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ASHNOTT LEAD MINE, RIBBLE VALLEY, LANCASHIRE AN ARCHAEOLOGICAL SURVEY OF THE LANDSCAPE EVIDENCE

David Went



ASSESSMENT



ENGLISH HERITAGE

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ASHNOTT LEAD MINE RIBBLE VALLEY, LANCASHIRE

An archaeological survey of the landscape evidence

David Went

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SUMMARY

Ashnott lead mine is located in the Newton Fells in the southern part of the Forest of Bowland Area of Outstanding Natural Beauty. The mine is of particular interest for the evidence it contains of complex and successive phases of mining, potentially originating in the medieval period, and clearly documented in the early post-medieval period. From the early 16th century, if not before, miners created an intricate pattern of interconnected workings by chasing the erratic lead deposits present within a small limestone knoll at Ashnott. Exploration appears to have begun with open-cuts and shafts mined from above, and to have culminated in levels driven into the hillside to exploit deeper deposits and to facilitate underground transport and drainage. A major collapse in the price of lead, perhaps combined with the difficulties of extraction at Ashnott, seems to have brought an end to these operations in the 1830s.

A broad sequence of development can be determined within the complex pattern of shafts, level entrances, open-cuts, spoil mounds and dressing floors which remain visible across the surface of the knoll. The area presently designated as a scheduled monument encompasses the greater part of these remains, with the principal exceptions of two dams (and related watercourses) to the east and two former level entrances to the west. The scheduled area also appears to include, based on records of exploration in 1961, the majority of the known underground workings, with the exception of the greater part of a deep drainage level extending to the north.

CONTRIBUTORS

The aerial survey was flown and photographed by Gary Nel of UK Aerovision, to a brief supplied by Jon Bedford and David Andrews of English Heritage's Imaging & Visualisation and Remote Sensing teams. Jon Bedford processed the digital aerial imagery and assisted with the on-site survey control. David Went produced the site interpretation with assistance in the field from colleagues in the Assessment Team North, Rebecca Pullen and Marcus Jecock, and with additional archival research by Amy Smith, Historic Environment Placement with Assessment Team South. The report plans were drawn by Philip Sinton.

ACKNOWLEDGEMENTS

The author would like to thank the landowners, the Peel (Knowlemore) Company, and their agents, Ingham and Yorke LLP, for permission to conduct the survey, and Lawrence Whitaker of Ashnott Farm for enabling access and providing useful information about the more recent history of the site.

ARCHIVE LOCATION

The report has been deposited at the English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon.

DATE OF SURVEY

The aerial survey took place on 14th August 2014, and further ground survey on 15th October 2014.

CONTACT DETAILS

English Heritage, 37 Tanner Row, York, YO1 6WP

David Went: 01904 601927; david.went@english-heritage.org.uk

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Cover. Aerial photograph of the Ashnott mines by David MacLeod, 11th December 2012.
Archive No. 28362 048 © English Heritage.

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INTRODUCTION

Ashnott Mine is located on the northern edge of Crag Hill in the Newton Fells, about 2km south of the village of Newton-in-Bowland where the River Hodder is crossed by the Clitheroe to Slaidburn road (Figure 1). A civil parish since 1866, Newton originated as a township within the wider medieval manor of Slaidburn. Together with the later parish of Slaidburn it was transferred from the West Riding of Yorkshire to Lancashire in 1974.

The former surface workings - a mixture of in-filled or roughly-capped shafts, open-cuts, level entrances, spoil heaps and dressing waste - extend over an area of about 2.8ha covering much of the surface of a limestone knoll – presumably the ‘knott’ from which Ashnott takes its name - at the northern tip of a broad promontory below Crag Hill. The workings lie immediately uphill and to the south of a house and barn of mid-19th-century and earlier date, and above a quarried face which may have supplied a former lime kiln situated immediately to the east of the farm buildings. They are bordered to the east by an unnamed tributary to the Crag Beck which flows northward into Ashnott Wood, and to the west by improved pastures which descend to the main course of the Crag Beck within Ing Barn Wood and Bateson Wood. The ground to the south, divided into large enclosed fields, rises gently over a distance of some 500m to the foot of Crag Hill. To the north and west, below the knoll, the ground falls away to the wooded stream valleys of Crag Beck and its tributaries which separate Ashnott from the line of the former Roman road between Ribchester and Old Borrow Bridge passing within a kilometre to the west.¹ The views northwards from the knoll are extensive, encompassing a broad sweep of fells rising to the heart of the Forest of Bowland Area of Outstanding Natural Beauty. In geological terms, the mine is located on and within a limestone reef knoll raised by the Slaidburn anticline and exposed by subsequent erosion of the surrounding Worston Shales. It is one of a number of such knolls that occur along the valleys of the rivers Hodder and Ribble, including that on which stands the castle at Clitheroe.²

The area of the mines was designated as a scheduled monument in 1999 following the recommendations of a national review of the lead industry carried out for English Heritage in 1989-1993.³ This review highlighted both the unusual variety of the Ashnott workings and the potential for these remains to include evidence of early mining practices.⁴ The condition of the monument has, however, given cause for concern for a number of years principally due to the subsidence of various hollows and shaft tops, and the accumulation of scrap metal and other debris dumped in some of the hollows to prevent stock from wandering over potentially hazardous voids; for these reasons it appears on the English Heritage’s ‘Heritage at Risk Register’ and is considered a priority site for Natural England’s Higher Level Stewardship programme.⁵ This report was requested by Cathy Tuck of English Heritage’s National Planning and Conservation Team, to ensure that any management plans agreed with the landowner and tenant - to improve fencing and instigate a sympathetic grazing regime - are informed by a thorough understanding of the nature and extent of the mining remains, and to help identify the locations of points of mine subsidence which will require proper and safe capping.

The request for the Ashnott survey coincided with Assessment Team’s wish to test the effectiveness of a relatively new survey method – Structure from Motion – which, as

applied in this case, uses aerial photographs to construct a detailed 3D model of the terrain. This approach (see Survey Method below) was combined with ground-based observations to refine the plans and inform the interpretations which appear in this report.

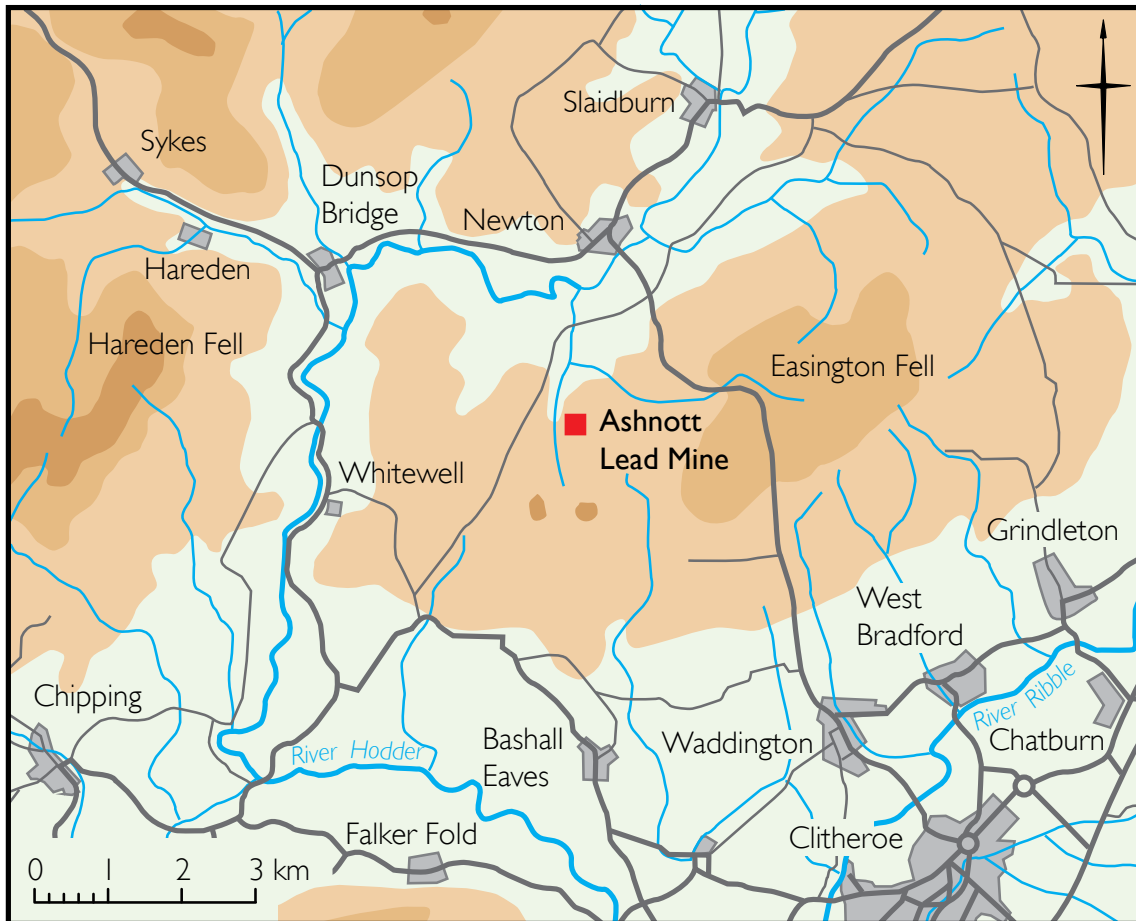


Figure 1: The location of Ashnott Mine. Drawn by Philip Sinton, © English Heritage.

