

GRINTON HOW DRESSING FLOOR,  
RIDLEY HUSH, GRINTON MOOR, SWALEDALE,  
NORTH YORKSHIRE

ARCHAEOLOGICAL RECORDING AFTER  
JULY 2019 FLOOD DAMAGE



Ed Dennison Archaeological Services Ltd  
18 Springdale Way  
Beverley  
East Yorkshire  
HU17 8NU

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Author: Shaun Richardson & Ed Dennison

Ed Dennison Archaeological Services Ltd  
18 Springdale Way  
Beverley  
East Yorkshire  
HU17 8NU

On behalf of

Yorkshire Dales National Park Authority  
Yoredale  
Bainbridge  
Leyburn  
North Yorkshire DL8 3EL

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## EXECUTIVE SUMMARY

*In April 2020, 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 a programme of archaeological recording following July 2019 flood damage to the former dressing floor of Grinton How Mine, near Grinton, Swaledale, North Yorkshire (NGR SE 0433 9626 centred). The work comprised a detailed measured topographical survey at a scale of 1:100, supplemented by photographs, and drawings at a larger scale of exposed structural remains. The scope and scale of the project was defined by an EDAS methods statement, with the YDNPA funding the on-site survey work and EDAS funding the reporting element.*

*The Grinton How Mine dressing floor complex is located c.2.3km to the south-west of the village of Grinton, on the southern slope of Swaledale in North Yorkshire. It lies some 610m south-west of Grinton smelt mill, at an elevation of c.364m AOD, within the valley of Smales Gill, a small side valley to Lemon Gill/Cogden Gill. Although lead mining had taken place in the Grinton area since at least the late 16th century, the dressing floor was probably laid out in the early 19th century to serve two earlier levels, How Level and Cooper's Level. On the Ordnance Survey 6" map of 1857, the dressing floor was depicted as comprising three parallel north-south aligned unroofed structures or platforms. The western platform was linked to both levels by tramways, and was sub-divided into three parts of equal size; it was longer than the other two, extending further to the south. The central structure was un-divided, whilst the eastern structure was of two equal parts.*

*The survey recorded the remains of at least three platforms, most likely corresponding to the structures depicted in 1857. The platforms were terraced into the natural slope, stepping down from west to east, this arrangement being characteristic of lead mining dressing floors as it allowed gravity to be utilised to assist the movement of both materials and water through the different stages of processing. Parts of the tramways linking the levels to the uppermost, western, structure survive as linear earthworks, with the platform incorporating a set of bouse teams and perhaps also a wash kiln or other structure associated with the dressing process. There is no clear documentary or structural evidence for a waterwheel-driven crushing mill, which would not be expected until the later 19th century. The next platform to the east was set c.1m lower than the base of the bouse teams and was probably originally c.7m wide. It had a surface of neatly cut flagstones, which were laid in the same distinctive pattern to the north and south ends. This platform was probably used to reduce the size of the ore-bearing material, using hand techniques on knocking stones. The third terrace or platform beyond was set 0.90m lower, and it was approximately 7.5m wide and again had a flagstone surface. This provided an area for hotching tubs and trunk buddles, where worked material was further classified and concentrated. The map evidence suggests that in 1857 various watercourses supplied the dressing floor and took waste water from the eastern platform to a small area of parallel settling tanks or pits.*

*It is probable that the dressing floor was worked until at least 1867, but after that usage tailed off, and it would certainly not have extended beyond 1895 when the mines closed. Improvements to the existing estate track between 2002 and 2009 disturbed the southern end of the dressing floor's western structures, although this damage was relatively limited compared to that caused by the July 2019 flooding.*



## **1 BACKGROUND INFORMATION**

### **Reasons and Circumstances of the Project**

- 1.1 In May 2020, Ed Dennison Archaeological Services Ltd (EDAS) undertook a programme of archaeological recording at the former Grinton How Mine dressing floor, in Ridley Hush on Grinton Moor, Swaledale, North Yorkshire (NGR SE 0433 9626 centred) (see figure 1). The work arose after a report of significant erosion to the dressing floor by Andrew Rhoades, following flood damage in July 2019. The survey work was defined by an EDAS methods statement (see Appendix 2); the Yorkshire Dales National Park Authority (YDNPA) funded the on-site survey work and EDAS funded the reporting element.

### **Site Location and Designations**

- 1.2 The Grinton How Mine dressing floor complex is located c.2.3km to the south-west of the village of Grinton, on the southern slope of Swaledale, North Yorkshire. It is centred on a watercourse which runs almost east-west along the floor of the Ridley Hush, before joining Smales Gill, on Grinton Moor (see figure 2); it lies some 610m south-west of the Grinton lead smelting mill, at an elevation of c.364m AOD. The dressing floor is reached by an un-metalled estate track, which leaves the nearest unclassified Grinton to Redmire road some 530m to the west. The estate track is also used as a footpath, particularly by walkers undertaking a circular walk from Reeth.
- 1.3 Grinton How Mine takes its name from the How Vein, which in turn is probably named after How Hill, a local promontory overlooking the southern slope of Swaledale. The vein crosses the Grinton to Redmire road, running north-east to south-west. The earliest known period of the working of lead deposits in the Grinton area was during the late 16th century and, prior to the mid-18th century, working was concentrated to the west of the Redmire road. Lead ore was initially sent for smelting to the mills at Marrick, but in the early 18th century the first mill was built at Grinton itself, in the nearby Codgen Gill. In the mid-18th century, it was discovered that an extension of the southern branch of the How Vein was present in the Main Limestone bed, to the east of the existing Redmire road. This branch was worked by both hushes and shafts, with a number of levels (including those adjacent to the survey area) thought to have been started during the 1820s. There appears to have been an upsurge in working again between 1859 and 1867, but the amount of ore raised was limited, and the mine ceased production in or shortly after 1895.
- 1.4 The dressing floor is not a Scheduled Monument nor is it subject to any other statutory protection, although it lies within the Yorkshire Dales National Park. It is listed on the YDNPA Historic Environment Record (site MYD16846) as part of Grinton How Mine.

### **Previous Archaeological Investigations**

- 1.5 The history of lead mining in the Grinton area is covered in some detail by Tyson, Spensley and White (1995), including reproductions of early plans, and also by Gill (2001); these two publications also contain some information on the Grinton How mine itself (Tyson, Spensley & White 1995, 59-65; Gill 2001, 130). No more recent survey work or investigation appears to have taken place.

- 1.6 As part of the preparatory work for this project, a walkover survey of the mine was undertaken by Shaun Richardson of EDAS in December 2019, which highlighted those remains exposed by the July 2019 flooding which might merit further recording. These comprised structural and building remains on the dressing floor dating to the 19th century, and an appropriate survey area was determined. An additional site visit was made on 20th February 2020, and the survey work was undertaken in late April and mid May 2020. It is believed that this report represents the first detailed archaeological survey of any part of the Grinton How Mine complex.

## 2 SURVEY METHODOLOGY

### Aims and Objectives

- 2.1 In accordance with the EDAS methods statement (see Appendix 2), the aims and objectives of the survey work were:
- (i) to record the damage caused to the Grinton How Mine dressing floor and its associated landscape, and also any new archaeological material or features that might have been exposed;
  - (ii) to produce a detailed 'Level 3' survey (as defined by English Heritage (now Historic England) 2007, 20-24) of the damaged area, to provide a basis for any subsequent conservation works that might be proposed;
  - (iii) to produce a survey report and archive, appropriate to and commensurate with the results obtained, and to place these in the public domain.

### Documentary Research

- 2.2 No original documentary research was carried out as part of the project. However, all available existing material relating to the history and development of the mine complex was collected and collated, to inform the subsequent recording work.

### Field Survey

#### *General Topographical Survey*

- 2.3 A detailed measured topographical survey was undertaken of the survey area at a scale of 1:100 using EDM total station equipment. The survey area was sub-square in plan, and had maximum dimensions of c.60m square. Sufficient information was gathered to allow the survey data to be readily located through the use of surviving structures, fences, walls, water courses, trackways and other topographical features. The survey 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. The detailed site survey paid particular attention to any structural remains, and also recorded areas of erosion (both natural, animal and man-made) or other damage.
- 2.4 The site survey was integrated into the Ordnance Survey national grid by resection to points of known co-ordinates. A survey station was assigned a nominal height of 100m AOD, and relative levels obtained across the survey area in relation to this. Survey points were taken from fixed survey stations on a closed traverse

around and through the site; the locations, descriptions and values of the survey stations and control points are stated in the final survey data.

- 2.5 On completion of the total station survey, the field data was plotted and re-checked on site in a separate operation, with any new information added by hand measurement. The resulting site survey was produced at a scale of 1:100 and presented as interpretative hachure plans and drawings using conventions analogous to those used by Historic England (English Heritage 1999; 2002, 14; 2007, 31-35). As noted above, the survey work equates to a Level 3 archaeological survey.

#### *Detailed Drawn Record*

- 2.6 The July 2019 flooding had cut several channels across the survey area, and in one of these, the exposed section revealed structural detail and stratigraphy relevant to the development of the complex. This detail was therefore drawn at scales of 1:20 and 1:50. In addition, on the north-western edge of the main survey area, the erosion had also partially exposed the remains of a wooden launder, and so a section through the launder was drawn at a scale of 1:5. All drawings were produced by hand measurement according to Historic England guidelines (2016, 13-17).

#### *Photographic Survey*

- 2.7 General photographic recording of the survey area, together with close-up photography of significant details and structures, was undertaken using an SLR digital camera with 12 mega-pixel resolution; artificial lighting in the form of flash was used where necessary. The guidelines produced by Historic England (2015; 2016, 17-21) were followed and each photograph was normally provided with a scale.
- 2.8 All digital photographs were taken in colour in jpeg format, and were clearly numbered and labelled with the subject, orientation, date taken and photographer's name, and were cross referenced to film and image numbers. A photographic register detailing the location and direction of each shot was completed (see Appendix 1). All the photographs have been incorporated into the site archive, and a number have been used to illustrate this report.

#### *Written Accounts*

- 2.9 Sufficient notes were taken on site in order for a detailed description of the survey area to be prepared, in combination with the drawn and photographic records. For ease of description, each of the main site elements or components was given a unique identifier letter (e.g. A, B, C etc), and these form the basis of the detailed written description below.

### **Report and Archive**

- 2.10 This EDAS archive survey report has been produced based on the results of the documentary collation and the information obtained during the fieldwork. It assembles and summarises the available evidence for the site in an ordered form, synthesises the data, comments on the quality and reliability of the evidence and, if necessary, how it might be supplemented by further field work or desk-based research. The report is also illustrated by reduced versions of the survey drawings, various historic maps and plans, and a selection of photographic plates. The

report has been produced in an electronic (pdf) format, and has been distributed to all interested parties, including the YDNPA HER.

- 2.11 EDAS also subscribe to the OASIS (Online Access to Index of Archaeological Investigations) project, and all EDAS projects are fully OASIS compliant. An OASIS online record was initiated during the reporting phase of the project, and key fields completed on Details, Location and Creators forms. All parts of the OASIS online form were subsequently completed at the end of the project, for submission to Historic England and the YDNPA HER; this includes an uploaded pdf version of the project report which will be placed in the Archaeology Data Service's Grey Literature Library.
- 2.12 A fully indexed and ordered field archive has been prepared, following the guidelines produced by the Chartered Institute for Archaeologists (CIfA 2020). The archive comprises primary written documents, site drawings, plans, sections and photographs, and an index to the archive (EDAS site code GHM 20). The site archive was deposited with the YDNPA at the end of the project.

### **3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND**

- 3.1 Grinton How Mine takes its name from the How Vein, which in turn is probably named after How Hill, a local promontory overlooking the southern slope of Swaledale. The vein has a north-east to south-west alignment, and crosses the unclassified Grinton to Redmire road. The vein has been proved for over 2km, but the surface evidence suggests that ore was found mainly in the topmost beds of the Main Limestone and in the overlying cherts, the latter making up much of the extensive debris (Dunham & Wilson 1985, 175). Blenk's Hush (now called How Hush) and Ridley's (now Ridley) Hush lie to the east of the road while the main area of workings lie to the west (see figure 3).
- 3.2 The earliest known period of the working of the lead deposits in the Grinton area was during the late 16th century and, prior to the mid-18th century, working was concentrated to the west of the Grinton to Redmire road. The most productive period in the history of the mine was when it was held by the Marriotts, father and son (both Reginald), between 1696 and 1736; from an initial loss of £173 in 1702, their Grinton mines went on to make a profit of £4093 in 1704 with similar returns for the following five years (Gates 2012, xvi). Presumably as a result of these sums, between 1705 and 1708 the workings were the scene of a bitter dispute between Lord Wharton and Reginald Marriot which had its roots in a legal error made as far back as 1599 (Tyson, Spensley & White 1995, 13-22; Gill 2001, 122-123); details of this dispute have been published in detail (Gates 2012). Various plans and surveys produced for the dispute provide useful information on the state of the mines, and one of the earliest, dating to c.1708, shows a series of shafts along the line of the How Vein named as the 'How Lead Mines' (Gates 2012, figure 3). Lead ore was initially sent for smelting to the Marrick mills, and possibly also to the Ellerton and Bobscar mills (Tyson, Spensley & White 1995, 100), but in the early 18th century the first mill was built at Grinton itself. No specific date for the building of this mill is known, but it was probably constructed by Reginald Marriot in the early 18th century, possibly between 1705-10, after he purchased the rights to the surface waste in the Manor of Grinton (Richardson, Lamb & Dennison 2019, 6-7). The fact that he had obtained the rights of turbary (peat cutting) in the area, as well as owning some coal mines and stone quarries, meant that he was in a good position to build and operate a new smelting mill at relatively low cost. The location for this new mill took advantage of the plentiful water supply provided by a

spring and the Cogden/Lemon Gill, and was close to the mines on Grinton How; for this reason, the mill is also known as the How or Low Mill.

