as appropriate drawings (reduced to A4 or A3) and illustrations.

The report will also recommend appropriate measures to rectify any structural problem(s). Where repairs/remedial works, or further investigations are recommended, these recommendations will, where appropriate, include a range of alternative options with a "best" option based upon good conservation principles and sound practicality.

The report will also consider the results of the separately-produced Wildlife survey report (to be provided by the YDNPA), so that any recommendations made by this survey can be incorporated as appropriate.

Consolidation Specification

Using the results of the topographical survey and the building recording, together with the wildlife survey, a consolidation specification will be prepared for the Smardale kilns. These recommendations will identify all work necessary within the site to protect, secure and consolidate the monument and enable surviving features to withstand natural erosion and a low level of agricultural and visitor activity. Options to safeguard, and encourage further colonisation of fauna and flora will be suggested. The concept of 'consolidate as found' will be followed wherever possible, rather than restoration and rebuilding. However, it is accepted that some limited rebuilding may be required to secure the structural integrity of the structures and if so, appropriate justification will be made. It is anticipated that the recommendations will require the use of traditional methods of building using traditional materials and should normally be reversible. No demolition will be required.

In general, the recommendations will provide for the protection of the site and its structures, rubble clearance, repointing and rough racking, replacement, resetting and/or rebuilding, the design and installation of any safety barriers etc if required, treatment of any metal or timber work, vegetation management, the removal of modern spoil and rubbish dumps, archaeological and other monitoring, and site reinstatement.

The consolidation specification will also consider the results of the separately-produced Wildlife survey report (to be provided by the YDNPA), so that any recommendations made by this survey (e.g. for the retention of any bat roosts etc) can be incorporated as appropriate.

Once the consolidation specification has been approved by the YDNPA and other interested bodies, four hard copies of a detailed document suitable for seeking competitive tenders will be provided, as well as pdf copy. A guide price for the work will also be indicated as a guide to future funding submissions, and recommendations for appropriate specialist contractors will be provided. However, the obtaining of tenders for the work and the production of other documentation such as contracts etc will be responsibility of the YDNPA.

OASIS Compliance

EDAS subscribe to English Heritage's OASIS (Online Access to Index of Archaeological Investigations) project, and all EDAS projects are fully OASIS compliant. Prior to the start of the fieldwork, an OASIS online record will be initiated and key fields completed on Details, Location and Creators forms. All parts of the OASIS online form will be subsequently completed for submission to OASIS and the YDNPA HER. This will include an uploaded pdf version of the entire report.

Health and Safety, and Insurance

EDAS will comply with the Health and Safety at Work Act of 1974 while undertaking the project. A full copy of their Health and Safety Policy is available on request.

The sites are privately owned and EDAS will indemnify the respective landowners in respect of their legal liability for physical injury to persons or damage to property arising on site in connection with the survey, to the extent of EDAS's Public Liability Insurance Cover (£5,000,000). Risk assessments will also be produced prior to any site work.

Staffing and Experience

The project will be mostly undertaken by EDAS, who are registered as an Archaeological Organisation with the Chartered Institute for Archaeologists (CIfA). All survey and reporting works will therefore meet appropriate CIfA standards. The project will be managed by Ed Dennison, Director of EDAS.

The documentary research and collation, archaeological topographical survey, building recording and photographic survey will be undertaken by Ed Dennison and Shaun Richardson of EDAS, assisted by Richard Lamb; Ed Dennison's CV is attached to this documentation. Both Dennison and Richardson each have over 20 years experience in non-intrusive earthwork and topographical survey, and have undertaken numerous walkover and detailed surveys of specific monuments of all types, as well as of areas of historic landscape throughout the Yorkshire Dales. These surveys have included land uses of all types, and in addition to identifying a wide range of archaeological remains, detailed management strategies and recommendations have been proposed.

EDAS have gained particular expertise in the study of castles, following major survey projects at Wressle, East Yorkshire (2015 & in press), Sheriff Hutton (1998 & 2008), Harewood (2008 & 2012) and Ayton castles, all North Yorkshire (1996 & 2008), while smaller-scale work has been undertaken at Flamborough, East Yorkshire (in progress), Helmsley, Crake, Kyme, Harlsey and Hornby (all North Yorkshire) (2007) and Sheffield Castle (2014). Both Richardson and Dennison have published papers in the *Castle Studies Group Journal*. Richardson has also assisted Erick Matthews in the field survey of the remains of Lammerside Castle in the Eden valley, which has recently been published (Matthews, E 2015 "Politics, Pleasure and Prestige: The Context of Lammerside Castle, Mallerstang, Cumbria", in Oren, R (ed) *Tower Studies, 1 & 2: A House that Thieves Might Knock at"* p.78-91.