HISTORY AND PREVIOUS RESEARCH

David Cranstone's entry for Ashnott in the 1993 Lead Industry Step Report listed this mine among the more important examples in northern England.⁶ In addition to noting the significance of early forms of workings (ie open-cuts and rock-cut shafts), Cranstone referred to the existence of documentary evidence suggesting mining activity at Ashnott in the late 13th and late 16th centuries – references which had been brought to his attention by the late Mary Higham, a highly regarded medieval historian and archaeologist with extensive knowledge of North West England and the Forest of Bowland. Unfortunately, the details of Higham's references were not recorded, merely notes on file, the first of which related to a '1296 sough' (or drain) and the second to a map of 1591.⁷

There are no references to the Ashnott mines in Higham's published books and articles. Her various works concerning other aspects of the area do, however, provide some insights into the range of documentary sources with which she was certainly familiar. From one article in particular it is possible to suggest that the '1296 sough' may originate in the estate accounts of Henry de Lacy, Earl of Lincoln, which survive for the periods 1295-6 and 1304-5, and were published together in a single volume in 1884.⁸ The later series of accounts for the Honor of Clitheroe includes several references to lead, of which the movement of seven cart loads and 36 stone of lead from Baxenden (about 15km south of Clitheroe) to Bradford⁹ and the sale of this material for £18/18s to the Earl's receiver at Pontefract¹⁰ are the only entries to specify precise locations. In a subsequent list of expenses incurred by the Earl's receiver at Clitheroe, under the heading *minerae* (mines or ore) the following are recorded:¹¹

91 loads, 6½ dishes of ore brought from the mines [9 dishes make a load] £8/8s/1½d.
9 ½ fothers, 7 pieces, 1 stone of lead from the same [6 stone make a piece, 25 pieces a fother] £13/3s/3d.
Cutting down and cutting up wood for burning said ore 7s/5d.
Carrying said wood and ore to La Boole [the Bole] 8s/8½d.
Expense of burning said ore £1/16s/6d.
Making and binding with iron a pair of scales for weighing the lead and making necessary utensils 2s/6d.
Making a shed for the lead, and an enclosure for ore 5s/8d.
Given by the Earl to the miners for making a certain trench underground to draw water from the other trenches 13s/4d.
Given to the miners by the Earl 10s.
Wages of Hugh de Welmaker for 24 weeks beside the ore £1/10s.
Wages of Elyas de Assenhirste, beside the miners, for 42 weeks £2/2s.

Arthur Raistrick, drawing on an interpretation of these accounts in Tupling's 'Economic History of Rossendale', made the assertion that these expenses relate solely to Baxenden.¹² In the original rolls, however, these accounts were brigaded under the heading 'Cliderhau' (Clitheroe) in the sense of the whole Honor of Clitheroe, which encompassed numerous manors within and around the Forests of Bowland (including Newton within the manor of Slaidburn) and Blackburnshire. Of particular interest

Higham's second historical reference, to a map of 1591, can be identified with certainty. It is without doubt an estate plan of the parish of Slaidburn which featured in several of her published works.¹⁶ This plan, drawn in 1591, accompanied an enquiry concerning the enclosure of waste or common land in the 'Champion, Ramore, Brunghillmore and Youkestonwood' areas of the townships of Slaidburn, Newton and Grindleton.¹⁷ Within the area marked as Youkeston Wood, in an identifiable position relative to the village of Newton, Crag Fell and the line of the Foulscale Beck and Bonstone Brook, a stylised knoll is marked with the name 'Eshkot (or Eshknot) myne' (Figures 2 and 3).



Figure 3: Detail from a plan concerning the enclosure of waste lands in the parish of Slaidburn drawn in 1591. Reproduced by permission of The National Archives (MR 11778). Photo: Amy Smith.

An earlier document, also held in The National Archives, shows that lead mining had been established at Ashnott at least 50 years before the date of this plan. In 1538 Thomas Proctor was granted a three-year lease covering a part of the lands lately subject to attainder following an unspecified act of high treason (participation in the Pilgrimage of Grace perhaps?) by one Stephen Handton. This grant, issued on behalf of the crown¹⁸ by Sir John Dawne, king's councillor, John Halot, baron of the exchequer and Richard Pollard, the king's rememberancer, included the croft, ground and pastures with 'approvements' at 'Asshe Notte adjoining Yolston Wood in the parish of Slatebourne' with 'licence to dig, take and mine lead ore within the said ground and pastures'.¹⁹ Proctor was, furthermore, 'according to the laws of mining' to lay yearly accounts of the price of the ore before the King's auditor and to pay such sums of money found to be due to the King's receiver. The full transcription of this indenture (see Figure 4) is provided in Appendix 3. This document does not prove beyond doubt that Ashnott had been mined in Handton's day, or indeed beforehand; but the wording of the lease, and its short duration, does suggest that Proctor acquired the property, with its enclosed

land perhaps adjoining a dwelling (croft), pastures, fields (ground) and other enclosures (improvements) in anticipation of a quick return from a proven source of lead, rather than to embark on a protracted search.

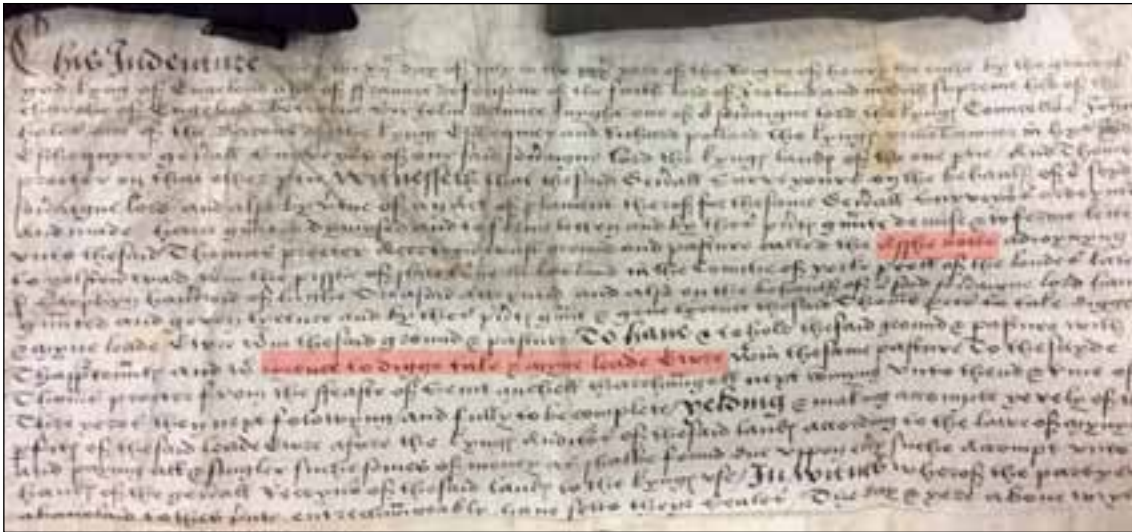


Figure 4: Extract from the 1538 lease of 'asshe notte' to Thomas Proctor including the 'licence to digge take & myne leade aeiore'. Reproduced by permission of The National Archives (NA 210/1477). Photo: Amy Smith.

Other mining operations are known to have taken place in the wider area in the later part of the 16th century. The Elizabethan mining adventurer and entrepreneur, Bevis Bulmer, appears to have been engaged in mining lead, or perhaps silver, in the Forest of Bowland prior to moving north to manage Thomas Foullis's lead mines in Lanarkshire in 1576.²⁰ In the early 17th century Bulmer was working again in Bowland at the King's silver mines on Brunghill Moor near Newton (also noted on the 1591 plan), and it has been suggested that a blanket lease may have been held by the Company of Mines Royal, allowing him also to work at neighbouring mines of Sykes, Brennand and Ashnott,²¹ if indeed Ashnott was active at that time.

A blanket licence was certainly issued by James I in 1608, allowing Richard de Houghton and Thomas Ireland 'to mine and digge as well for lead ore and cole as alsoe for all such copper oare and slate as shall happelie be found in all or anie the waste grounds of the said King's Majesty of the Forest of Bowland'.²² In the following year the Company of Mines Royal issued a further licence to de Houghton's servants, Richard Simpson and Richard Berry, authorising them to work all 'the mines of lead and silver discovered, or to be discovered, in a piece of waste called the Cawdstones, County of York, or anywhere within a compass of 10 miles'.²³ Although no direct connection can be claimed, it is interesting to note that Cawdstones may be identified as Cold Stone Plain on Catlow Fell, about 8 miles north of Ashnott.²⁴

A bundle of more than fifty documents held by The National Archives contains numerous indentures related to mining in Slaidburn and the Forest of Bowland in the late 17th century.²⁵ The earlier indentures were issued by (General) George Monck, who was

created Duke of Albemarle in 1660 in recognition of his pivotal role in the restoration of Charles II, and subsequently given possession of the Forest and Chase of Bowland in 1661.²⁶ Later documents were issued by his son Christopher, the 2nd Duke. A cursory examination of the bundle has revealed no specific references to Ashnott, although any mining there may have been encompassed by a lease issued to Ralphe Stayne in March 1668 which covered all of the Duke's lead mines in the Forest of Bowland for a period of 41 years. These documents would certainly repay a detailed palaeographic study, but such research lay beyond the scope of the present investigation.

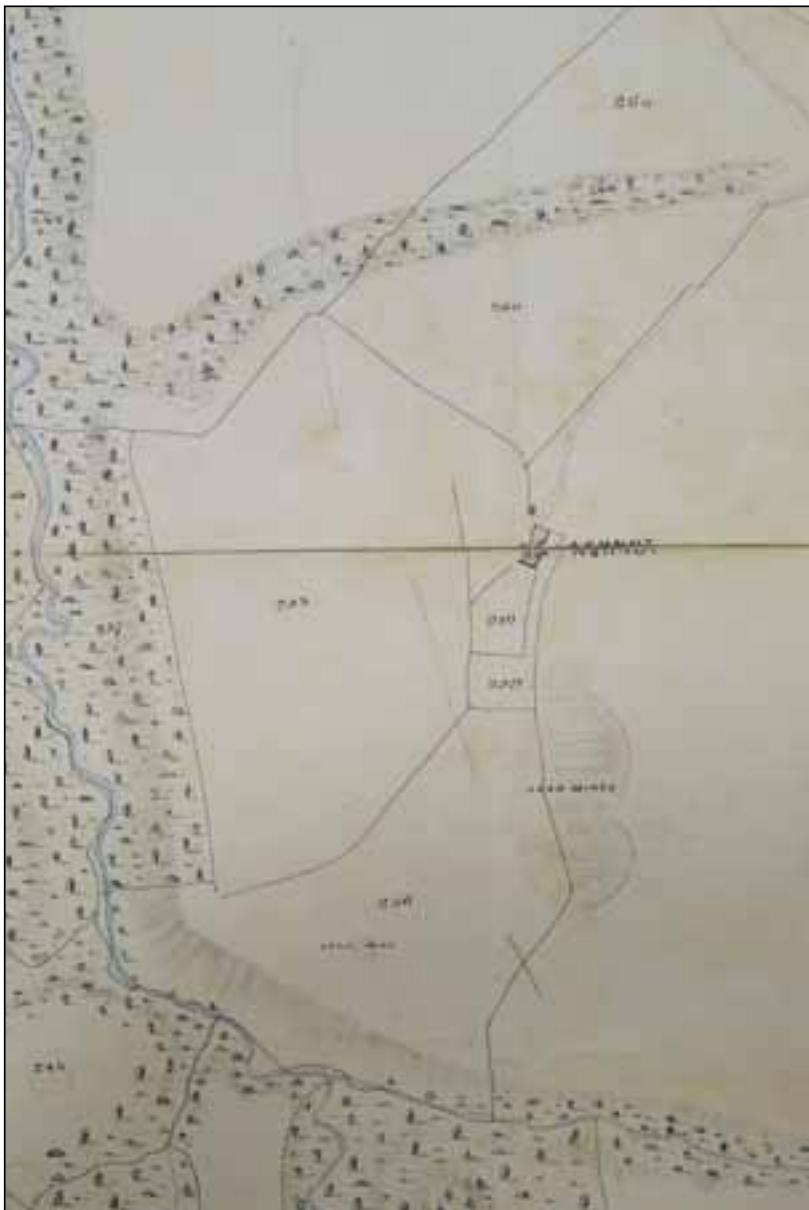


Figure 5: Extract from the Tithe Plan for the Township of Newton surveyed and drawn by J R Allen and J Watson Preston, May 1838. Lancashire Archives PR 3035/4/3. Reproduced with permission.