- 3.3 In the mid-18th century, it was discovered that an extension of the southern branch of the How Vein was present in the Main Limestone beds, to the east of the Grinton to Redmire road. This outcrop of the vein was worked by the Blenk's and Ridley's hushes, thought to date from the 1750s, with the High and Low Ventilator Shafts sunk to work the vein at depth (Tyson, Spensley & White 1995, 62; Gill 2001, 130); the names of these shafts suggests a connection with a level to provide ventilation, which implies that How Level was of the same date (Richard Lamb, *pers. comm.*) and both How and Cowper's levels are both shown on the 1774 plan and they shared the same spoil tips; the How Level at the foot of the hushes, is shown as being significantly advanced (see figure 3). It was previously thought that this level had been started in the 1820s (Gill 2001, 130), although it is now accepted to be earlier than this. It is generally thought that in areas where work was done using meers (as was the case at the Grinton How mine; Tyson, Spensley & White 1995, 62), hushing post-dates working from shafts. This is because a hush could obviously not be used if any part of the vein was still being worked underground. Normally a level might later be driven from near the foot of the disused hush, but in this case both How and Cowper's levels do not appear to have been in the direct path of a hush, and so they could have been driven earlier (Mike Gill, *pers. comm.*). The early date of How Level suggests it probably initially served a dual drainage and ventilation purpose, and was later adapted to remove mined ore from the workings.
- 3.4 In 1768 and between 1774 and 1788, the mine produced 22.23 tons of lead (Gill & Burt 2003, 195). The How Level enters as a short crosscut in the middle part of the Main Limestone, and is known to continue to the head of the How Hush. At 432m from the portal, a north-north-west crosscut 213m long gave access to the North Vein (Dunham & Wilson 1985, 175). How Level 'forehead' is mentioned in an account of 1850, but it is not clear if the level was still being driven at that point (Tyson, Spensley & White 1995, 63; Gill 2001, 130). Coincidentally, between 1820-22, ore from Grinton smelt mill was being sent to some of the other nearby mills for smelting, leading to the suggestion that Grinton mill was being rebuilt at this time.
- 3.5 The Ordnance Survey 1857 6" to 1 mile map is the earliest detailed depiction of Grinton How Mine uncovered during the research undertaken for this report (see figure 4); unfortunately, there is not any more detailed 25" coverage. Ridley Hush and How Hush (the former Blenk's Hush) form prominent landscape features to the west of the survey area. Ridley Hush has a watercourse running down its base, which is supplied by a reservoir at its head, retained by a semi-circular earthwork dam. At the east end of the hush, the watercourse takes a marked turn to the north-east, away from How Level dressing floor, before turning south-east to enter the floor of Smales Gill; a branch also takes water via a long linear pond to the Swinston Hush and Swinston Level (formerly Swinston Brow Level) to the north-east. There is another semi-circular water-filled reservoir at the head of How Hush, which was also presumably used to flush this hush, with an overflow watercourse running south-east into Smales Gill, and a branch from this also supplies the How Level dressing floor. However, there are also two earthworks running along the south side of the hush, which are presumably bypass leats. Both of the hushes are supplied by a further circular reservoir some distance to the west, on the north-eastern slopes of Greets Hill.

- 3.6 To the immediate west of the EDAS survey area, 'How Level (Lead)' is marked, just to the east of the confluence of the two hushes. The name appears to relate to a level entrance covered by a building to the west; a tramway issues from the building and curves around to the south for a short distance. A second, un-named and unmarked level (assumed to be Cooper's Level) is located to the north, evidenced by a tramway emerging from the entrance and running south-east in a straight line, crossing the watercourse where the two hushes converge. This tramway extends to the north end of one of three parallel north-south aligned un-roofed structures that occupy the survey area; they are not immediately adjacent to one another, but have gaps of a similar width between them. The western structure, i.e. that connected to the tramway, is shown as comprising three parts and is somewhat longer than the other two. The central one is undivided, whilst the eastern is of two parts. Two watercourses issue from the south-east corner of the eastern structure which then curve around to re-unite to the south-east. They enclose two small areas of ground of unknown function, and there is a small detached roofed building and track to the immediate north. When compared to the surviving evidence on the ground (see chapter 4 below), it appears that the three parallel structures form part of the dressing floor complex, the western one perhaps being a set of bouse teams while the other two are platforms defined by low walls terraced into the falling ground.
- 3.7 The 1857 map also shows that the How Level and its immediate surroundings were accessed by a main trackway which runs up the eastern part of Smales Gill from the Grinton smelt mill located in the Lemon Gill valley. The track crosses the Smales Gill watercourse several times, before branching off to the west directly to the level and dressing floor. This track also probably formed the direct route for the dressed ore, either to the mill or beyond. The mine is also accessed by at least two longer footpaths running south across the open moorland from Grinton village.
- 3.8 There appears to have been an upsurge in working at the mine between 1859 and 1867; in 1861, 27 men were hired to find new deposits in the How Level. Although work continued until 1867, much of the ground was found to comprise old workings, and the amount of ore raised was limited (Tyson, Spensley & White 1995, 63; Gill 2001, 130). The Grinton Mining and Smelting Company Limited was formed in 1888, but again met with very limited success, with only 193 tons of ore being raised from the mines at Grinton during their ownership, and the company was dissolved at the end of 1895 (Flynn 1999, 46-47). The Ordnance Survey 6" map of 1895 still marks 'How Level (Lead)' and shows the small square building at the level entrance, with small spoil heaps to the east and south-east, and a single track leading to the level over the moorland from the north (see figure 5 top). However, none of the detail within the survey area shown in 1857 appears. The complex is similarly depicted in 1914, by which date the level is marked as being disused (see figure 5 bottom).
- 3.9 A photograph of the mine taken during the early 1970s, looking north-west, shows that the extent of the ruined structures in the southern part of the survey was then greater than it is now; there are also extensive spoil heaps to the east ([https://www.aditnow.co.uk/SuperSize/Grinton-Mine-Probably-Early-1970S\\_112787/](https://www.aditnow.co.uk/SuperSize/Grinton-Mine-Probably-Early-1970S_112787/)) (see figure 7). A slightly earlier photograph, dating to April 1965 and held in the archives of the Northern Mine Research Society, shows some of the ruined structures in more detail (see figure 6). Modern aerial vertical colour photography (Google Earth imagery) appears to indicate that the existing estate track was improved and re-surfaced between 2002 and 2009; at the former date, it is barely visible, but by 2009 it can clearly be seen. The improvement/re-surfacing appears to have truncated some of the dressing waste tips at the mine.

## 4 DESCRIPTION OF SURVEY AREA

### Introduction

- 4.1 The features within the EDAS survey area are described below in a logical sequence, broadly from north-west to south-east. The purpose of the description is to illustrate what elements have been damaged by the flooding, or what new information has been revealed. As has been already noted in paragraph 2.9 above, for ease of description, each major feature or structure has been assigned a unique letter identifier.
- 4.2 Reference should also be made to the survey plans and other drawings (figures 8 and 9) and plates; the photographic record appears as Appendix 1 and digital photographs are referenced in the following text in italics and square brackets, the number before the stroke representing the date on which the photograph was taken and the number after indicating the image number, e.g. [2/032]. Finally, in the following text, 'modern' is taken to mean dating to after c.1945.

### Location and Setting

- 4.3 As previously noted, the survey area is located c.2.3km to the south-west of the village of Grinton, in an isolated location within an area of unenclosed moorland, at an elevation of c.364m AOD (see figures 1 and 2). It is set just to the east of the confluence of the Ridley Hush and the How Hush, to the south of the prominent spoil heaps resulting from How Level and Cooper's Level. The ground level within the survey area generally slopes downwards from north-west to south-east, with the estate track running along the southern boundary. The survey area contains the remains of numerous spoil heaps, ruined walls and structures, culverts and watercourses [1/309-1/311] (see plate 1).
- 4.4 Prior to the July 2019 flooding, the survey area comprised an uneven, largely un-vegetated ground surface, incorporating heaps of mining and dressing waste. During the survey work, it became clear that the majority of the floodwater had travelled down the two hushes, moving a great deal of material as it did so. It had then essentially divided into two streams. One ran along the north side of the How Level/Cooper's Level spoil heaps, cutting a deep erosion channel and eventually finding its way east into Smales Gill. The second stream overflowed the erosion channel to run south of the spoil heaps, across the survey area. This had again sub-divided, cutting two erosion channels across the dressing floor, before re-uniting to the south-east to again enter Smales Gill. The force of the floodwater was such that significant amounts of stone rubble had been washed down Smales Gill for over 250m beyond the survey area itself [1/313] (see plate 2).

### The Levels and Associated Remains (see figure 8)

- 4.5 Both the How Level and Cooper's (formerly Cowper's) Level are suggested to have started during the 1820s, and to have shared the same spoil heaps. How Level is shown in 1857 with the level entrance covered by a building, from which a tramway issues and then curves around to the south (see figure 4 bottom). A second, unnamed level (assumed to be Cooper's Level) is located to the north, with a tramway crossing a watercourse where the two hushes converge.
- 4.6 The entrance to How Level formerly lay immediately to the west of the survey area, and undated photographs posted on the internet show a partly collapsed adit in this location, on the south side of the area at the base of the hushes

([https://www.aditnow.co.uk/Photo/How-Level\\_118728/](https://www.aditnow.co.uk/Photo/How-Level_118728/)); one of Andrew Rhoades' pre-flooding photographs taken in April 2017 also shows it (WA006) (see plate 3). However, the uncontrolled July 2019 flooding meant that the area became filled with rubble and debris brought down the hushes by the floodwater and this appears to have obscured the remains of How Level [2/326, 2/327] (see plate 4).

- 4.7 However, the site of Cooper's Level (A on figure 8) remains visible where it is shown in 1857 as a north-south aligned linear depression running into the natural hill slope here, although there is no evidence for the actual entrance [2/328] (see plate 5). A short distance to the south of the remains of the level entrance, a second linear depression, lined with ruined, drystone rubble walls, branches off to the east [2/329, 2/330] (see plate 6). This depression is c.1m wide, and 0.75m deep and runs north-east for a distance of 5.50m before entering a stone-lined culvert [2/331]; this culvert has previously been identified as Cooper's Level. The arch is 1m wide and 1m high internally [2/333] (see plate 7), and it runs for c.3.50m to the north-east before opening out into a linear depression once more. This follows a curvilinear line along the contour for over 325m to the north-east, where it turns sharply to the south-east to enter a more prominent linear depression, over 170m long and set on a very straight north-west/south-east alignment. In 1857, the latter formed Swinston Hush, with the linear depression leading to it from near Cooper's Level forming a watercourse, which terminated in a long rectangular pond at the head of the hush. The 1857 map suggests that the watercourse was fed with water from the similar feature running down the base of Ridley Hush.
- 4.8 Moving south from the position of Cooper's Level, there are few remaining traces of the tramway shown in 1857 which formerly ran to the south-east. A grassed linear soil heap (B), standing up to 1.20m in height, may be developmental spoil from the level itself [2/336] (see plate 8), but the former line of the tramway is lost amongst the flood debris at the base of the hushes. However, close to where the tramway is likely to have crossed this area, the flood erosion had exposed a section of wooden launder (C) which appears to remain *in situ*, although it is uncertain. The visible section is aligned north-west/south-east, and measures 1.40m in length, although both ends were buried under flood debris [2/319, 2/321] (see plate 9). The launder is made from three pieces of softwood, a base and two sides, the sides being nailed to the base; in cross section, it has maximum dimensions of 0.25m wide by 0.13m deep [2/317, 2/318] (see figure 9). When the flood debris was removed and the interior excavated, the launder was found to be filled with a fine orange-brown sand to a depth of 0.05m [2/322, 2/323] (see plate 10). There is another piece of timber set into the base of the erosion channel to the west of the launder, and a possible line of stones to the east.
- 4.9 The detailed function of this launder is unknown, although it is aligned broadly on both Cooper's Level [2/324, 2/325] and the earthwork of a leat (D) located on the south edge of the survey area, on the south side of the access track [2/335]. This leat (D) is represented by a grassed linear depression up to 0.40m deep and embanked to the east side [2/345] (see plate 11). Beyond the survey area, it appears to curve around to the south-west, and was perhaps the curving watercourse shown in 1857 which supplied the dressing floor from the reservoir at the head of How Hush. If this was the case, then the leat may have no connection with the launder at all.
- 4.10 The floodwaters had deposited a bank of rubble along the southern edge of the aforementioned erosion channel, and also washed a considerable amount of material further to the south-east. To the immediate south-west of the rubble bank, adjacent to the estate track, there was an angular rubble bank that appeared to



have been created by a tracked or wheeled excavator [2/347]. The same machine also appeared to have been used to create a short track running parallel to the south side of the erosion channel [2/341].