EDAS have undertaken numerous surveys of prehistoric sites, such as a carinfield at Hawnby (2011), a prehistoric field system and related features on Thimbleby Moor (2011), and linear dyke systems in Hambleton (2016) and have also produced a major survey of Ingleborough hillfort (2014); many of the larger landscape surveys undertaken in the Dales also include prehistoric elements. EDAS also have experience in the recording of quarries and related industrial monuments, and have produced surveys of the Hungry Hush chert quarries (2016), the Seavy and Burtersett Quarries (2014), and Grange Gill quarry and limekilns (2009) (all Yorkshire Dales) and again, many of the larger landscape surveys undertaken in the Dales also include quarries, limekilns and other surface mining-related features.

EDAS are also familiar with the work of David Johnson on the survey and excavation of early lime kilns in the Yorkshire Dales, and have also recently completed a field survey of the important early medieval settlement site at Southerscales in the Yorkshire Dales. Richardson is assisting Yvonne Luke in her ongoing work on Neolithic long mounds and wider prehistoric landscapes, particularly within the Malham area and Wensleydale (see, for example, Y Luke 2013 *Neolithic Long Mounds of the Yorkshire Dales and Allied Structures: First interim report towards a Resource Assessment*).

The topographical surveys will be undertaken in conjunction with Benchmark Land Surveys of Leeds, who have worked with EDAS on almost every earthwork survey project since 2000.

A summary of previous EDAS experience relevant to this project is as follows (all Yorkshire Dales unless stated). Please note, only selected projects are included, and further details of other reports and projects can be found on EDAS's website (*www.edarchserv.co.uk*):

Selected EDAS Archaeological Survey and Recording Projects (since 2007)

- Archaeological survey, Beever and Cockber Mines, Grassington Moor (in press);
- Hungry Chert Quarries, Moulds Side, Arkengarthdale, North Yorkshire: Archaeological Survey (2016);
- Repairs and Alterations to the Priest's House and Chapel, Barden Tower, Barden, North Yorkshire: Architectural and Archaeological Observation, Investigation And Recording (2016);
- Garden and Other Earthworks, South of Wressle Castle, Wressle, East Yorkshire: Archaeological Survey (2015);
- Management and Other Landscape Enhancement Works, Wressle Castle, Wressle, East Yorkshire: Archaeological Observation, Investigation and Recording (2015);
- Archaeological Survey, Ingleborough Hillfort, Ingleton, North Yorkshire (2 vols) (2014);
- Archaeological Evaluation Strategy for Sheffield Castle, Sheffield, South Yorkshire (2 vols) (2014);
- Seavy and Burtersett Quarries, south-east of Burtersett, North Yorkshire: 2006 Archaeological Survey (2014);
- Gunnerside Gill, Melbecks, North Yorkshire: Further Archaeological Erosion Survey (2013);
- Dob Park Lodge, Weston, West Yorkshire: Architectural and Archaeological Survey (Phase 1) (2013);
- Brockma Gill East, Morley Gate, Kearton, North Yorkshire: Architectural and Archaeological Recording (2013);
- Harewood Castle, Harewood, West Yorkshire: Archaeological and Architectural Survey and Recording (3 vols) (2012);
- West Mill, Askrigg, North Yorkshire: Archaeological and Architectural Survey (3 vols) (2012);
- High Blean Lime Kiln, Stake Road, Bainbridge, North Yorkshire: Archaeological and Wildlife Survey (2012);
- Erosion survey, Gunnerside Gill (2011);
- Scotland Farm Cairnfield, Hawnby, North Yorkshire: Archaeological Survey (2011);
- Grange Gill Quarry, Lime Kiln and Hen House, Skellgill Lane, Low Abbotside, North Yorkshire: Archaeological Survey (2009);
- Sheriff Hutton Castle, Sheriff Hutton, North Yorkshire: Archaeological and Architectural Survey of the North-east Tower (2 vols) (2008);
- Ayton Castle, West Ayton, North Yorkshire: Phase 1 Repairs: Architectural and Archaeological Recording (2008);
- Harewood Castle, Harewood, West Yorkshire: Archaeological and Architectural Condition Survey (3 vols);
- Grass Wood, Grassington, North Yorkshire: Archaeological Survey (2007);
- Seamer Manor House, Seamer, North Yorkshire: Photographic Survey and Archaeological Observations (2007);
- Neville Castle, Kirkbymoorside, North Yorkshire: Photographic Survey and Archaeological Observations (2007);
- Crayke Castle, Crayke, North Yorkshire: Photographic Survey and Archaeological Observations (2007);
- John of Gaunt's Castle, Haverah Park, North Yorkshire: Photographic Survey and Archaeological Observations (2007);
- Kyme Castle, Newton Kyme, North Yorkshire: Photographic Survey and Archaeological Observations (2007).