M C Gill has established that the mine adventurers of Grassington in Wharfedale maintained an active interest in the area in the 18th and early 19th centuries, during which time several 'Bolland' ore parcels were received at the Grassington smelt works.²⁷ In 1814, however, a smelt mill to serve the Liberty of Bowland was built alongside the Clitheroe to Newton road, about 2km east of Ashnott, and it is presumed that this is

where ore from the Ashnott mine was subsequently taken.²⁸ The mill was not working in 1835 when a report on its condition also noted that a formerly productive mine within the manor, perhaps Ashnott, had ceased operations 'in consequence of the depreciation in the value of lead'.²⁹ A further mill 'near the mine, with an overshot waterwheel, and the requisite apparatus for smelting ore', is mentioned in the same report, although the location of this mill remains unknown.

The 1838 tithe map for the township of Newton (see Figure 5) indicates the general area of mining across the summit of the knoll as well as an isolated mine, presumably a level, entering the knoll from the west. The map does not specify whether the mines were active or not and, as mining was not subject to tithes, they receive no mention in the accompanying schedule of rent-charges drawn up in 1843.³⁰ The buildings clustered below the knoll (259 on the plan) are listed simply as 'house, barn and garden', and the surrounding land as 'meadow' (256, 258), 'pasture' (260, 261) and 'plantation' (216, 238, 257). The occupier in 1843 was John Titterington, who had been recorded as a farmer on the 1841 census, living with his family at Thirty Acre in the township of Great Mitton, east of Clitheroe. He was still a farmer in 1851 according to the next census, living at Ballendon Brook in the more southerly township of Tottington Higher End, near Bury. The census entries for Ashnott in 1841 list two households in one dwelling. The first comprised Henry Hindle, a farmer, with his wife and children; the second consisted of Andrew Burnet and James Swain, both clog-makers. There are no references to lead mining or working. A single household is reported in 1851 when Ashnott was occupied by another farmer, Richard Topham, his family and an agricultural labourer named James Lund.³¹

The first edition 6-inch Ordnance Survey map, surveyed 1847, marks the surface workings with the label 'Lead Mines' suggesting that they remained active, or had been so in the relatively recent past (see Figure 6). However, the first 25-inch edition, published in 1894, depicts the workings as 'old quarries, lead mines and shafts'. The adjacent 'old limekiln' was also apparently redundant by that time.³²



Figure 6: Extract from the 1850 Ordnance Survey 6-inch map (sheet 165), surveyed in 1847, reproduced from the original by permission of the National Library of Scotland.

Underground exploration

The accessible subterranean passages at Ashnott were explored by A E Cannell and other members of the Northern Cavern and Mine Research Group in 1961, resulting in the sketch map reproduced here as Figure 7 and a report published in 1966.³³ Their investigations describe a mine that developed on four main levels, with larger workings in the lower sections. The lowest level of all was equipped with a tramway which (in 1961) still retained sections of wooden rails with strips of iron on their running surfaces.

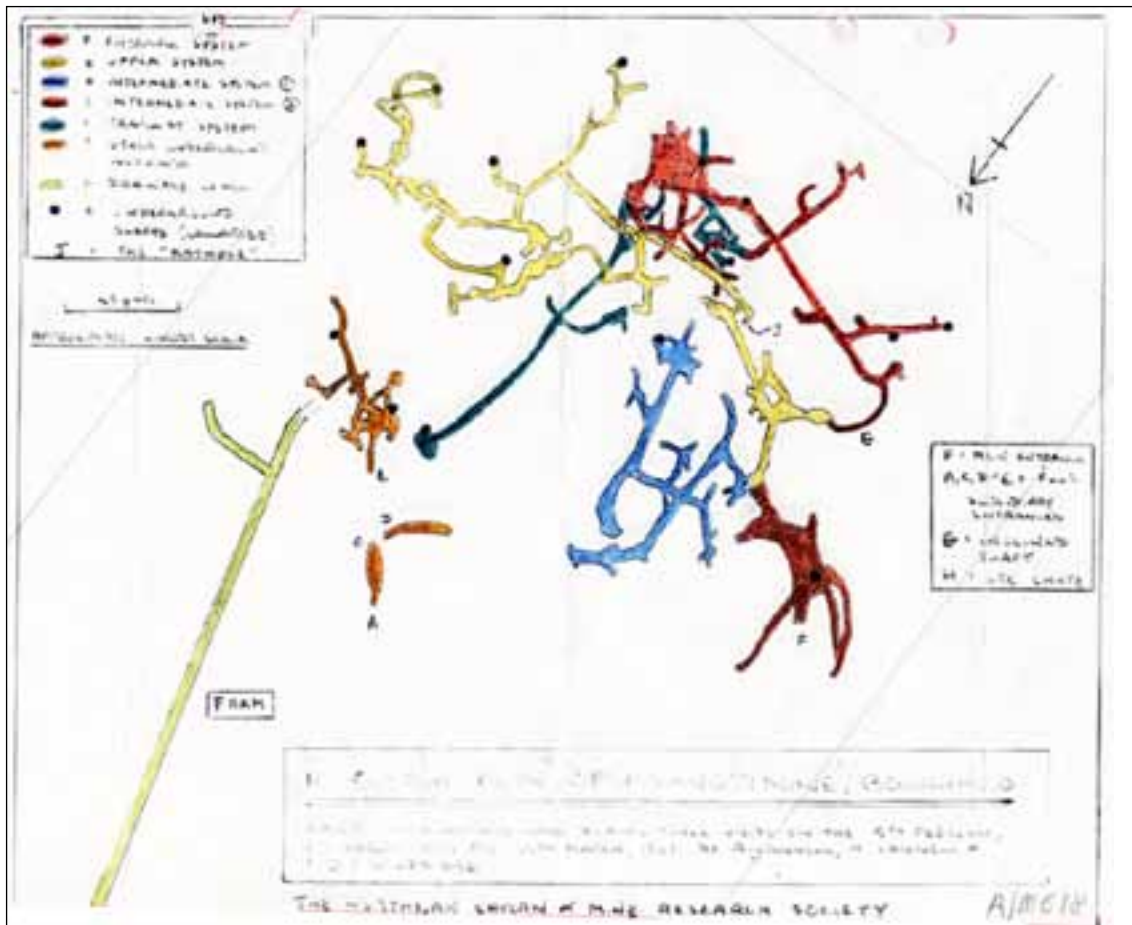


Figure 7: Cannell's 'Sketch Plan of Ashnott Mine, Bowland' based on underground exploration in 1961. Reproduced by permission of the Northern Mines Research Society. Note that north is to the bottom left.

The unusual complexity of the workings evident from Cannell's sketch has been attributed to the pattern of mineralisation forming irregular strings within the limestone knoll.³⁴ However, the lower workings saw more concentrated areas of extraction, or stoping, indicating that the ore deposits grew thicker at depth. The lower levels were also found to be stacked with deads - rock removed to gain access to the ore – which was not the case in the higher regions of the mine.³⁵

Reviewing this evidence in 1987 Gill agreed with the original investigators that the method of mining in the upper levels had been to sink shafts from the surface and to work radially until reaching other workings. In contrast, the lower two levels represented a more systematic approach in which ore was passed downward from a series of roomy workings, via a number of underground shafts, to a network of tramway levels below. Gill considered the upper workings, consisting of small shafts and open-cuts, to be principally 17th- and 18th-century in date, whereas the larger lower levels with their more orderly system of haulage dated from the late 18th or early 19th centuries.³⁶

A separate level, only the southern end of which falls with the scheduled area, was also investigated in 1961 (see Figure 7). This level, the entrance labelled 'lead mine' on the first edition Ordnance Survey 6-inch map (see Figure 6), was driven into the side of the stream in Ashnott Wood, about 180m to the north of Ashnott farmhouse. Cannell discovered that it continued south of the house into the area of the limestone knoll ending in two branches in the underlying Worston Shales, where any connection to the other workings had been lost to collapse.³⁷ Cannell refers to this as a drainage level, which is certainly the case given its depth, length and angle, and the absence of any processing waste adjacent to its finely arched masonry opening. Poor air quality in the drainage level was observed during the 1961 investigations and noted as the cause of three unconscious schoolboys having to be rescued 'from this locality' by firemen with breathing apparatus some years previously.³⁸ Subsequent ventures into the underground workings have been few and, with the exception of the rescue of a cow from the drainage level in 1986,³⁹ scantily reported. The most recent exploration appears to have been undertaken by the East Lancashire Bat Group, assisted by the Burnley Caving Group and Northern Boggarts in 2013, conducting a survey of likely bat hibernation and swarming sites.⁴⁰

SURVEY METHOD

The earthwork survey was undertaken using the Structure from Motion (SfM) and Multi-View Stereo (MVS) applications: an approach which uses the principles of photogrammetry to create a highly accurate 3D digital model from an overlapping series of low-level aerial photographs. The Ashnott Mine provided an ideal opportunity to test the effectiveness of this relatively new survey method in an open, upland landscape, and to refine techniques for creating analytical plans from the resulting imagery. It also offered the potential for a significant saving in time compared to more traditional ground-based survey techniques. The SfM/MVS technique is described in greater detail elsewhere,⁴¹ and only a summary description of the process is provided here.