- 4.11 To the south-east, the lines of both tramways shown in 1857 can be traced on the ground for relatively short lengths as earthworks. That from Cooper's Level (E) survives as a low, curvilinear grassed flat-topped bank [2/343], possibly once wholly or partly revetted with stone which survives in the southern corner [2/348], whilst the line of that from How Level (F) is formed by a linear flat-topped bank, aligned north-west/south-east and over 26m in length [2/340, 2/344]. The latter stands up to 1.0m in height and comprised approximately two thirds small (less than 1cm) pieces of iron-stained stone and one third angular stone rubble (up to 0.10m across) (see plate 12). Towards the eastern end, the material making up this bank becomes sandier, and at the very east end there is a sub-oval heap of angular stone and shale which is probably a modern dump [2/353]. The southern edge of the tramway bank (F) has been cut back by the adjacent estate track [2/342, 2/346] (see plate 13).
- 4.12 The top of the main spoil heap (G) resulting from the How and Cooper's Levels was not recorded in detail, but it forms a prominent feature in the local landscape, being over 60m long and standing over 7m in height (see plates 1 and 14). The majority of the spoil comprises shale and angular stone, which is well vegetated, but at the eastern end there is finer waste which remains un-vegetated [2/339] (see plate 15). A deep erosion channel, caused by the July 2019 floods, had cut away some of the north side of this large spoil heap [2/334, 2/337, 2/338] (see plate 16). There are two smaller, flat-topped heaps emerging from the western end of the south side, whilst further east there is a smaller, flat-topped, linear heap of light-coloured sand and small angular stones between 1cm-3cm across (O) [2/366, 2/405] (see plate 17).

#### **The Dressing Floor and Associated Remains** (see figures 8 and 9)

- 4.13 Elements associated with the three north-south aligned un-roofed parallel structures shown occupying the dressing floor area in 1857 (see figure 4 bottom) were partly exposed by the July 2019 flooding. As previously noted, it was thought that these represented stepped terraces or platforms, defined by low stone walls, a common characteristic of lead mine dressing floors.
- 4.14 In 1857, the western rectangular structure was directly connected to the straight section of tramway (E) which emerged from Cooper's Level, with the curving tramway from the How Level (F) running parallel to the west. This western structure was divided into three parts and was somewhat longer than the other two features to the east, projecting further to the south. The surviving remains strongly suggest that the western feature actually comprised a set of square-ended bouse teams, open to the east, and likely to have been set on a platform or terrace.
- 4.15 The surviving remains of the bouse teams can be seen either side of the estate track, and modern aerial photography (Google Earth) appears to show that the improvements made to the track between 2002 and 2009 involved cutting through part of what then existed. To the north of the track, there are at least four parallel stone walls (H), all aligned east-west, projecting from the east side of the flat-topped bank (F) representing the How Level tramway [2/352] (see plate 18). Three of the walls survive as ruined squared rubble structures, whilst the fourth is marked by an earthwork; they are spaced at approximate 4.5m centres. The visible parts of the walls are up to 5.0m long, 0.70m wide and project up to 0.30m above the

ground surface [2/349-2/351] (see plate 19). The difference in height between the top and base of the adjacent bank (F) suggests that the walls, representing the divisions between the individual teams or storage bins, originally stood to over 1.5m in height at their western ends. The east end of the northernmost wall curves around to the south-east in plan, whilst there is a flat-topped linear bank of waste, comprising angular stone up to 5cm square to the front of the southern pair of walls.

- 4.16 To the south of the estate track, there remains a section of standing wall (I), aligned east-west, measuring 6.40m long by 0.90m wide, and up to 1.80m high [2/409]. It was clearly built in two (and perhaps even three) different phases, with a central 1.0m long section being the earliest part and built from much larger pieces of squared rubble; this central section is butted by later wall sections to either side [2/406, 2/408] (see plate 20). The south face has an area of collapse to the eastern part [2/410-2/412] (see plate 21). There may be traces of other associated structures only visible in plan to the immediate south and east of the standing wall, and there was definitely more of the walls surviving on the April 1965 and early 1970s photographs (see figures 6 and 7); the four walls appear much higher and potentially stepped towards the east ends. The surviving wall almost certainly represents the southern end of the western structure as shown in 1857, giving it approximate overall dimensions of c.25m long by c.7m wide. A sub-oval depression to the immediate east of the standing wall is probably modern [2/413, 2/414], whilst the spoil heap to the south-east has been partly dug away using a wheeled JCB excavator or similar in the past, probably to repair the estate track [2/415].
- 4.17 In 1857, the central structure or platform is shown as being un-roofed and undivided, and is somewhat shorter than that to the west, with a gap between. Two erosion channels created by the July 2019 flooding had exposed the northern and southern ends of this central platform - these erosion channels are set c.14m apart and the remains in both were similar.
- 4.18 In the northern erosion channel, the remains of a flagstone surface (J) were exposed. Most of the flagstones were aligned broadly east-west, but two at the western end were set north-west/south-east; the majority are very neatly cut, with smooth surfaces [2/354-2/359] (see plate 22). Close to these flagstones, in the north side of the erosion channel, there was a large well-dressed flagstone laid over waste containing a high proportion of shale [2/360, 2/361]. A narrow culvert with stone side walls runs east from the flagstones for at least c.2m [2/362, 2/363] (see plate 23), and perhaps as far as a section of north-south aligned wall fragment set c.3.5m to the east. A low curving wall line visible at the base of the large spoil heap (G) to the north may have been related to this wall fragment [2/364, 2/365].
- 4.19 In the southern erosion channel, a more extensive area of flagstones (K) was exposed [2/390, 2/404] (see figure 9 and plate 24). The majority were again very neatly cut with smooth surfaces and laid on the same orientation, but again with two flagstones at the western end set north-west/south-east [2/385, 2/386, 2/388, 2/393, 2/395, 2/396, 2/399, 2/402] (see plate 24); they were all 600mm thick. These flagstones formed part of a more extensive structure extending some 4m to the east, ending in a north-south aligned revetment wall standing up to 0.9m in height, with some mortar to the joints [2/394]. The surface of the structure was not all set at the same level, but had a raised central section flanked by lower outer sections, and this difference in height was reflected in the wall face at the east end [2/376-2/379, 2/391] (see plate 25). The eastern edge of the raised area was

defined by a line of upright stones [2/387], whilst to the western edge, there is a long flagstone which is inclined so that it slopes gently downwards from west to east. This slope appears to be an original feature, rather than the result of collapse, as the east end of the flagstone is held in place by a timber [2/389, 2/392] (see plate 26).

- 4.20 Beyond the north-south aligned wall, the structural remains within the southern erosion channel become more fragmentary, due to the extent of flood damage. The central part of the north-south wall face was butted by a short wall stub, flanked by the remains of another flagstone surface to either side, perhaps forming a buttress [2/380-2/384] (see plate 27); the surface was set at the same level either side of the stub wall, and 0.90m lower than that described above. A line of flagstones was visible in the southern side of the erosion channel at the same height, with several different coloured waste layers beneath them, sloping downwards from west to east [2/373, 2/374] (see plate 28). The north side of the erosion channel also contained a line of larger blocks towards the base [2/372, 2/375] which can be traced intermittently for over 4.50m to the east of the north-south wall face, whilst further to the east are the remains of another section of north-south aligned wall (L) which was partially hidden under another rubble spread [2/369, 2/370] (see plate 29). Taken together, the visible structural remains suggest that there was a continuous flagstone surface below the north-south wall face which ran for c.7.50m to the east. The west half of this surface was set at the same level, but it is not certain if it was stepped downwards again after this point. However, it terminated in another section of north-south aligned wall, beyond which the ground surface did step down again. The flagstone surface may have covered the width of the central structure shown in 1857, or could have been located in the gap between the central and eastern structures. The northern half of the surface was not exposed, but the ground surface in line with it was noticeably wet and boggy at the time of survey, even after a sustained spell of dry weather.
- 4.21 Beyond (or east) of the lower north-south wall (L), the visible structural remains became still more fragmentary. The remains of a possible culvert [2/371] curve around gently to the north-east for c.4m along the south side of the erosion channel, where it meets more north-south aligned wall footings (M). To the east, there are at least two sections of curvilinear wall footings visible in plan only. Further to the north, wall footings surviving to a height of 0.40m appear to define the two sides of a further revetted structure or platform (N) measuring c.3.50m along each side [2/368] (see plate 30); the concentration of rubble eroding out of the slope to the west of the wall footings suggests that the walls of the structure were once higher but have since collapsed. This might represent the remains of the eastern structure or platform shown in 1857. Towards the east, several poorly defined channels emerge from an area of boggy ground, with a small spoil heap of soil between them (see plate 2).

## 5 DISCUSSION AND CONCLUSIONS

- 5.1 Although uncertain, it seems reasonable to assume that the majority of the structures recorded within the Grinton How dressing floor were laid out at some point in the early 19th century, perhaps in the 1820s when the Grinton smelt mill was rebuilt. It is tempting to see these works as part of a wider scheme to revitalise the Grinton mines generally, although there is, at present, no evidence to definitely confirm this.
- 5.2 It is always dangerous to ascribe and interpret recorded remains to a single Ordnance Survey map source. Although accurate, the 1857 map will depict the

site at a single moment in time (in this case 1854 when the area was surveyed), and many industrial sites, including those associated with lead mining, are known to exhibit frequent changes in layout as processes become better defined. In addition, many of the buildings were temporary in nature, and were frequently rebuilt or re-arranged as the site evolved.

- 5.3 That being said, by the mid 19th century, the dressing floor appears to have been laid out in three parallel structures or platforms, as depicted on the 1857 map, running broadly north-south. Although it is not certain if some of the recorded remains form the depicted structures, or if other features were situated in the gaps between them, the surviving evidence shows that these platforms were terraced into the natural slope here, with the resulting ground surfaces stepping downwards from west to east (see figure 9). This stepped or terraced form is a common characteristic of dressing floors, which allows gravity to be utilised to assist the movement of both materials and water through the different parts of the floor (Burt 1982, 10; Palmer & Neaverson 1989, 27-29). This arrangement has been recorded on numerous other lead dressing floors in the Yorkshire Dales and North Pennines, an example of the former being the comparable mid-19th century Bolton Park Mine, situated some 3.5km to the south-west of Grinton How in Wensleydale (Dennison & Richardson, forthcoming). It is interesting to note that similar but smaller structures are also depicted in the same fashion on the same 1857 map at the Grovebeck Mine dressing floor, a short distance to the north-west of the Grinton How mine.
- 5.4 Figure 10 attempts to correlate the map evidence as shown on the 1857 map to the surveyed remains, bearing in mind the caveats relating to a single map source and the damage caused by the July 2019 floods. The western and uppermost structure or platform was linked to Cooper's Level and almost certainly the How Level by surface tramways, both of which have left traces as earthworks (linear banks E and F respectively). The western structure or platform was longer than those to the east, measuring c.25m long by c.7m wide; its south end as shown in 1857 is marked by the isolated surviving standing wall (I). In the northern half of the platform, there was a set of bouse teams, comprising at least three compartments or bins, each 4.50m wide and standing over 1.50m high to their rear (west) sides; the April 1965 photograph suggests there were four square-ended bins (see figure 6). It is unclear whether the whole of this western structure formed bouse teams, or whether a structure in the southern half had a different function. The April 1965 photograph seems to suggest that there was a detached separate structure of a similar form to the other bins, with the surviving standing wall (I) representing the end wall in the photograph. This has some structural evidence to imply more than one phase of construction, and the spoil heap to the west does not extend to it. Its precise function is therefore unclear, although it is presumably another mining-related structure such as a wash kiln or open-sided building housing equipment or other dressing or crushing machinery, and it is curious that it survives in the photograph while the other bins do not - perhaps it was utilised as an agricultural shed or other structure after the mine was closed.
- 5.5 The mined material containing ore (known as 'bouse', the term possibly being derived from farmer/miners stalls where cattle were kept and variously pronounced 'bewce' or 'boose'; Spensley 2014, 58) was taken to the bouse teams via tramways, and tipped into the bins; the tramway either travelled over the top of the bins, or along the back wall. The arrangement of tramways on the 1857 map might imply that that from Cooper's Level passed over the side walls, while that from How Level ran along the back or west side before continuing to a spoil heap - both tramways might not have been in use at the same time. The presence of the

earlier, stronger, core to the surviving standing wall (I) might suggest the need to support a tramway running over the top.