Specifications for Consolidation of Lead Mining Remains and Other Structures (EDAS since 2000)

- Specification for consolidation work, High Blean lime kiln (2012);
- Specification for consolidation of lead mining remains, Beever and Cockber Mines, Grassington Moor (2011);
- Specification for additional stonework repair, Sandal Castle, West Yorkshire (2001);
- Specification for consolidation works, Bunton Level and Sun Hush Mines, Gunnerside Gill (2000);
- Specification for consolidation works, Sir Francis Level and Dressing Floors, Gunnerside Gill (2000);
- Specification for stonework repair, Sandal Castle, West Yorkshire (2000);
- Specification for erosion repair, Sandal Castle, West Yorkshire (2000).

The structural assessment will be undertaken by Peter Gaze Pace, a Historic England approved conservation architect based at Scrayingham near York. Peter Pace's CV is attached, and it can

be seen that he has considerable experience in the conservation, consolidation and stabilisation of historic buildings and other structures, and is currently a consultant architect to the North York Moors National Park Authority; of particular relevance to this project is his work on the consolidation of a set of large lime kilns at Old Byland, North York Moors. The recommendations for consolidation will be drawn up by Peter Pace, with input where required from Ed Dennison. Both have worked together to produce several similar documents in the past, including consolidation specifications for lead mining remains in Gunnerside Gill (see list below) and on Grassington Moor; this work also included obtaining tenders from appropriate contractors, monitoring the site work, undertaking archaeological recording during the site work, and reporting on the findings. Peter Pace has also produced consolidation specifications for monuments ranging from multi-phase castles, vernacular buildings, industrial and military monuments, and churches, and has often worked on these projects with EDAS.

Programming

No detailed timetable of work was supplied with the YDNPA tender documents, although it is stated that the project must be completed by 31st December 2017.

The archaeological topographical survey at Pendragon Castle is best undertaken first, followed by the building surveys here and at Smardale, together with the documentary research. Subject to a prompt commission, the project would be started in late September 2017. The drawings and other data produced by the building survey and archaeological topographic survey are required for the structural assessment, and so these elements will be undertaken next, probably in late October/November 2017. The earthwork surveys of the Crosby barrows and shieling are best undertaken at a later date (say November) when vegetation growth is minimal.

If appointed to the project, EDAS would agree a detailed programme of work with YDNPA prior to any start of work on site.

Monitoring

It is understood that the fieldwork, and the project as a whole, will be monitored at periodic intervals by the Senior Historic Environment Officer of the YDNPA. The YDNPA brief states that the following meetings should be allowed and costed for (four in total):

- An appointment/inception meeting with the Senior Historic Environment Officer, likely to be attended by the owner of the Pendragon estate;
- Two short onsite monitoring meetings during survey work at Pendragon and the Smardale kilns;
- A meeting to discuss draft reports before final submission.

Additional meetings are proposed by the conservation architect with relevant parties to finalise the approach to consolidation and to approve the consolidation specification.

Modifications

The programme of work outlined may be modified in accordance with the professional judgement of the staff undertaking the work, insofar as the overall provisions and objectives of this methods statement will not be changed. Any variations in the project will be discussed and agreed in advance with the YDNPA.

References

English Heritage 1999 *Recording Archaeological Field Monuments: A Descriptive Specification*

English Heritage 2002 *With Alidade and Tape: Graphical and Plane Table Survey of Archaeological Earthworks*

English Heritage 2006 *Understanding Historic Buildings: A Guide to Good Recording Practice*

English Heritage 2007 *Understanding the Archaeology of Landscapes: A Guide to Good Recording Practice*

Fiorato, J F 1990 *Pendragon Castle: An Archaeological and Historical Perspective* (unpublished BA dissertation, University of Durham)

LUAU 1996 *Pendragon Castle, Cumbria: Excavation and Clearance 1994-95* (unpublished LUAU report)

Ed Dennison, EDAS
7th September 2017