An area of approximately 3.6ha, encompassing the scheduled monument and a broad margin, was identified for survey during an initial site visit on 5th June 2014. English Heritage then issued a contract to Horizon AP Ltd to overfly this area (within a rectangular flight-path rectangle of approximately 7.7ha) on 25th July using a small unmanned aircraft (SUA) to take a series of overlapping vertical photographs from a height of 50m above ground level. In order to achieve precise geo-referencing for the aerial photographs a number of highly accurate (and highly visible) ground control points were marked out across the hillside using a Trimble R10 Global Navigation Satellite System (GNSS).

During the first attempt at photography a combination of turbulent air and problems with flight and navigation software rendered the SUA (a radio-controlled, eight-rotor 'octocopter') unserviceable. Horizon AP Ltd subsequently concluded that the conditions were more suited to a fixed wing device and, having none of their own, sub-contracted the task to UK Aerovision who operate a pre-programmable, autonomous Sensefly 'Ebee' SUA (Figure 8). The second attempt using this aircraft took place on the 14th August and proved successful.



Figure 8: The autonomous Sensefly 'Ebee' small unmanned aircraft (SUA) used by UK Aerovision Ltd to capture the aerial imagery. Photo: David Went.

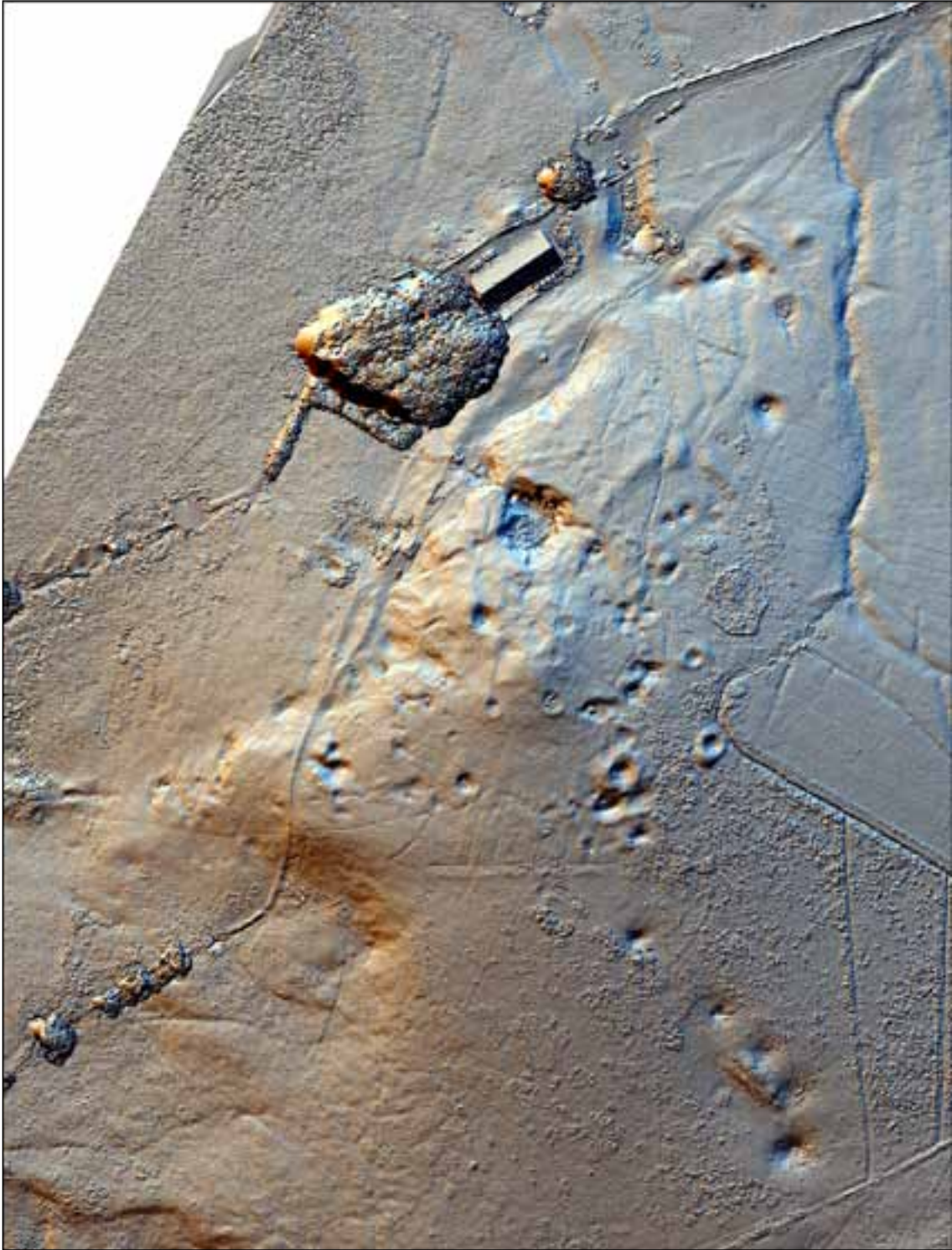


Figure 9: Digital surface model derived from aerial photographs of the Ashnott mines. Processed by Jon Bedford. © English Heritage. North is at the top.

The aerial imagery, captured using a compact Canon Ixus 16 megapixel camera, was processed using Agisoft Photoscan Pro software: first aligning the photographs to create a seamless orthoimage using the SfM application, and then employing the MVS process to create digital terrain and surface models. These models, accurate to *circa* 20mm in the horizontal plane and 35mm in the vertical plane, can be manipulated, enhanced with artificial illumination from any direction and projected at multiple scales. The version shown in this report (Figure 9) is a digital surface model with slope analysis and 16-direction hill-shade, generated in ArcGIS 10.1.

The hachured analytical plan of the mining area (Figure 18, at the back of this report) was drawn from the surface model by the author with reference to the orthoimage to a projected scale of 1:1000 using AutoCad Map 3D (2012). It was refined and verified through close inspection of the site on 15th October 2014 when some further details, especially in areas masked by vegetation, were added by Assessment Team North using the Trimble R10 series GNSS.

THE VARIETY AND CHRONOLOGY OF THE MINING REMAINS

The interpretation of the earthwork remains, derived from the aerial imagery and from observation on the ground, is illustrated as Figure 18 at the back of this report. Key areas and individual features mentioned below are labelled 1-42, or otherwise indicated on the plan.

The earliest forms of mining remains on the surface of the knoll are largely to be found on its margins, where they appear not to have been overlain or removed by the development of the later workings. One might expect the earliest works to include a number of large, readily identifiable open-cuts. However, with the possible exception of the large quarried hollow (3 - discussed in greater detail below), none is apparent, suggesting that the irregular nature of the mineralisation near the surface did not lend itself to that approach. Narrow and shallow open-cut trenches (1 and 2) follow two fault lines in the limestone crag leading to the western rim of the large quarried hollow (3), but these are both quite insubstantial. The northern example (1) clearly overlies a level on the same alignment, and may have been cut simply to exploit or prove the upper part of the same ore string (Figure 10).



Figure 10: The smaller open-cut trench (1) in the edge of the quarried hollow viewed from the west. Photo: Rebecca Pullen, © English Heritage.

To the south, just within the boundary of the scheduled area, a small open-cut appears to have been dug to explore a shakehole (a natural solution hollow), resulting in a low spread of upcast on its western side (4). Further shakeholes continue down the slope to the south-east, two more having slight indications of working while the last three appear to be entirely natural. These hollows, usually formed above cracks or fissures in

the limestone, may have offered a comparatively easy means of access into the knoll for the purpose of prospection. On this south side of the knoll, however, the prospects must have been fairly poor since exploration did not result in significant extraction.

A line of four worked hollows at the extreme northern end of the complex (5), east of Ashnott farm, also appear to have begun by exploiting a run of shakeholes. These workings developed further than those to the south, accumulating considerable mounds of upcast on their northern, downhill flanks, as well as low terraces of dressing waste on the slope below. A narrow sub-rectangular hollow within this waste suggests the former presence of at least one small structure. A shallow leat (now dry) drawn from the main stream to the east follows an embanked crease across one of the larger spoil heaps, and doubtless served to wash and separate ore in the dressing area before issuing northward along a linear drain towards Ashnott Wood. The 'T' shaped arrangement of low banks visible just below the spoil mounds may have been part of the mining operation, but its relationship to the other workings is obscured by a later track. This track, surveyed in 1847 for the first edition Ordnance Survey map (see Figure 5) appears to have given access to the later workings along the western flank of the knoll, as well as to the limekiln (36) near Ashnott farm.

The winding stream to the east of the mines appears to have originated as a natural channel draining a spring (still marked as such on modern Ordnance Survey maps) which rises in the area bracketed by two converging banks (6). These banks are the remnants of a small dam placed here to contain the spring, but also to hold water supplied along a rather erratic artificial channel drawn from issues at the foot of Crag Hill some 500m to the south-east. This supply could be regulated by a by-pass channel around the dam's northern side. The position of the dam is such that it can only have served the northernmost mines on the edge of the knoll (5). Since its water supply was subsequently diverted further west to the workings in the centre of the knoll (see below) both this dam and the mines it served must be considered among the earliest mining remains at Ashnott.

Water for the later mines was marshalled in a second dam, recorded in 1847 (see Figure 6), the remains of which (7) are situated some 120m south-east of the first. This second dam took its supply from the same issues on the edge of Crag Hill via a separate, more southerly channel. The issue from the later dam leads north-west in a direct line toward the major area of workings on the promontory, its route cutting across a tributary (8) to the northern dam, further emphasising that the southern dam was a replacement rather than an addition to the first. On reaching the workings the later supply channel curves abruptly to the north-east near shaft 14 to join the outflow from the earlier dam. Although this course is now the main drainage route around the knoll it was probably no more than an overflow during the operation of the mine. The obvious original intent was to feed a series of leats (now dry) which flowed west and north through the workings to various points of need. The principal leats ran into the main area of processing waste (9) east of the large quarried hollow before running north into the older workings (5) or re-joining the old outflow leading to Ashnott Wood. A version of this watercourse is indicated on the 1850 Ordnance Survey map (Figure 6).

The main ore dressing area (9) is in two parts. The first consists of a cluster of small discard mounds at the eastern end of a large bank of limestone debris spreading downhill and to the north of the embanked shafts 10 and 11. The absence of significant dressing waste around the shafts further south suggests that bouse (a mixture of rock and ore) was routinely carried northwards to a point where the ore was liberated by hammering or crushing. The orientations of several terraced tracks and faint paths tend to support this notion. The second part of the dressing area - a sunken area flanked by low spreads of small limestone waste - lies slightly further to the north, where several leats provided water for the purpose of washing and separating the crushed ore.