- 5.6 The details by which the bouse was processed to produce lead ore ready for smelting are well-known (e.g. Burt 1824; Gill 2001, 15-17; Spensley 2014, 58-65). Some initial sorting and separation from clay and gravel would have taken place in the bins, with the material perhaps also being washed in a structure known as a wash kiln; the leat (D) could have been used to bring water as a dedicated supply from the reservoir at the head of How Hush to a wash kiln or to the bouse teams themselves.
- 5.7 After sorting and washing, the material had to be reduced in size by breaking or crushing. In earlier periods, this would have been done manually, and indeed manual breaking continued at the smaller mines to the end of the 19th century (Burt 1982, 14). One might have expected a waterwheel driven crushing mill to have been installed at Grinton How, but there is no convincing documentary or above-ground archaeological evidence for one, and the mechanisation of the dressing processes does not seem to have been a particular objective in Swaledale until the later part of the 19th century (Mike Gill, *pers. comm.*). Therefore, it must be assumed that, if present, a crushing mill lies buried beneath later and/or flood deposits, but perhaps it is more likely that it was never present and that all breaking was done manually.
- 5.8 The terrace to the east of the bouse teams is set approximately 1m lower than the base of the bouse teams themselves. In terms of overall dimensions, this terrace was c.17m long by at least 4m wide; the original width was probably closer to 7m, with the east side defined by a wall standing up to 1m in height. The remains at the north and south ends of this terrace (J and K) that were uncovered in the erosion channels suggest that the entire floor area was paved, but with raised and lowered sections within the paving. It is considered that this terrace was where the ore-bearing bouse was reduced in size, by hand on knock stones, and sorted. It is interesting that, in both exposed areas of flagstones, there are two set at a different angle to the others, and also one longer flagstone, inclined in area K. It is possible that this could be the remnants of a trunk buddle, although Burt (1982, 43) also illustrates a line of mid-19th century jigs with overflow launders leading into adjacent sunken tanks, and the flagstones might alternatively represent a similar arrangement; certainly in the case of the northern flagstones (J), water was channelled beyond them in a stone-lined culvert. One might draw parallels with the excavated 19th century dressing floors at High Rake Mine in Derbyshire, where paved areas were interpreted as standing areas for equipment operators where water spillage was common, with adjacent pits as sumps collecting the spillage of fine wastes from the dressing equipment (Barnatt 2011, 72). The high quality Yoredale flagstones would have provided an excellent surface for shovelling and wheeling barrows, and other dressing floors, such as those recreated at Killhope (Northumberland), used timber as a flooring material.
- 5.9 Following reduction in size, the material needed to be classified and concentrated, and this is likely to have taken place on the easternmost terrace using hotching tubs and buddles. This terrace was c.7.5m wide and probably about 17m long, and again had a flagstone paved surface. The separation of the ore from the remaining stone revolved around the different specific gravities of ore and stones in water; the heavier ore settled out more quickly in water than the lighter stone. However, for this method to be effective, the materials being processed had all to be of similar size (Burt 1982, 30-31). The classification could be done by sieving or by revolving trommels. After classification, concentration took place. The first

stage was usually achieved using jigs or hotching tubs. Reduced to their basic elements, these comprised a metal sieve attached to one end of an overhead lever, carried on two fixed supports either side of the sieve. The sieve sat within an open wooden box or trunk, filled with water, and by moving the sieve up and down within the water, the heavier ore settled to the bottom of the sieve. The jigs were initially hand-operated but from the mid-19th century were increasingly mechanically driven by a small waterwheel. Jigs formed the principal method used for separating ore that needed to be less finely reduced, such as lead and copper (Burt 1982, 40-45). Whilst jigging was suitable for larger pieces of mixed ore and stone, finer material had to be put through a buddle. Again, reduced to their most basic elements, the majority of buddles incorporated an inclined stone or wooden surface on which the material was placed and water moved across it, washing away the lighter elements. The most common form was the trunk buddle, which had three main parts; a trough, a small square pit, and the trunk. The trunk was the largest element and was about 3m long. There were also variations known as running or draw buddles. Mechanised round buddles were introduced at some mines during the 19th century, but they required a waterwheel for power and they were not widely adopted in the Yorkshire Dales (Burt 1982, 45-52). As a final stage in the process, the very finest material, known as slimes, could be run off into settling pits.

- 5.10 On the Grinton How dressing floor, it is most likely that that hotching tubs, in which the sieve and ore was moved up and down in a stationary tub of water, were used together with one or more trunk buddles, rather than jigs which are usually associated with a more modern mechanised dressing plant (Mike Gill, *pers. comm.*). There would also have been several drainage channels beneath the flagstone floor of this eastern terrace, to provide water to and from the trunk buddles. It is also important to remember that, although there was a general reduction in size of the material being dealt with across a dressing floor, it does not necessarily follow that all of the buddles would have been located below the 'knocking' terrace; at the aforementioned dressing floors at the Bolton Park mine in Wensleydale, there is good evidence that the finer material was all diverted to the western end of each terrace and eventually passed into a large settling tank or pond (Dennison & Richardson, forthcoming). At Kilhope, hotching tubs sat either side of a trunk buddle, saving some of the time spent in shovelling and wheeling barrows (Mike Gill, *pers. comm.*).
- 5.11 To the east of the easternmost terrace, the visible structural remains become very fragmentary, but at least one culvert conveyed water through this area, whilst to the north there was a sub-square platform or structure (N). Some or all of these elements may have been associated with further processing or settling tanks or ponds, designed to collect the slimes which had passed through the rest of the dressing process. The curious arrangement of watercourses shown off the south-east corner of the eastern platform in 1857 may well represent larger settling tanks or ponds, from where further treatment and concentration in dolly tubs took place. Unfortunately, no evidence for these elements remained at the time of the survey.
- 5.12 As with many lead mining sites, which relied on significant amounts of water for power and washing, considerable effort was expended to ensure a constant supply to the dressing floor. The 1857 map shows that there was a curving leat bringing water from the reservoir at the head of How Hush, and other water flowing down the Ridley Hush was also utilised. The latter was also diverted along the contours to the north, where it fed another reservoir above Swinston Hush and Swinston Level, and part of its western end, close to Cooper's Level (A) survives as a well-built culvert part of which passes underground. Waste water from the Grinton How

dressing floor was taken down Smales Gill to join Lemon Gill just below the smelting mill.

5.13 It is probable that the dressing floor worked until at least 1867, but that usage tailed off after that date, and would certainly not have extended beyond 1895. Given the depth of material that has accumulated over the remains of the dressing floor, not all of which can be accounted for by modern disturbance or the July 2019 flooding, it seems likely that it fell out of use and that the dumping of waste and/or spoil from elsewhere had started across before actual mining had ceased. More recent improvements to the existing estate track between 2002 and 2009 disturbed the south end of the dressing floor's western structure.

5.14 It is considered likely that the buried remains of the Grinton How dressing floor are more extensive than those exposed in the two erosion channels, and now that it has been surveyed in detail it would make a suitable subject for archaeological excavation, for example by YDNPA volunteers with some archaeological supervision, or by a local archaeological group or organisation. However, the depth of the deposits overlying the remains, and their compacted nature, means that much of the overlying material would have to be removed by machine (under supervision) before hand excavation could take place.

## 6 BIBLIOGRAPHY

### Primary Sources

1857 Ordnance Survey 6" to 1 mile map Yorkshire sheet 52 (surveyed 1854)

1895 Ordnance Survey 6" to 1 mile map Yorkshire sheet 52NE (revised 1891)

1914 Ordnance Survey 6" to 1 mile map Yorkshire sheet 52NE (revised 1910)

### Secondary Sources

Barnatt, J 2011 'High Rake Mine, Little Hucklow, Derbyshire: Excavations and Conservation at an Important Nineteenth Century Mine'. *Mining History: The Bulletin of the Peak District Mines Historical Society*, vol 18 nos 1 and 2, 2-217

Burt, R 1982 *A Short History of British Ore Preparation Techniques in the 18th and 19th Centuries*, vol 2

CIFA (Chartered Institute for Archaeologists) 2020 *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*

Dennison, E & Richardson, S (forthcoming) *Bolton Park Mine, Castle Bolton, North Yorkshire: 1997 Archaeological Survey and 2020 Condition Survey* (unpublished EDAS archive report for YDNPA)

Dunham, K C & Wilson, A A 1985 *Geology of the Northern Pennine Orefield, volume 2: Stainmore to Craven*

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

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

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

Flynn, C 1999 *The Decline and End of the Lead Mining Industry in the Northern Pennines 1865-1914: a socio-economic comparison between Wensleydale, Swaledale and Teesdale* (Durham thesis, Durham University - available at <http://etheses.dur.ac.uk/4569/>)

Gates, T (ed) 2012 *The Great Trial: a Swaledale Lead Mining Dispute in the Court of Exchequer 1705-1708*. Yorkshire Archaeological Society Record Series vol 162

Gill, M 2001 *Swaledale: Its Mines and Smelt Mills*

Gill, M & Burt, R 2003 *The Mines of Yorkshire* (British Mining No. 72)

Historic England 2015 *Digital Image Capture and File Storage: Guidelines for Best Practice*

Historic England 2016 *Understanding Historic Buildings: A Guide to Good Recording Practice*

Palmer, M & Neaverson, P 1989 'Nineteenth Century Tin and Lead Dressing: A Comparative Study of the Field Evidence'. *Industrial Archaeology Review* vol 12(1), 20-39

Richardson, S, Lamb, R & Dennison, E 2019 *Grinton Lead Smelting Mill, Cogden Gill, Swaledale, North Yorkshire: Archaeological Investigation and Recording during Internal Clearance Works* (unpublished EDAS report 2019/588.R01 for YDNPA)

Spensley, I M 2014 *Mines and Mines of Wensleydale: an Extensive History of Wensleydale's Mining Industry*

Tyson, L O, Spensley, I M & White, R F 1995 *The Grinton Mines* (British Mining No. 51)