The large curved bank (12) to the north of the washing area has something of the appearance of a contour dam and its clay composition, revealed here and there by stock erosion, would tend to support such an interpretation. A dam in this location could have served the processing areas at the foot of the knoll to the north (5). However, the long south-western tail of the bank, which rises up the slope of the knoll, could not have retained water, and although an extremely narrow pond might have been possible within the northern-most part of the curve (assuming that it was originally one continuous earthwork), such a large feature would not have been necessary to provide such a small reservoir. On close inspection it appears that the channels leading north (except for those cut through the bank) are the product of natural drainage rather than any deliberate form of water management, further undermining any suspicion that this originated as a dam serving the northern workings. Indeed, the bank appears to pre-date all the mining activity on the knoll and even appears to have been a minor obstruction which had to be cut through in several places to allow drainage from the processing area. The curvature of the bank bears a superficial similarity to a number of sub-circular prehistoric settlements in the region⁴². However, while the terrain model (eg Figure 9) tempts the eye to complete an oval enclosure there is actually no physical evidence to support such an interpretation. Parts of such an enclosure could have been obliterated or obscured by mining to the south and west, but this does not appear to have been the case to the east where the bank simply fades away into the rising ground. Prehistoric enclosure banks in the region are usually far less broad, often contain a high proportion of stone; where this stone is absent the bank is usually accompanied by an external ditch. The width of the bank, lack of stone and absence of ditch raises the possibility that the feature is not man-made at all, and might be no more than a natural post-glacial deposit of clay formed around the contour of the knoll. The truth of the matter will have to await more intrusive forms of archaeological investigation.

As Cannell noted in 1966, the variety of shafts across the summit of the knoll appear to represent a mixture of extraction and ventilation.⁴³ In general terms one can suggest that those lacking adjacent or surrounding upcast were dug for ventilation - some quite possibly dug upwards, or underhand, from levels below (i.e. 20-24) - whereas those with pronounced spoil heaps of 0.5m to 1m in height, most notably those clustered on the southern part of the promontory (13-19), clearly represent digging from above, overhand, and were mostly likely used for extraction. Given the interconnected nature of the underground workings, however, it is quite likely that shafts dug for one purpose were adapted to others as the mines developed. None of the mounded shafts is accompanied by any trace of a horse gin or other major winding apparatus, so it must be assumed that simple windlasses and kibbles (buckets) were employed throughout their operation.



Figure 11: The northern mine entrance (25), in the eastern side of the large quarried hollow. Photo: Rebecca Pullen, © English Heritage.

The later working of the mine was undertaken through a series of levels, the entrances to which were driven into the western face and slopes of the knoll. It was through two of these openings that Cannell gained entrance to the underground workings in 1961 (see Figure 7). As far as can be determined (see discussion of the underground workings below) Cannell's northern entrance appears to be that which is now blocked in the eastern rock face within the large quarried hollow (25 and Figure 11). Other passages radiate from this hollow. To the north-west is a short tunnel (1), now largely impassable, between the hollow and the western face of the limestone crag, mentioned above as the level beneath an earlier open-cut (see Figure 10). To the south, the tops of two openings, close together, remain visible above a mound of accumulated soil within the hollow, indicating either a single or double passage leading in that direction (26). To the south-west the slight open-cut trench (2) may, judging from a point of partial collapse on the surface, overlie a further level, the entrance to which is also buried within the hollow. Such a convergence of levels raises the strong possibility that the hollow originated neither as a quarry nor as a large open-cut, but as an underground working - a large chamber or stope - centred on a major deposit of ore. Such a deposit could have been one of the earliest foci of mining activity, exploited first through superficial open-cuts and later through shafts or levels, until the resulting chamber simply collapsed or was dug away to retrieve the last of the ore.

Cannell's southern mine entrance (27), now the only means of entering the mine, is a rock-cut opening in a limestone crag some 50m south-west of the quarried hollow (Figure 12). Due to the accumulation of soil from the slope above, the entrance is now

only about 1m high, but it opens into a small chamber with a shaft in the floor and levels extending in different directions as indicated on Cannell's sketch plan (see Figure 7, F). Waste from the mine was deposited in a series of broad terraces along the natural bench below the limestone scarp, alongside an intermittent track which gave access to a series of workings around the foot of the knoll. Other, less obvious level are indicated by small voids where their openings have been largely blocked, deliberately or through slope erosion (e.g. 30) or by shallow horseshoe-shaped hollows where the entrances have long since been completely buried (e.g. 33). Two former level entrances lie outside the area of the scheduled monument. The northern one (32) is represented by a corona of spoil around the buried opening and a narrow hollow leading downhill toward a second small spoil heap. The second, level (33) was cut into the foot of a spur at the south-western end of the knoll. The blocked entrance here is visible as a slight hollow from which a tramway extended west to create and eventually override a finger dump of spoil. A higher blocked entrance to the east (34) and another higher still (35) trace the line of the mine into the spur, culminating in a cluster of small ventilation shafts (20, 21 and 22) and other hollows indicating points of collapse above the underground workings. There are no obvious indications of ore-processing below the lower south-western level entrance (33), but a thin and solitary (dry) leat threading its way across the knoll from the curved stream suggests that some washing and dressing may once have taken place. Given the position of this level, however, and the relatively small mound of associated spoil, it is quite possible that its main function was to drain the other workings.



Figure 12: The southern mine entrance (27), and sole surviving point of access to the main levels beneath the knoll. Photo: Rebecca Pullen, © English Heritage.

The farm buildings

A dwelling at Ashnott may be indicated by the reference to a croft in Thomas Proctor's 1538 lease⁴⁴ but the present building, which has not been studied in any detail, appears to be a 19th-century enlargement of an 18th-century cottage, the latter incorporated toward the south-western end of the present range. It has not been possible to establish whether this earlier building housed miners, or indeed contained a mine shop. It was described in the 1843 tithe award as a house and barn, which appear to be depicted on the accompanying map of 1838 (Figure 13) as two ends of an off-set range.⁴⁵ From the position of the range in relation to the present building it seems likely that the southern end comprised the house. In the latter part of the 19th century, and certainly before 1893, the house was extended further to the south-west and the barn was enlarged to form the large rectangular range, or laithe house, which stands today.⁴⁶ A small outbuilding to the north shown on the 1838 tithe map and the first edition 6-inch map (see Figures 6 and 13) was swept away in the process, replaced by the present outbuilding to the south-west which may contain some stonework salvaged from an earlier structure.



Figure 13: Ashnott farm today, viewed from the south east (photo: D Went, © English Heritage), and depicted on the 1838 Tithe Plan (Lancashire Archives PR 3035/4/3. Reproduced with permission).

The adjacent limekiln (36) was omitted from the tithe map, as were all lime kilns in the township. This and more than a dozen other kilns dotted across the parish were depicted on the broadly contemporary first edition 6-inch map (Figure 5), but unfortunately this map did not (as later editions) differentiate between kilns that were active or 'old'. The Ashnott example is a simple kiln with single pot, built of limestone blocks cut from the small quarry into which it was placed. It has a low arched drawing hole and single eye at the base and a slumped hollow marking the charge hole above (Figure 14). It is a type commonly built in the 18th and early 19th centuries to provide lime mainly for field dressing rather than mortar,⁴⁷ and as such it probably accompanied the agricultural improvements of the later 18th century.

The source of the limestone charge may have been the quarry into which it was built, or one of a number of small quarried faces stretching along the rock outcrops to the south. It is quite possible that the kiln was placed to make use of some of the output from the mine, including perhaps material cleared from the quarried hollow (3) in the centre of the knoll. At the present time the future of the limekiln is somewhat threatened by the stability of a mature ash rooted in the top of the pot.



Figure 14: The small single pot lime kiln (36) included in the scheduled monument at Ashnott. Photo: Rebecca Pullen, © English Heritage.

The agricultural landscape

The 1993 Lead Industry Report site assessment refers to the Ashnott workings as seemingly being respected by medieval ridge and furrow cultivation⁴⁸ which, if true, would be an important indication of the early development of the industry. On close examination, however, the only cultivation patterns to demonstrate a near association with the workings are those on the gentle slope west of the knoll. These narrow ridges, 4m to 5m in width, could have been created in the 16th century (perhaps the 'grounds' mentioned in the 1538 lease) or at any time up to the late 18th century. They bear little relationship to the mine, except where they appear to be overlain by spoil from the lower mine entrances.

The summit of the knoll, just south of the main workings exhibits some faint tightly-drawn linear scarification, which does not appear to represent ploughing in any ordinary sense. It over-rides a broad bank (37) which appears to mark a boundary along the southern edge of the mine, and supersedes some traces of land drainage on the knoll's southern flank. As such it would appear to be rather late in the sequence of events.

Elsewhere, and particularly to the east, the majority of linear features represent field drainage: the earlier drains following natural creases, the more recent drains forming more extensive and systematic patterns. No research has been undertaken into the origin of these systems, but the later patterns could reflect a wider trend of land improvement through the late 18th and 19th centuries, in which lime dressing might also have played a considerable part. The system of drainage is framed to the east by a striking double-ditched bank (38), which runs north-east from the later dam (7) straight as a die for nearly 300m before reaching the enclosures around Ashnott Barn and Stone Fold. This same boundary also continues south from the dam before swinging west around the contours of the knoll toward Crag Beck. The aerial photograph on the cover of this report provides a view of Ashnott from the north in which both sections of the boundary are picked out by strong and low winter sunshine. The straight northern section matches the rigour of the long fields to the north-east which follow a regular plan commonly associated with upland enclosure in the later 18th and early 19th centuries. The curvature of the southern section is more reminiscent of earlier enclosures which were laid out in relation to the lie of the land rather than to suit the regularity of a preconceived plan, but it is clearly part and parcel of the same boundary. When this boundary was made remains open to question. The majority of former commons within the Manor of Slaidburn and its dependent townships (Slaidburn, Newton, Grindleton and West Bradford) were enclosed from the 16th century onward, and the process is thought to have been largely completed in the 20 years that followed a decree by the Duchy of Lancaster in 1619.⁴⁹ At Ashnott the job of enclosure may have begun with the 'improvements' mentioned in Thomas Proctor's lease of 1538, and continued after 1591 when the broad area of uplands known as Youkeston Wood was mapped (see Figure 2) for an inquiry into the enclosure of wastes in the parish of Slaidburn.⁵⁰ However, all that can presently be said with any certainty is that the boundary must have been abandoned before 1838, presumably in favour of newer field walls set further up the slope of Crag Hill, as it not shown on the tithe map (see Figure 5) or any subsequent Ordnance Survey map.



Figure 14: The double-ditched boundary bank (38) north of the dam (7) viewed from the north. Photo: Rebecca Pullen, © English Heritage.

The boundary appears to have been aligned on the later dam (7), and indeed the bank can be seen to abut the dam's northern embankment. At present, this merely indicates that the dam predated a late 18th-century boundary, as might be expected. If, however, the boundary could be shown to form part of the earlier process of enclosure in the 17th or indeed 16th century, this would have a significant bearing on the chronology of the mine's development.

Underground workings

Figure 16 is an attempt to combine aspects of Cannell's 1961 sketch plan of the underground workings (see Figure 7) with the earthwork survey. It has not been a particularly satisfactory exercise; indeed it has only been possible to achieve the limited correlation seen here by completely altering both the scale and orientation of the

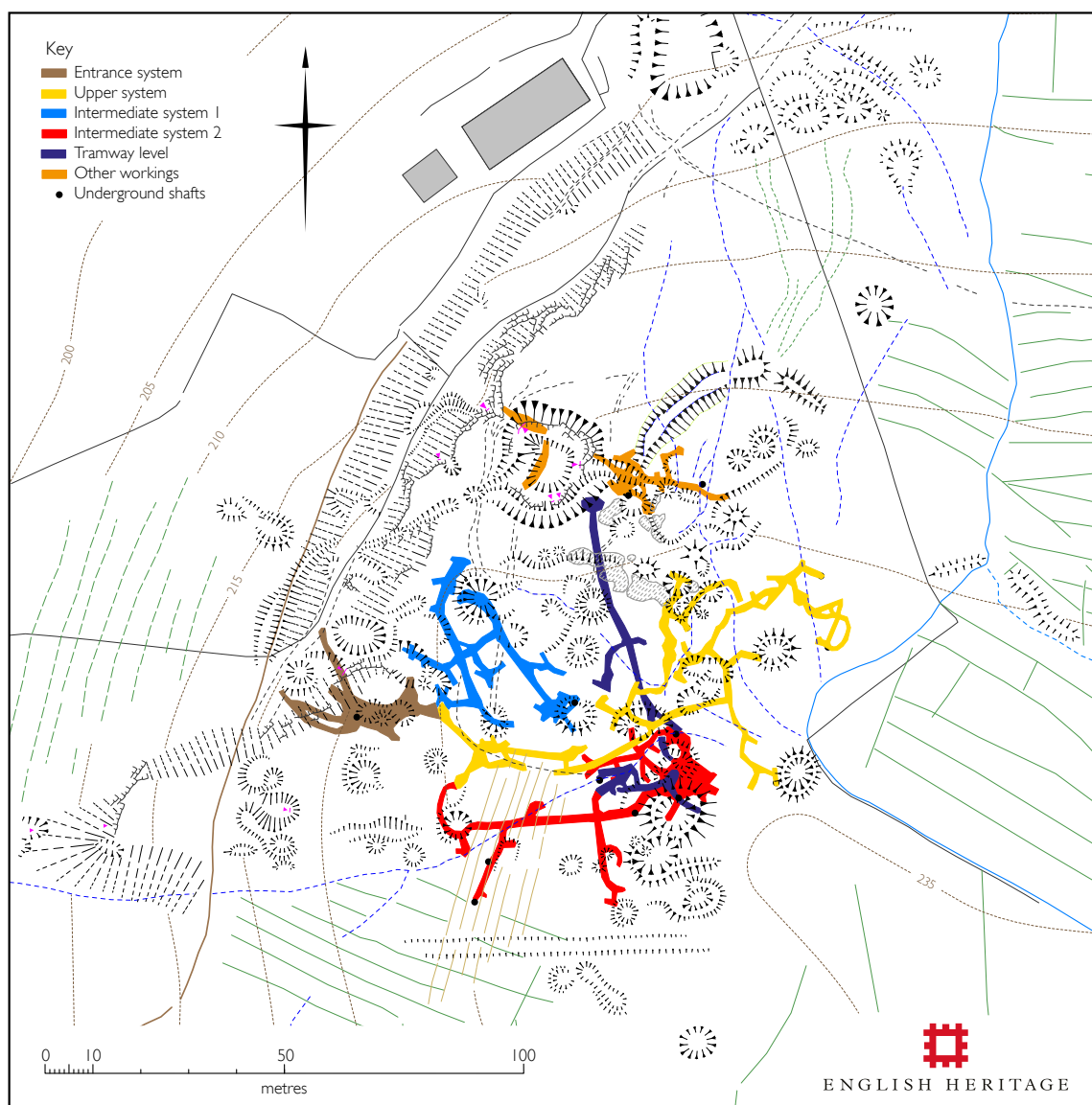


Figure 16: The underground workings, taken from Cannell's 1961 sketch plan, re-oriented and scaled to broadly fit alongside the earthwork survey.

original sketch. These changes were required to co-locate two key features on the 1961 sketch with their surveyed counterparts: namely the main entrance (F on Figure 7, and 27 on Figure 18), which is the only accessible entrance in this area in recent memory,⁵¹ and the subsidiary entrances (A, C, D and E on Figure 5) converging in the quarried hollow (3 on Figure 18) to the north-west. In order to achieve this fit Cannell's sketch had to be rotated approximately 9½ degrees west, perhaps simply to compensate for its orientation to magnetic north in 1961.⁵² More problematic, however, was the matter of scale. In order to roughly correlate these entrances the sketch had to be reduced by about 60 per cent, raising a question as to whether Cannell's '40 yard' scale bar should, for the main part of the workings, have read 40 feet.

With these adjustments in place the correlation of features, while far from exact, is reasonably convincing. The pattern of underground workings is entirely contained within the knoll and there is significant convergence between areas of intense activity above and below ground. It is also possible to identify likely associations (although no precise connections) between some of Cannell's 'underground shafts' and the shaft tops visible above. Most significantly, it would seem, from this overlap, that the tramway system running north through the centre of the complex once exited inside the large quarried hollow, where a near-buried opening (26) was noted in the recent survey. This suggests the possibility that ore was raised from here to the processing area (9) above and to the east, thereby accounting for the worn hollow between the two.

A particular difficulty arising from the accommodation of the two plans is that the reduction in the scale places Cannell's depiction of the farm far south of its true location, and raises some difficult questions about the recorded position of the long drainage level. It has not been possible to reconcile these discrepancies, and for that reason the long drain is not included on Figure 16. In the final analysis it appears that the 1961 plan, helpful as it is, should be treated as indicative rather than accurate. This, of course, is not to denigrate the efforts of Cannell and his colleagues, who faced far greater difficulties surveying below the knoll than any encountered by their successors on the surface above.

A note on the condition of shafts

Apart from peering into various openings no underground exploration has been undertaken as part of this survey. All of the surface shafts have long since been in-filled. Some may have been completely packed with stones and earth; others, however, appear to have been capped in a less effective manner, perhaps by tipping in branches, tin sheets or planks to save on the amount of earth and rock need to plug the hole at the surface. These materials decay with the passage of time and there have been several incidents where the packing has collapsed. Cannell records one such shaft which was open shortly before his survey and about 60ft deep.⁵³ Since then a number of the old shafts have partly reopened, and scrap metal and other detritus has been thrown into some of the hollows as a means of preventing livestock and people from wandering into harm's way. The intended management plan for the scheduled monument includes proper measures to seal these shafts, and with that in mind the condition all those which give cause for concern was noted during the course of the survey. These are listed and depicted (Figure 17) in Appendix I.

CONCLUSIONS

The survey and the accompanying research has shed new light on the development and history of the Ashnott Mine, confirming and enhancing our knowledge of some aspects of its early origins and demonstrating how mining evolved here by combining analysis of the earthworks with the results of earlier investigations beneath the ground.

No conclusive evidence has been found to prove that mining took place at Ashnott in the medieval period, although lead from the wider Honor of Clitheroe provided significant revenue for its lord, the Earl of Lincoln, in 1304-5, and it is clear that he was prepared to invest significantly in developing the industry within the Honor at that time. Two centuries later, in 1538, the grant of the Ashnott property for a period of three years, and indeed the wording of that lease, strongly suggests that Thomas Proctor intended to exploit a known resource rather than embark on a speculative venture; in which case the Ashnott mine can be said not only to have existed in the late medieval period, but also to have been at the very forefront of the wave of mining adventures that broke across the Forest of Bowland in the later 16th and 17th centuries.

In terms of the physical remains, the earliest mining at Ashnott appears to be that represented by the crudest forms of prospection or extraction, including a few small open-cuts which have not been obliterated by later workings, and some delvings into shakeholes on the knoll's northern and southern flanks which stand apart from the more intense areas of later mining. On the northern flank these explorations developed sufficiently to justify the creation of a dam (6) and channels to provide water for processing the ore.

The shaft mines on the highest part of the knoll, typically 17th- or 18th-century in form but perhaps earlier, remained active for longer, threw up greater quantities of spoil and required significant modifications to the water supply, including a replacement dam (7), to serve a more elevated and concentrated area of ore washing and dressing. The later dam appears to have provided a landmark for a phase of enclosure on the lower fell side in the 18th century if not before, which raises an interesting question about the date of the earlier dam and water supply.

In the latter stages of the mine's development, extending into the 19th century, a series of levels were driven into the western side of the knoll, which, as Cannell has observed, connected the stopes and tunnels radiating from the earlier shafts to provide a more systematic means of removing the ore. Bouse from these operations was, however, still brought to the principal dressing area on the crown of the knoll, perhaps drawn upwards from levels which converged in the large quarried hollow below.