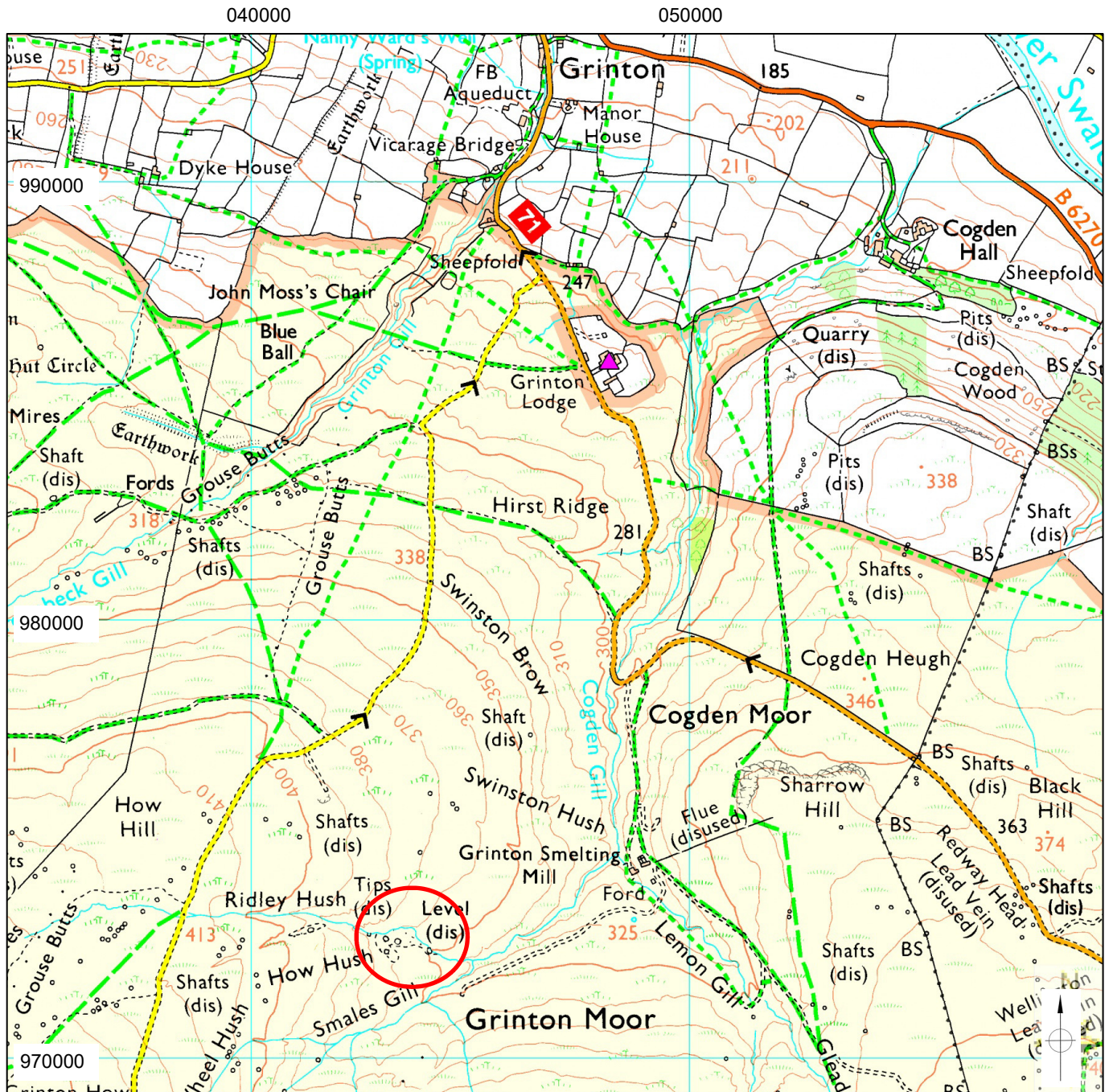
## Electronic Sources

<https://www.aditnow.co.uk/> = Mine Exploration & Mining History

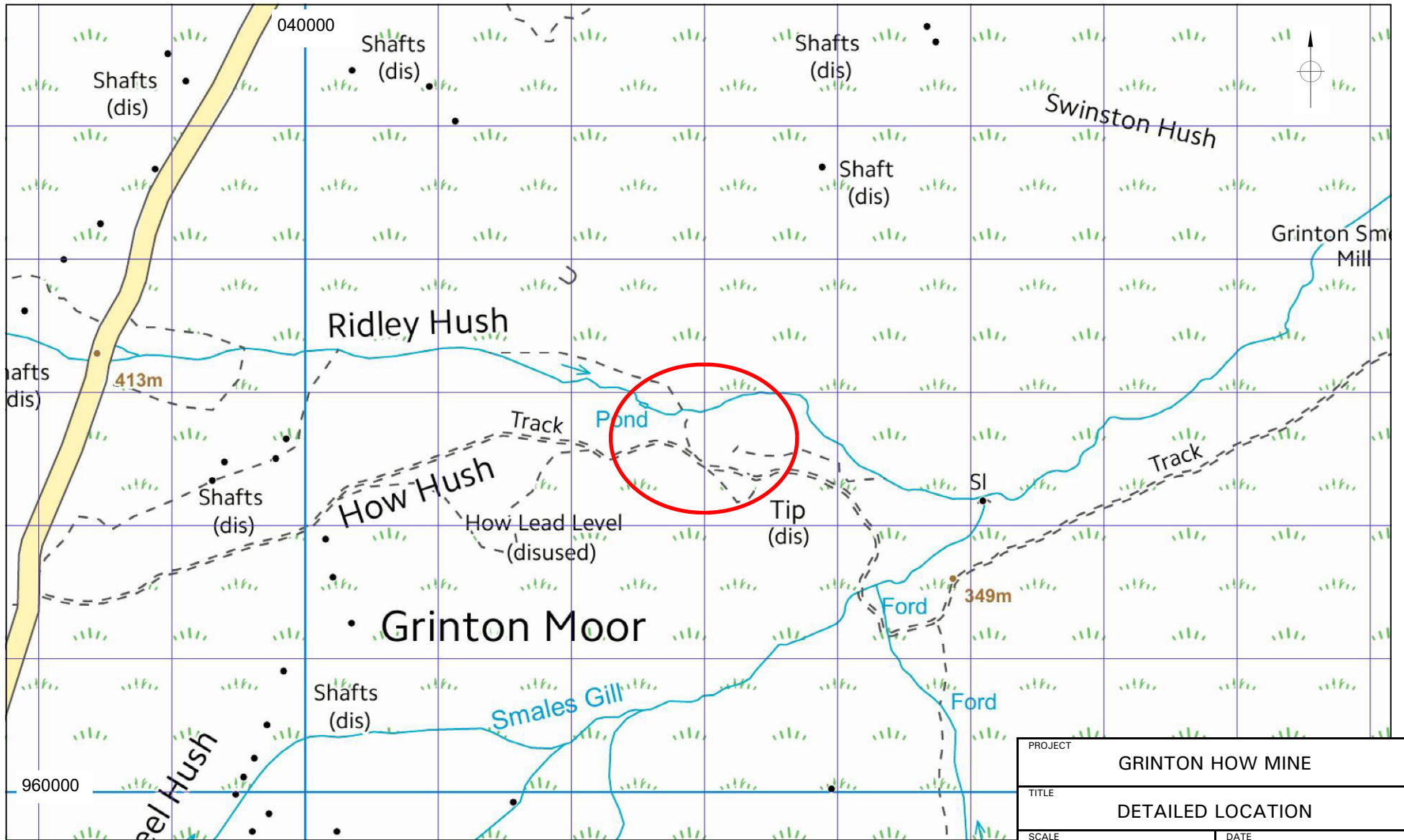
## 7 ACKNOWLEDGEMENTS

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- 7.2 Shaun Richardson took the site photographs and produced the field drawings. The reporting element was funded by EDAS, and the final report was produced by Ed Dennison, who retains responsibility for any errors or inconsistencies.





PROJECT	GRINTON HOW MINE	
TITLE	GENERAL LOCATION	
SCALE	AS SHOWN	DATE
		JAN 2021
	EDAS	FIGURE
		1



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PROJECT		GRINTON HOW MINE	
TITLE		DETAILED LOCATION	
SCALE	AS SHOWN	DATE	JAN 2021
	EDAS	FIGURE	2

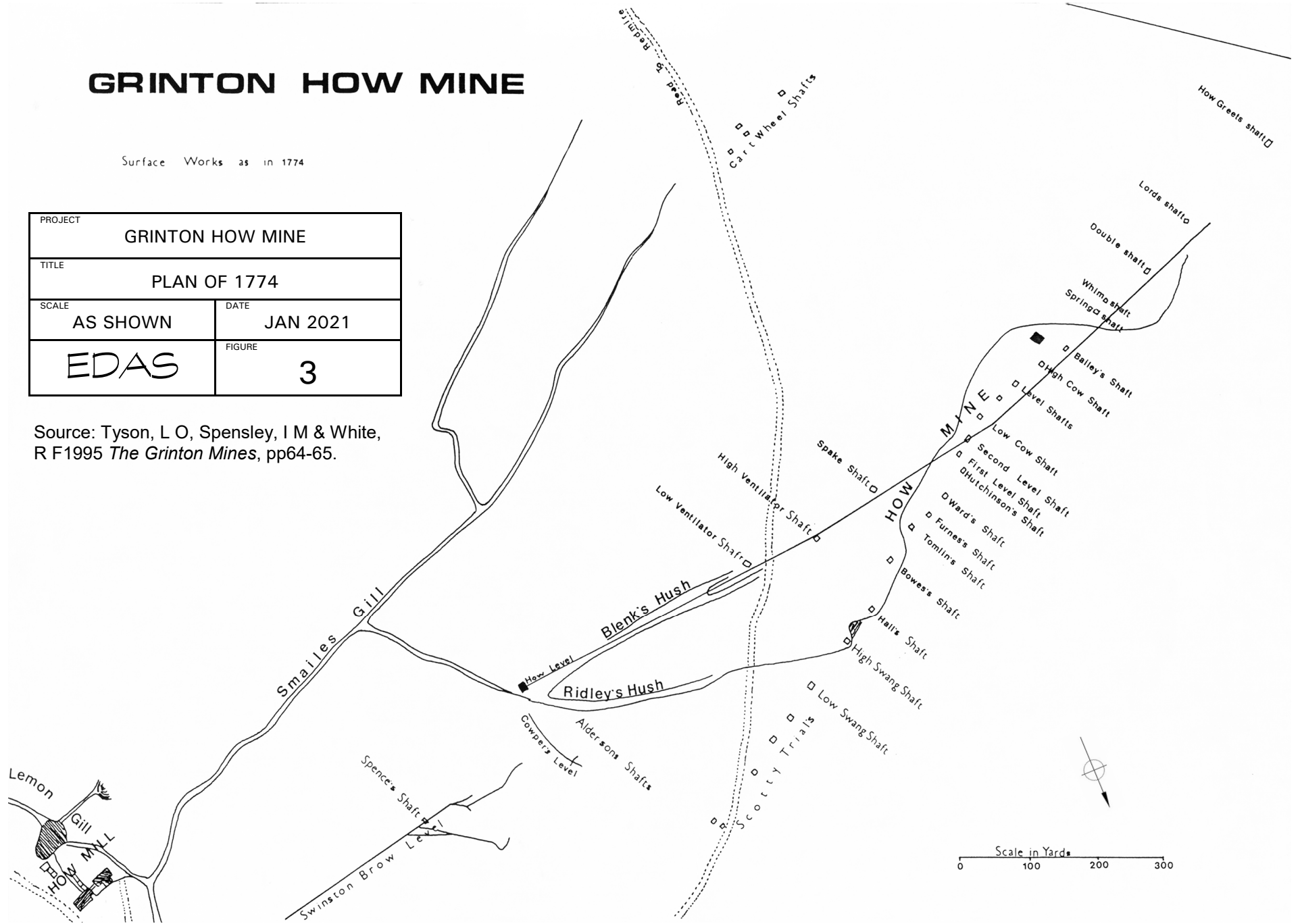


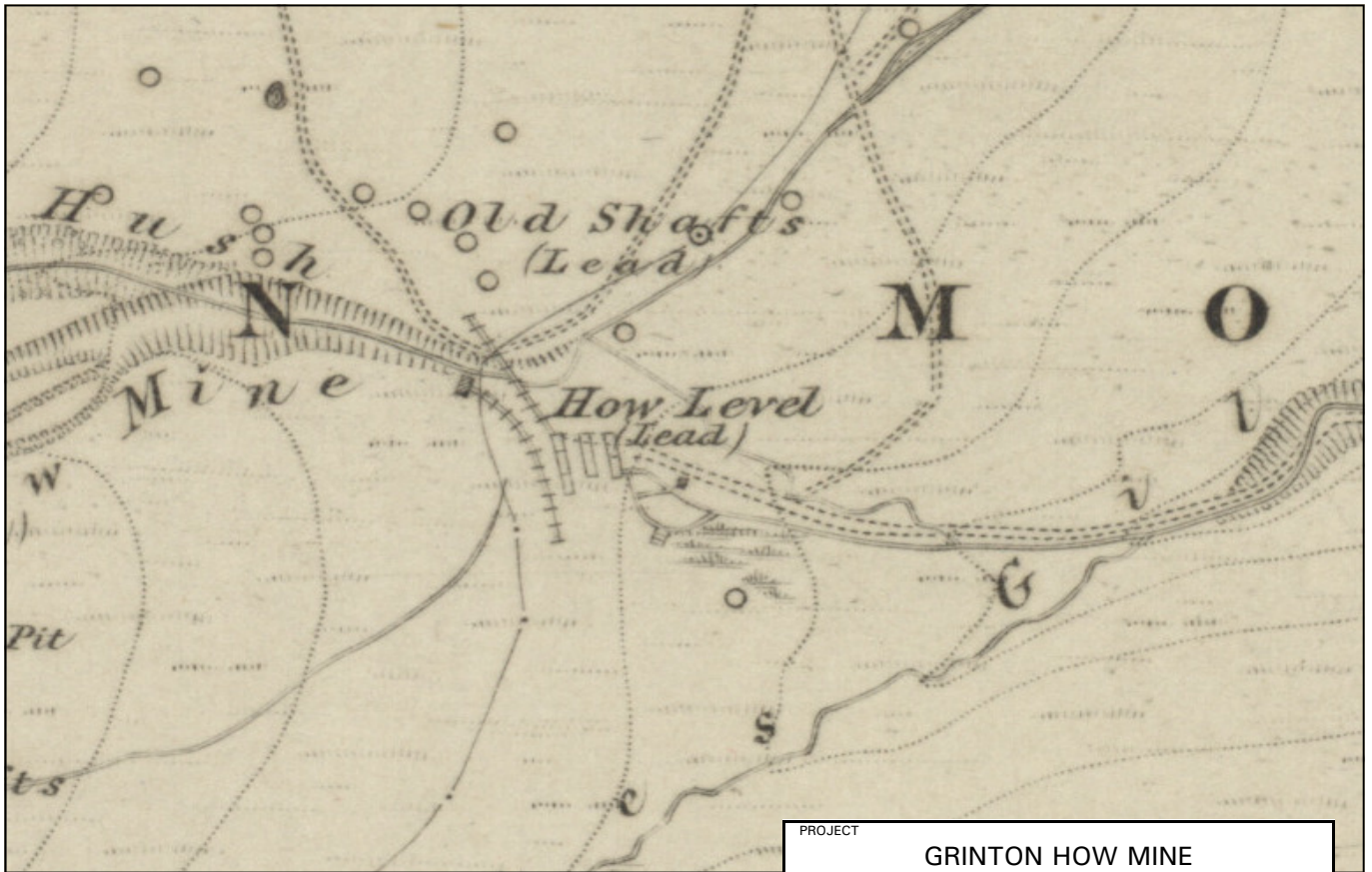
# GRINTON HOW MINE

Surface Works as in 1774

PROJECT GRINTON HOW MINE	
TITLE PLAN OF 1774	
SCALE AS SHOWN	DATE JAN 2021
EDAS	FIGURE 3

Source: Tyson, L O, Spensley, I M & White, R F 1995 *The Grinton Mines*, pp64-65.