Although Ashnott saw considerable investment in its later years, most notably the construction of the long drainage level to Ashnott Wood, in some respects it appears to have remained a fairly low-key operation, lacking evidence for heavily mechanised processing or even for the use of ore-bins or bing-steads. Perhaps the scale of the lead deposits and more particularly their erratic formation within the knoll placed practical limits on the mine's development. Even if Ashnott was the mine mentioned

in 1835 'from which a considerable quantity of ore has been obtained', it was clearly a rather marginal enterprise compared to the greater mines of the district – Brunghill, or Brennand and Whitendale for example – which were better able to withstand the slump in lead prices of the 1830s, some of which remained in production for a further 30 or 40 years.⁵⁴

The 'Structure from Motion' survey technique, combined with observations on the ground, has proved an effective means of archaeological investigation, and the resulting plan and interpretation of the surface evidence has allowed Cannell's earlier underground explorations to be viewed in a new and interesting light. Further documentary research, beyond the scope of this brief study, may help to pinpoint earlier periods of mining, but the present work has been sufficient to demonstrate the significance of the range of mining-related remains present on the site. This survey will support the implementation of the management plan which, among other things, will seek to cap hazardous openings, remove scrap metal, improve fencing and facilitate a more effective grazing regime across the knoll. It should be noted, however, that several significant elements of the mining complex currently lie outside the scheduled area: namely the greater part of the drainage level extending north, the two level entrances with their related spoil mounds below the western foot of the knoll, and the two dams with associated watercourses on the plateau to the east of the mines. These too should be considered in the development of the management plan.

NOTES

- 1 English Heritage Archive, NRHE record UID 966041
- 2 Gill 1987, 44; Earp et al 1961, 265
- 3 In 1999 Ashnott Mine was designated as scheduled monument 27848. This entry has since been transferred to the National Heritage List for England (NHLE) as Entry No. 1016555.
- 4 Cranstone 1992, Lancashire 1
- 5 English Heritage 2013, 63; 2014, 65
- 6 Cranstone 1992, Lancashire 1
- 7 Cranstone *pers comm* based on notes made during compilation of the Step 4 lead Industry report
- 8 Higham's 2002 treatise on medieval gardens in North West England, cites evidence from Lyon's (1884) translation and transcription of the accounts of Henry de Lacy 1295-6 and 1304-5
- 9 Lyons 1884, 185
- 10 *ibid* 183, 186
- 11 *ibid* 186
- 12 Tupling, G H 1927 Economic History of Rossendale 116, 186, cited in Raistrick 1989, 70-71
- 13 Lyons 1884 116
- 14 MC Gill has suggested (*pers comm*) that such a drain would be extremely unlikely in the context of early, largely open-cut works around the slopes and summit of the knoll.
- 15 *ibid* xix
- 16 Higham's article on 'shay' place names (from *Nomina* 12, 1989, 89-104) reprinted in Crosby 2007, 29, 33-4; Higham 1985 *Slaidburn: A Guide for Visitors*, 4, cited in Trippier et al 2006 2, 8
- 17 TNA MR 1/778 Plan of parish wastes in the townships of Slaidburn, Newton and Grindleton 1591. Higham (in Crosby 2007, fn 33) relates that this plan was identified by B J N Edwards, former Lancashire County Archivist, as drawn by Christopher Saxton. There is no attribution on or with the original plan, although it is appropriate to Saxton in terms of date and general style
- 18 The Honor of Clitheroe passed by marriage from the de Lacys to Thomas, Earl of Lancaster in 1311, and was subsequently incorporated within the Royal Duchy of Lancaster. Hence the grant to Thomas Proctor from the Crown was a simply matter of manorial lordship rather than an expression of royal mining prerogative.

- 19 TNA E210/1477 The King to Thomas Proctor 30 Hen VIII
- 20 Tyson 1996, 48
- 21 Gill 1993, 135
- 22 Houghton MSS 1234 cited in Gill 43
- 23 *ibid*
- 24 Gill 1987, 43
- 25 The National Archives: C 107/61 'Lead mines in Slaidburn and the Forest of Bowland'
- 26 Gill 1987, 43
- 27 *ibid*
- 28 *ibid* 47
- 29 LCRO PR3035/4 cited in Gill 47
- 30 LCRO PR 3035/4/3 Apportionment of the rent charge for Newton township 1843
- 31 1841 and 1851 census returns accessed via Ancestry.co.uk
- 32 Ordnance Survey 6-inch Sheet 165 (Yorkshire) surveyed 1892-3, published in 1896
- 33 Cannell 1966, 46
- 34 Gill 1987, 44
- 35 *ibid* 45
- 36 *ibid* 47
- 37 Cannell 1966, 48
- 38 *ibid*
- 39 Report by Pete Jones on the retrieval of a cow by the Bowland Pennine Mountain Rescue Team, 29th September 1986, filed on the group's website: <http://www.bowlandpenninemrt.org.uk/C.%20Ashnott%20Mine.pdf>
- 40 <http://www.eastlancsbats.org/projects/bats-underground-project/>
- 41 Bedford forthcoming
- 42 Quartermaine and Leech 2012; Oakey, *forthcoming*.
- 43 Cannell 1966, 46
- 44 TNA E210/1477, The King to Thomas Proctor 30 Hen VIII
- 45 LCRO PR 3035/4/3 Apportionment of the rent charge for Newton township 1843

- 46 Ordnance Survey 6-inch Sheet 165 (Yorkshire) surveyed 1892-3, published in 1896
- 47 Robertson 1999
- 48 Cranstone 1992, Lancashire Site 1
- 49 French and Hoyle 1999, 353
- 50 The National Archives: E210/1477, 1538; MR 1/778, 1591
- 51 Laurence Whitaker *pers comm* October 2014
- 52 Ordnance Survey 1-inch sheet 95 1961 (Difference from Grid North)
- 53 Cannell 1966, 46
- 54 Gill 1987, 43-49

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E 210/1477 1538-9 The King to Thomas Proctor: 'The Ashe Nothe' adjoining Yolston Wood in the parish of Slaidburn (Slatebourne) n Bowland (lease for three years) 30 Hen VIII.

MR 1/778 'A plat of the Champion, Ramore, Brunghillmore, and Youkeston Wood in the p[ar]rishe of Sladebourne, Belongi[n]g to Sladebourne, Newton and Grynlynton; in w[hi]ch plat the Champion is colored wth yeelow, Ramore w[i]th red. Brunghill and youkestonwood wth grene, wth their co[n]tents wrytten in the same. And the consynes left whit[e] devided wth Red Lynes. Maid in September. 1591. (Plan related to DL44/468 : enquiry in connection with proposed enclosure of waste land within the parish of Slaidburn).

Lancashire Archive Services, Preston (LCRO)

PR 3035/4/3 'Apportionment of the Rent Charge in lieu of Tithes in the Township of Newton in the Parish of Slaidburn in the County of York'. Valuer Felix Leach. Agreed 18th January 1843 (parish copy certified 4th June 1844). Tithe Plan surveyed and drawn by J R Allen and J Watson Preston, May 1838.

APPENDIX I: COLLAPSED SHAFTS AND VOIDS

The more pronounced shafts and hollows at Ashnott lead mine, and those with obvious signs of collapse, are labelled on Figure 17 and described below. Shafts 10, 17, 18, 39 and 42 (marked with red dots) need further assessment to determine appropriate forms of capping. Shafts 13, 24 and 41 (blue dots) contain deposits of scrap metal and require further investigation. Shaft 23 (also blue) has a small void, but this may be too small to be worth capping at the present time. The last fully open entrance to the mine complex, 27 (red dot), requires a gate to restrict access and allow movement of bats. The short passage between the limestone cliff and the quarried hollow (1) contains some scrap metal, perhaps overlying a collapse shaft, and may also need to be gated, although the passage is short and low.

- 1 Entrance to a short tunnel into the quarried hollow. Deposits of scrap metal visible inside the eastern opening. SD 69268 48117.
- 2 Small steep hollow, probably subsidence from below. No void or opening. SD 69258 48103.
- 10 Shallow depression (0.7m), spoil to north, with collapsed hole in base. SD 69284 48079.
- 11 Conical shaft top, cut 1.5m into rock. Very steep inside. Spoil to west. Slight entrance to north-west. Hard, dry earthen base with nettles. SD 69260 48081.
- 13 Shaft top, conical hollow, 0.5m high upcast rim. Scrap metal in base, but no evidence of actual void. SD 69321 48070.
- 14 Shaft top, conical interior with grass base, surrounded by spoil ring up to 1.4m high. No sign of collapse. SD 69326 48044.
- 15 Shaft mound, steep conical hollow with rubble in the base. No evidence of collapse. SD 96301 48036.
- 17 Shaft top with spoil ring. Collapsed base covered by scrap metal. SD 69280 48057.
- 18 Shallow dished depression with slight spoil bank to north (shaft top). 1.4m diameter collapsed hole in base. SD 69281 48070.
- 19 Small conical shaft top, cut into rock. Depth 1.2m. Slight spoil rim. Dry earth floor could be dropping slowly. SD 69263 48056.
- 20 Steep conical shaft top, cut into the rock to depth of c.2m. No spoil. Possible air shaft from level. Earthen base. No void SD 69255 48033.
- 23 Two shaft tops, very little spoil (probably for ventilation). West shaft has small void into rock. SD 69314 48110.