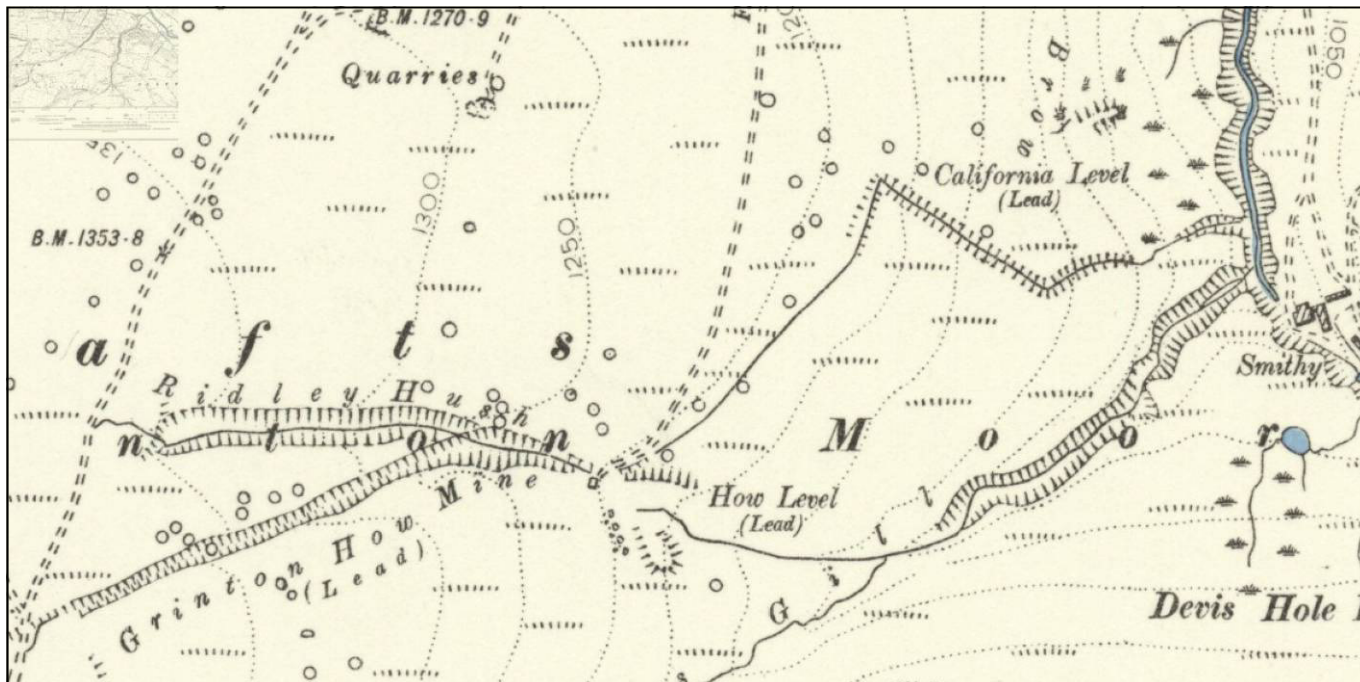


Source: Ordnance Survey 1857 6" map sheet 52, surveyed 1854.

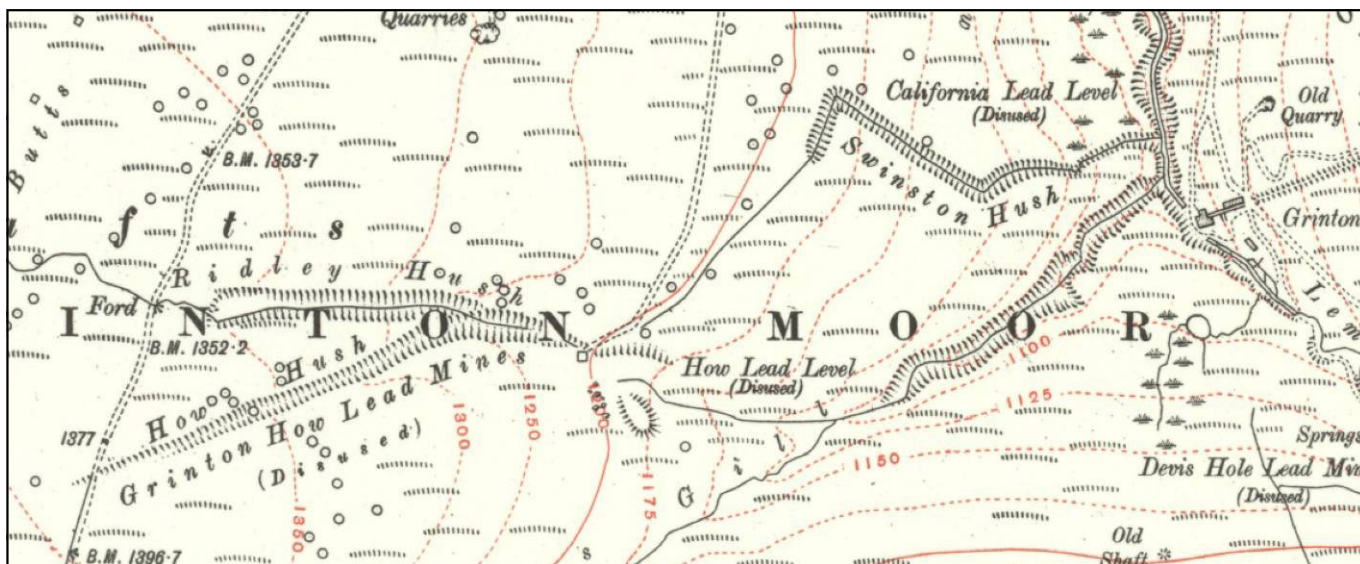


PROJECT		GRINTON HOW MINE	
TITLE			
ORDNANCE SURVEY 1857 MAP			
SCALE	NTS	DATE	JAN 2021
EDAS		FIGURE	4





Source: Ordnance Survey 1895 6" map sheet 52NE, surveyed 1891.



Source: Ordnance Survey 1914 6" map sheet 52NE, surveyed 1910.



PROJECT		GRINTON HOW MINE	
TITLE			
SCALE		DATE	
NTS		JAN 2021	
EDAS		FIGURE	
		5	



Source: NMRS archives, courtesy Mike Gill.

PROJECT		GRINTON HOW MINE	
TITLE		1965 PHOTOGRAPH	
SCALE	NTS	DATE	JAN 2021
EDAS		FIGURE	6

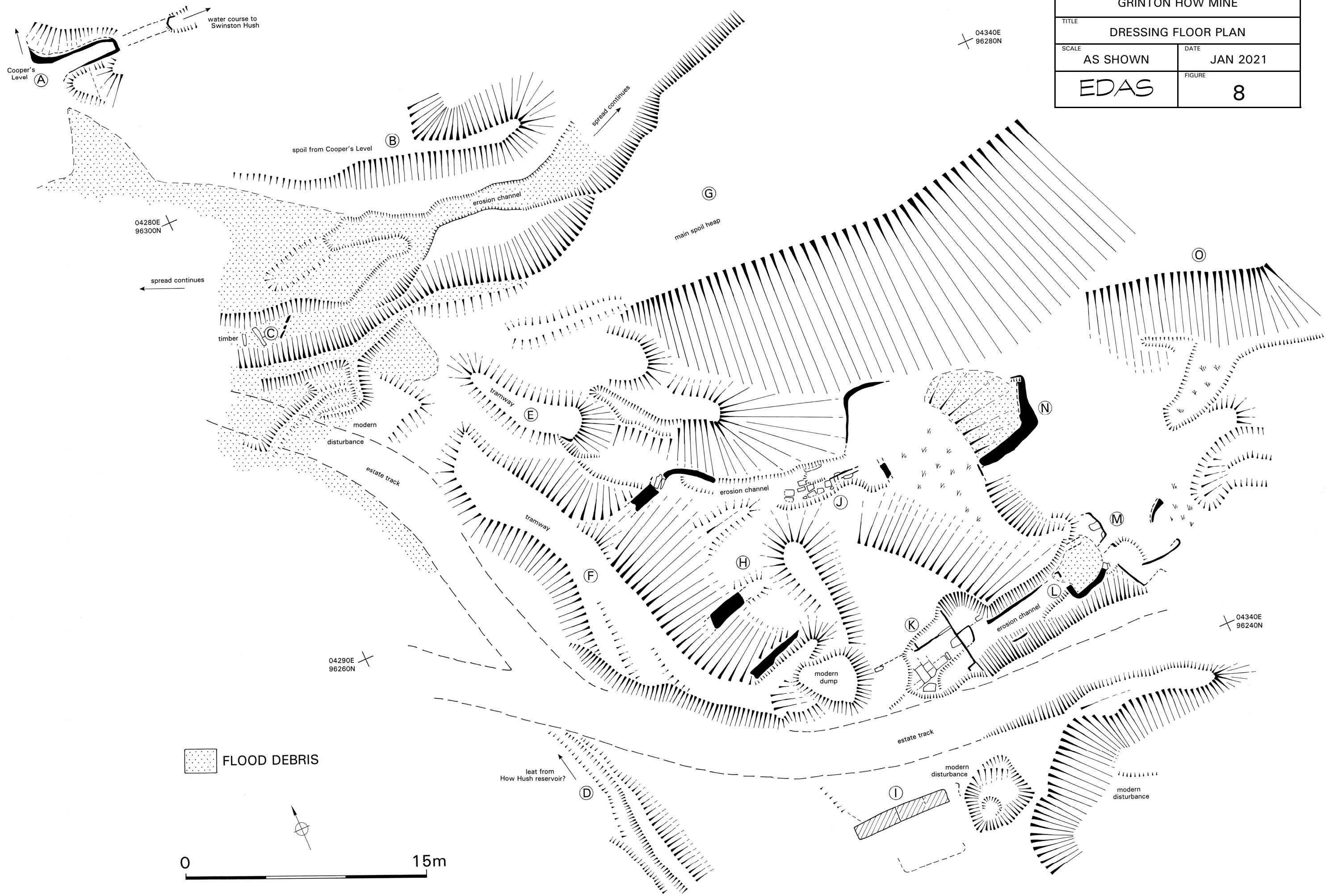





Source: [https://www.aditnow.co.uk/SuperSize/Grinton-Mine-Probably-Early-1970S\\_112787/](https://www.aditnow.co.uk/SuperSize/Grinton-Mine-Probably-Early-1970S_112787/).