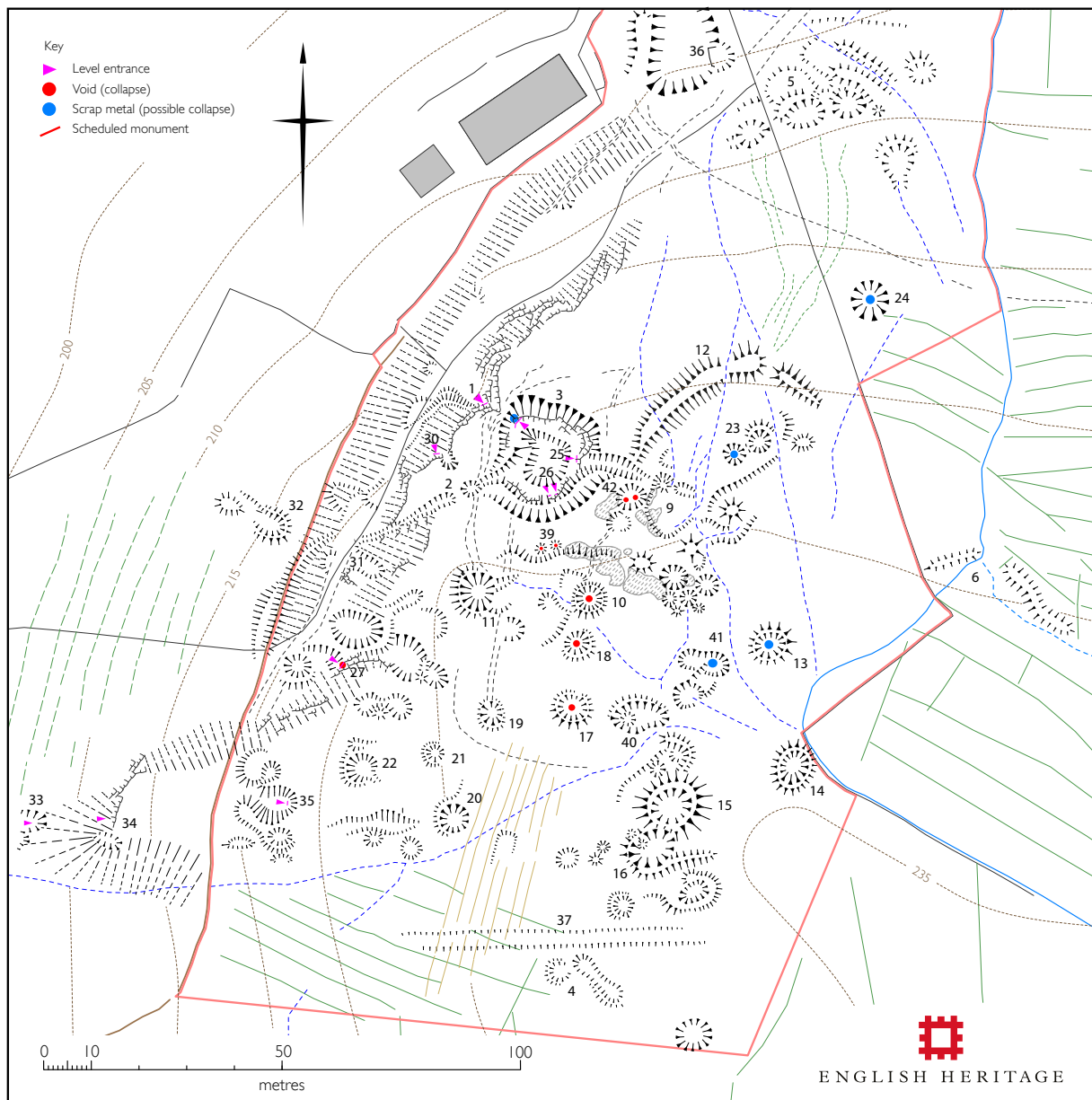


Figure 17: Plan of the earthworks highlighting collapsed shafts and other potential hazards mentioned in Appendix 1. Drawn by Philip Sinton, © English Heritage.

- 24 Broad conical shaft top, no spoil (ventilation?) Small amount of scrap metal and bundle of wire in base. Slumped, but no obvious void. SD 69342 48142.
- 25 Second entrance, within the large quarried hollow, leading to a smaller complex of passages under the knoll: a rock cut passage, 0.7m high, which although apparently open in 1961, is now blocked by collapse just inside the rock face. SD 69281 48109.

- 26 Two small voids in the southern internal face of the quarried hollow, largely blocked by slumped material, perhaps the entrance to the tram level investigated in 1961. SD 69276 48102.
- 27 The main mine entrance: a rock cut opening into the limestone crag, now c1.2m high, opening into larger internal chamber; with downward shaft and side passages a short distance inside. Formerly closed with corrugated iron sheets attached to flanking posts. Now closed by a pallet resting against the rock face. SD 69231 48065.
- 39 Two small openings, no upcast, perhaps cut for access or for ventilation from the level below. West hole covered with a pallet, east with galvanised water trough. SD 69275 48090.
- 40 Irregular hollow with dry stony patch in the base indicating possible blocked shaft. No evidence of collapse. SD 69291 48054.
- 41 Cluster of three hollows, the central one containing scrap metal which may mask collapse. SD 69310 48065.
- 42 Two small holes in rock – either cut or collapsed workings below. SD 69292 48101.

APPENDIX 2:

Transcription and modern rendering of the lease of Asshe Notte to Thomas Proctor, 1538 (The National Archive E210/1477).

This Indenture made the XV(?) day of July in the XXXth year of the reign of Henry the Eighth by the grace of God king of England and of France Defender of the Faith Lord of Ireland and in earth supreme head of the Church of England between Sir John Dawne knight one of our sovereign lord the King's councillors and John Halot one of the barons of the King's Exchequer and Richard Pollard the King's Remembrancer in his said Exchequer General Surveyors of our said sovereign lord the King's lands of the one party and Thomas Proctor of that other party **Witnesseth** that the said General Surveyors on the behalf of our said sovereign lord and also by virtue of any act of parliament thereof for the same General Surveyors ordained and made have granted devised and to seazine lessey and by that presentment grant devise and to seazine lesse the said Thomas Proctor a certain croft ground and pasture called the Asshe Notte adjoining Yolston Wood in the parish of Slatebourne in Bowland in the county of York part of the lands late of Stephen Handton of high treason attainted and also on the behalf of our said sovereign lord have granted and given licence and by that presentment licence the said Thomas Proctor to take dig and mine lead ore within the said ground and pastures **To have** and to hold the said ground and pastures with the approvements and have licence to dig take and mine lead ore within the same pasture to the said Thomas Proctor from the feast of Saint Michael the Archangel next coming onto the end and fine(?) of three years the next following and fully to be complete **Yielding** and making account yearly of the price of the said lead ore afore the King's Auditor of the said lands according to the laws of mining and paying all and singly such sums of money as shall be found due upon any such account onto the hands of the general receiver of the said lands to the King's use **In Witness** whereof the parties here aforesaid to this presentment entered amicably have set their seals on this day and year above written

Note: common words are rendered with modern spellings, appropriate capital letters and apostrophes to indicate possession. The original document, following normal legal practice, contains no punctuation other than the emphasis of certain words with greater size and weight of ink (here shown in bold). Uncertain words are followed by (?).

APPENDIX 3: ARCHIVE CONCORDANCE

The lead mine and lime kiln were designated as scheduled monument 27848 in 1999. This designation has since been transferred to the National Heritage List for England (NHLE) as list entry No. 1016555.

The lead mine and kiln are also recorded as PRN 10010 in the Lancashire Historic Environment Record, and as HOB UID 1232229 in the National Record of the Historic Environment England (NRHE), formerly the National Monuments Record (NMR) maintained by English Heritage, Swindon.

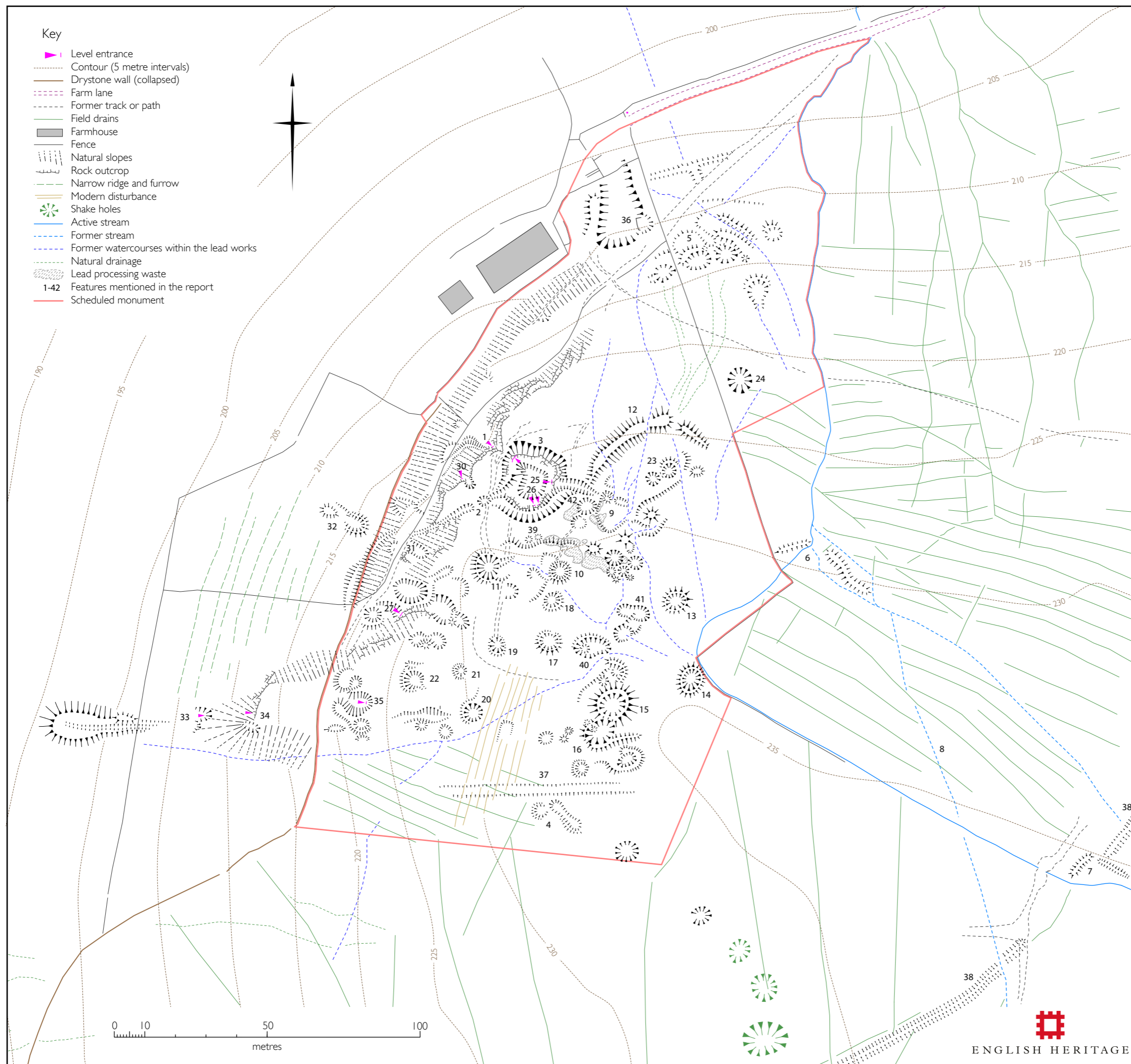


Figure 18: Analytical and interpretative plan of the Ashnott mine drawn from the digital surface model and aerial photography, verified and enhanced by observation on the ground. Prepared for publication by Philip Sinton, © English Heritage.



ENGLISH HERITAGE RESEARCH AND THE HISTORIC ENVIRONMENT

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- * Assessment (including Archaeological and Architectural Investigation, the Blue Plaques Team and the Survey of London)
- * Imaging and Visualisation (including Technical Survey, Graphics and Photography)
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