PROJECT		GRINTON HOW MINE	
TITLE		1970s PHOTOGRAPH	
SCALE	NTS	DATE	JAN 2021
EDAS		FIGURE	7

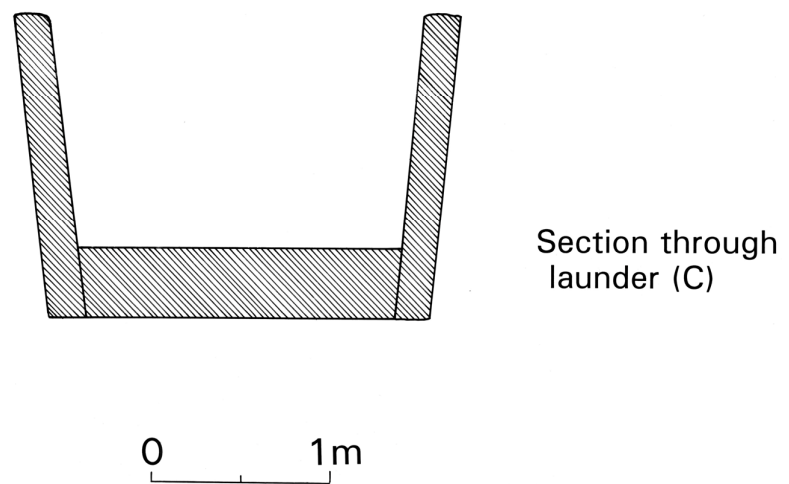
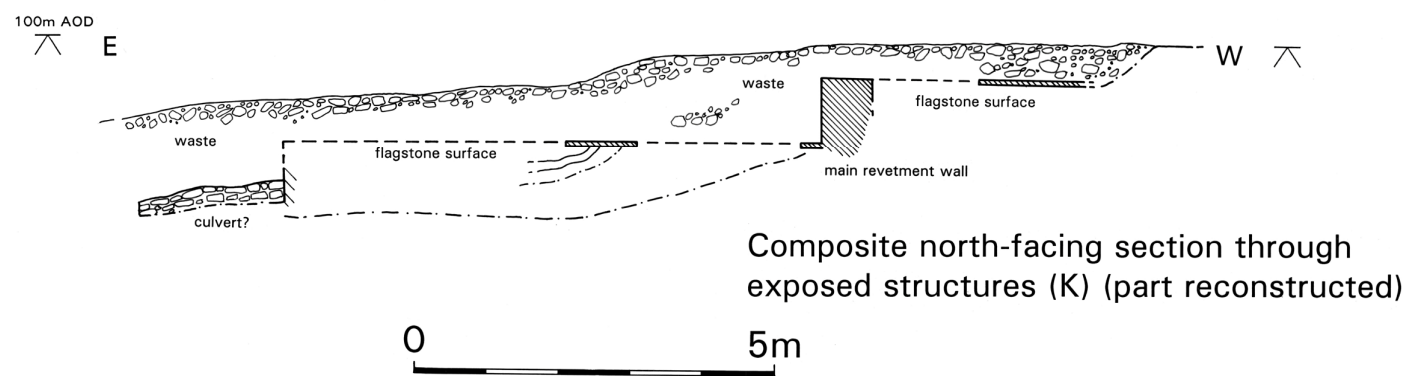
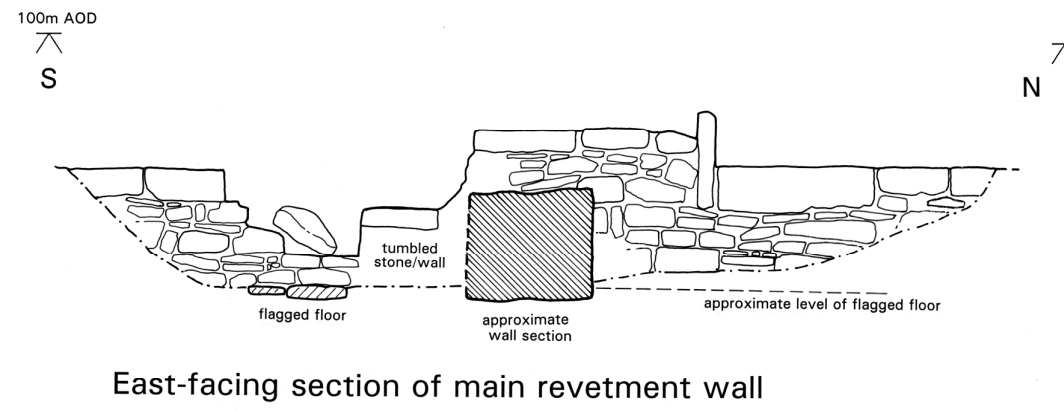
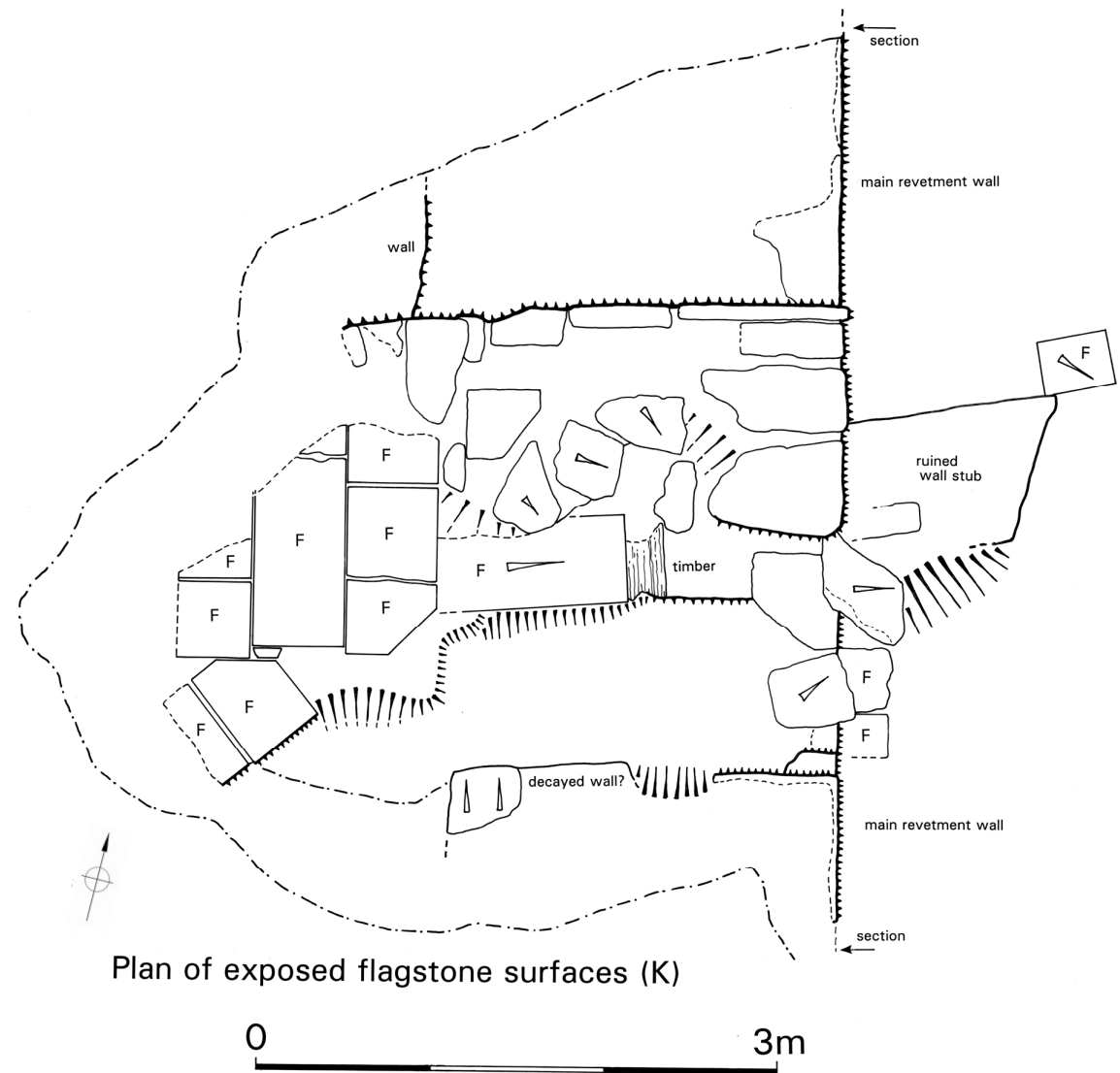
PROJECT		GRINTON HOW MINE	
TITLE		DRESSING FLOOR PLAN	
SCALE	AS SHOWN	DATE	JAN 2021
EDAS		FIGURE	8



 FLOOD DEBRIS

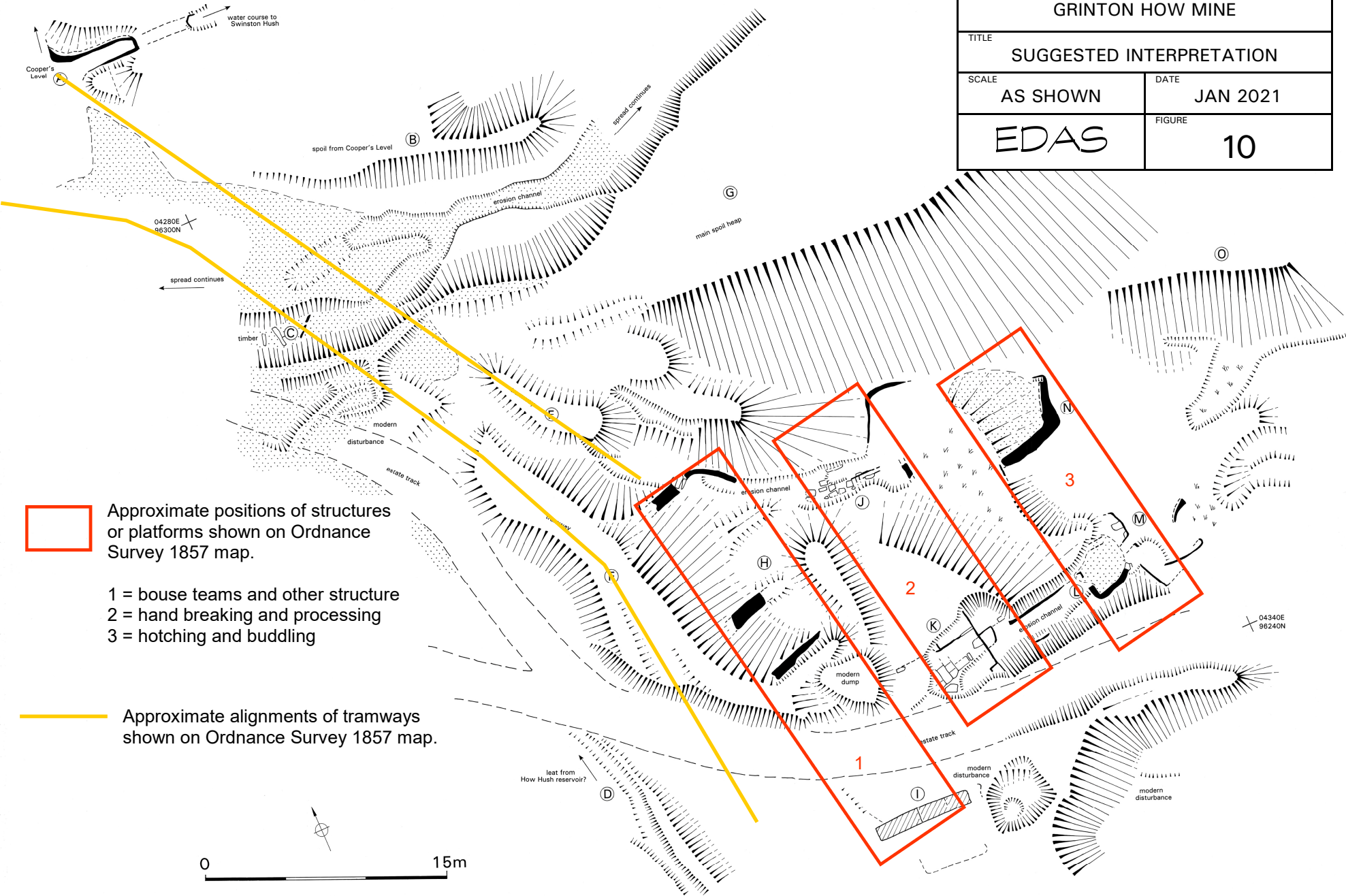
0  15m





PROJECT		GRINTON HOW MINE	
TITLE		DRESSING FLOOR DETAILS	
SCALE	AS SHOWN	DATE	JAN 2021
EDAS		FIGURE	9

PROJECT		GRINTON HOW MINE	
TITLE			
SUGGESTED INTERPRETATION			
SCALE	AS SHOWN	DATE	JAN 2021
EDAS		FIGURE	10



Approximate positions of structures or platforms shown on Ordnance Survey 1857 map.

- 1 = bouse teams and other structure
- 2 = hand breaking and processing
- 3 = hotching and budding



Approximate alignments of tramways shown on Ordnance Survey 1857 map.







Plate 1: General view to Grinton How mine, looking NW (photo 1/311).



Plate 2: General view to Grinton How mine, looking W (photo 1/313).





Plate 3: Andrew Rhoades' pre-flooding photograph of How Level (April 2017) (IMG-20170422-WA006, reproduced with permission).



Plate 4: Flood debris deposited at base of hushes, over site of How Level, looking W (photo 2/326).





Plate 5: Site of Cooper's Level (A), looking N (photo 2/328).



Plate 6: Start of Swinston Hush watercourse, south of Cooper's Level (A), looking E (photo 2/330).





Plate 7: Interior of culvert to Swinston Hush watercourse, looking W (photo 2/333).



Plate 8: Spoil heap from Cooper's Level, looking W (photo 2/336).





Plate 9: Launder (C), looking W to base of hushes (photo 2/319).



Plate 10: Launder (C), fill section, looking N (photo 2/323).





Plate 11: Leat (D), possibly from How Hush reservoir, looking S (photo 2/345).



Plate 12: Tramway bank (F), looking SE towards wall (I) (photo 2/344).





Plate 13: Estate access track cutting south side of tramway bank (F), looking N (photo 2/346).



Plate 14: Main spoil heap (G) with adjacent smaller heap to south (O), looking N (photo 2/405).





Plate 15: Top of main spoil heap (G), looking E (photo 2/339).



Plate 16: Main erosion channel, north side of spoil heap (G), looking E (photo 2/334).





Plate 17: Secondary spoil heap (O), south side of main spoil heap (G), looking E (photo 2/366).



Plate 18: View along bouse teams (H), looking N (photo 2/352).





Plate 19: North-west wall of bouse teams (H), looking SW (photo 2/350).



Plate 20: North face of wall (I), looking S (photo 2/406).





Plate 21: South face of wall (I), looking N (photo 2/410).



Plate 22: Exposed flagstones (J), looking W (photo 2/355).





Plate 23: Culvert to east of exposed flagstones (J), looking E (photo 2/363).



Plate 24: Exposed flagstones (K), looking NW (photo 2/390).





Plate 25: Main revetment wall to east end of flagstones (K), looking W (photo 2/379).



Plate 26: Exposed flagstones (K), looking N (photo 2/389).





Plate 27: Main revetment wall to east end of flagstones (K), looking W (photo 2/382).



Plate 28: Exposed flagstones and waste material below main revetment wall (K), looking S (photo 2/374).





Plate 29: Wall (L) towards east end of erosion channel, looking W (photo 2/370).



Plate 30: Revetted structure (N), looking W (photo 2/368).

APPENDIX 1  
EDAS PHOTOGRAPHIC CATALOGUE

## **GRINTON HOWE MINE EROSION DAMAGE - SURVEY PROPOSALS**

### **Background**

The Grinton Howe mine comprises a complex of features, including hushes, adits and structural remains, located some 500m east of the Grinton to Redmire road and 600m west of Grinton smelt mill, Swaledale, North Yorkshire. Working of the lead deposits here has a long history, but peaked during the 18th century. It had ceased by the early 20th century. The history of mining in this area has been covered in detail by Tyson and Spensley (1995).

The area suffered extensive damage during the flooding event at the end of July 2019. The flooding cut deep erosion channels through areas previously covered in spoil and dressing waste, exposing a number of structures not previously visible. An estate trackway, suitable for 4 x 4 vehicles only, passes through the southern part of the area.

### **Proposed Works**

EDAS have previously undertaken several surveys for the YDNPA arising from the damage caused by the July 2019 flooding, principally at Grinton smelting mill and at Faggegill Lead Mine, Arkengarthdale. The proposed survey work at Grinton Howe will essentially be very similar to that undertaken at Faggegill, comprising a total station survey, subsequently enhanced by hand, and the production of an illustrated archive report.

#### *Documentary Survey*

No original documentary research will be carried out as part of the project. However, EDAS will collect and collate existing material relating to the history and development of the mine complex to inform the subsequent recording work. Liaison will also be undertaken with Ian Spensley and Mike Gill, so that any remains that were uncovered can be properly interpreted.

#### *Topographical Survey*

The topographical survey will concentrate on an area to the north of (and including) a ruined gable end of a building and the estate trackway (see attached plan); the trackway is suitable for 4 x 4 vehicles only, and so it is proposed to park off the Grinton to Redmire road where the trackway meets it, and to walk down to the site. The survey area measures broadly 50m north-south by 35m east-west. On the Ordnance Survey 1857 6" to 1 mile map, the survey appears to contain three parallel north-east/south-west banks of rectangular structures, connected by a surface tramway to How Lead Level to the west. The level was disused by 1914. The survey area will include the ruined gable end of the building, part of the adjacent trackway, and the main remains exposed within the erosion channels created by the flooding. These appear to comprise two pairs of buildings or structures, each with a floor of well-cut flagstones, linked by stone-lined channels or culverts; it is assumed that they are the structures shown in 1857, and relate to the dressing of lead ore. To the immediate east and west of these, there are numerous fragments of retaining wall, culverts and walls (see attached photos 842 to 845).

The survey work will be undertaken at a scale of 1:100 using EDM total station equipment. Sufficient information will be gathered to allow the survey area to be readily located through the use of surviving structures, fences, walls, water courses, trackways and other topographical features. The survey 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. The survey 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, which may aid the functional differentiation and interpretation of the site. The detailed site survey will pay particular attention to any structural remains, and also record areas of erosion (both natural, animal and man-made) or other damage.

The site survey will be integrated into the Ordnance Survey national grid by resection to points of known co-ordinates (probably quite approximately given the isolated location). A temporary benchmark will be established on the standing gable end or another feature, and given a nominal height. 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 Bench Marks 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. The resulting site survey will be produced at a scale of 1:100 and presented as an interpretative hachure plan(s) using conventions analogous to those used by Historic England. The survey work will equate to a Level 3 archaeological survey as defined by Historic England.

### *Photographic Survey*

General photographic recording of the survey area, together with close-up photography of significant details, will be undertaken using an SLR digital camera with 12 mega-pixel resolution. In addition, photographs will also be taken of the general area of the mine complex to illustrate damage and/or any isolated examples of exposed remains away from the detailed survey area - these sites will be located with a hand-held GPS to include in the survey description, but they will not be plotted on a plan. The guidelines produced by Historic England will be followed and each photograph will normally be provided with a scale where appropriate.

All photographs will be in colour, and clearly numbered and labelled with the subject, orientation, date taken and photographer's name, and cross referenced to film and frame numbers. A photographic register detailing (as a minimum) the location and direction of each shot will be completed. Digital copies of the photographs will be provided in high resolution jpeg format.

### *Written Accounts*

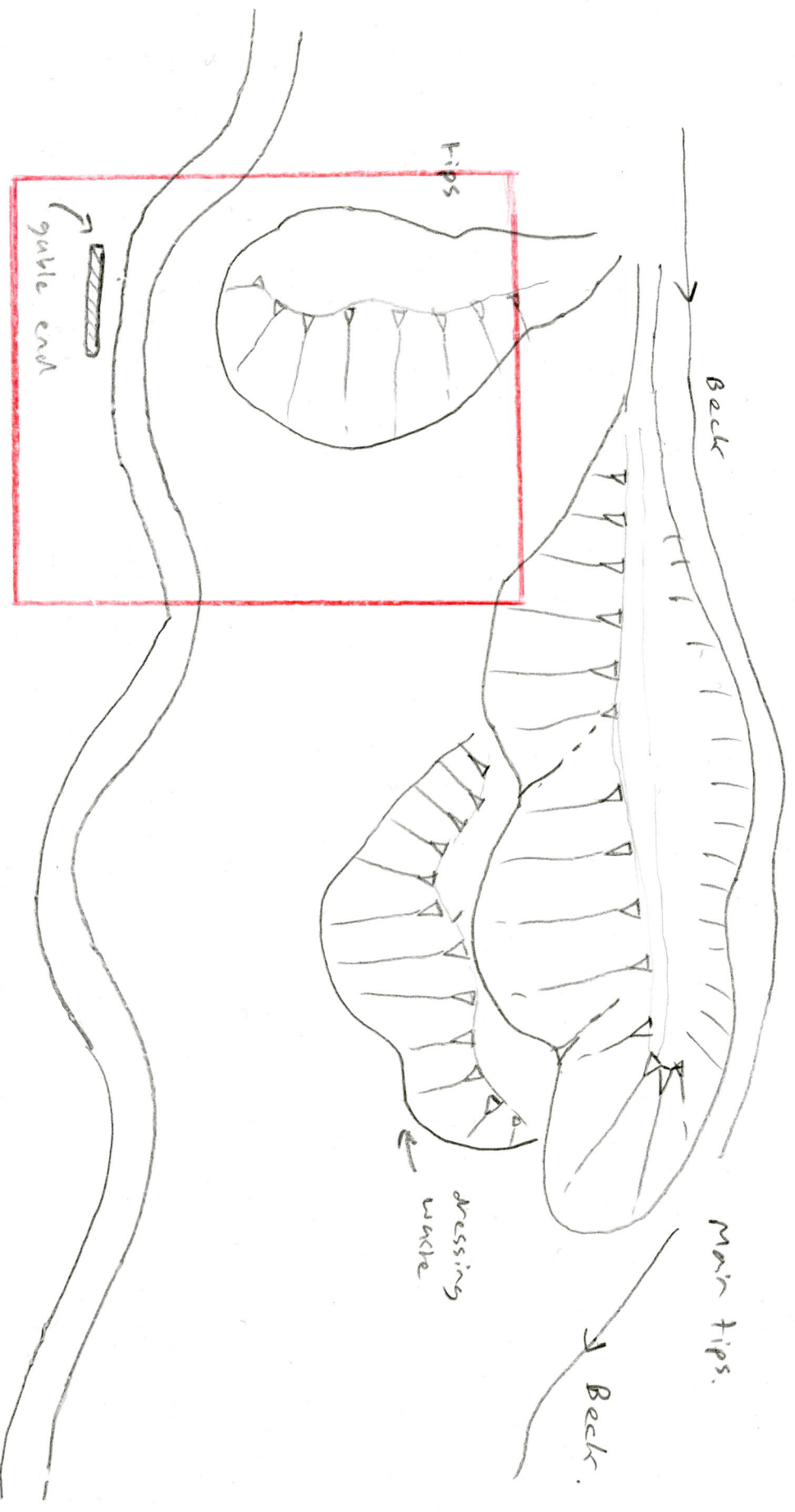
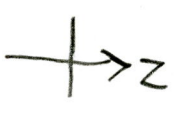
Sufficient notes will be taken on site in order for a detailed description of the survey area to be prepared, in combination with the drawn and photographic records.

### **Reporting and Archiving**

An EDAS archive archaeological survey report will be produced, based on the results of the documentary collation and the information obtained during the fieldwork. This report will assemble and summarise the available evidence for the 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 field work or desk-based research. The report will also be illustrated by reduced versions of the field plots, historic maps and plans, and a selection of photographic plates. The report will also contain various appendices, including photographic registers and catalogues. One hard copy and a pdf version of the final report will be supplied, for distribution to the YDNPA Historic Environment Record. Another copy will also be included within the site archive. Other pdf copies will be distributed to other interested parties.

An appropriate entry will be submitted to the OASIS (On-line Access to the Index of Archaeological Investigations) project, including the deposition of a digital copy of the report with the Archaeology Data Service, via the OASIS form, upon completion of the project. A fully indexed and ordered field archive will be prepared, following the guidelines produced by the Museum and Galleries Commission (MGC 1994) and the Chartered Institute for Archaeologists (CIfA 2014b). The archive will comprise primary written documents, plans, sections and photographs, and an index to the archive. Subject to the agreement of the landowner, the site archive will be deposited with the YDNPA.

Grinton How Mine - Sketch Plan. - Not to scale.



Proposed survey  
over - c. 40m x 30m





Photo 842.



Photo 843.





Photo 844.



Photo 845.



APPENDIX 2  
EDAS METHODS STATEMENT

## Grinton How dressing floor - Photographic Catalogue

Film 1: Colour digital photographs taken 14th May 2020

Film 2: Colour digital photographs taken 21st May 2020

<i>Film</i>	<i>Frame</i>	<i>Subject</i>	<i>Scale</i>
1	309	General view to Grinton How mine, looking NW	-
1	310	Wall (I), structures (H) and bank (F), looking NW	-
1	311	General view to Grinton How mine, looking NW	-
1	313	General view to Grinton How mine, looking W	-
2	317	Launder (C), looking W	1m, 0.3m
2	318	Launder (C), looking W	1m, 0.3m
2	319	Launder (C), looking W to base of hushes	1m, 0.3m
2	321	Launder (C), looking W	1m, 0.3m
2	322	Launder (C), fill section, looking N	0.3m
2	323	Launder (C), fill section, looking N	0.3m
2	324	Launder (C), looking N to Cooper's Level (A)	1m, 0.3m
2	325	Launder (C), looking N to Cooper's Level (A)	1m, 0.3m
2	326	Flood debris deposited at base of hushes, over site of How Level, looking W	1m
2	327	Erosion channel through flood debris deposited at base of hushes, with spoil heap (G) in background, looking SE	1m
2	328	Site of Cooper's Level (A), looking N	1m
2	329	Rubble walls to Swinston Hush watercourse, south of Cooper's Level (A), looking N	1m
2	330	Start of Swinston Hush watercourse, south of Cooper's Level (A), looking E	1m
2	331	Arched opening to Swinston Hush watercourse, south of Cooper's Level (A), looking E	-
2	333	Interior of culvert to Swinston Hush watercourse, looking W	-
2	334	Main erosion channel, north side of spoil heap (G), looking E	1m
2	335	Launder (C), looking S to leat (D)	-
2	336	Spoil heap from Cooper's Level (B), looking W	1m
2	337	Damage to north side of spoil heap (G), looking E	1m
2	338	Damage to north side of spoil heap (G), looking E	1m
2	339	Top of main spoil heap (G), looking E	1m
2	340	North-west ends of spoil heaps (E) and (F), looking N	1m
2	341	Modern track along south side of main erosion gully, looking W	-
2	342	Modern track cutting south side of tramway bank (F), looking SE	-
2	343	South-east end of tramway bank (E), looking SE	-
2	344	Tramway bank (F), looking SE towards wall (I)	-
2	345	Leat (D), possibly from How Hush reservoir, looking S	1m
2	346	Estate access track cutting south side of tramway bank (F), looking N	1m
2	347	Modern disturbance to flood debris, adjacent to estate track, looking E	1m
2	348	Possible revetment to south corner of tramway bank (E), looking NW	1m
2	349	View along bouse teams (H), looking S	1m
2	350	North-west wall of bouse teams (H), looking SW	1m
2	351	View along bouse teams (H), looking S	1m
2	352	View along bouse teams (H), looking N	1m
2	353	Modern dump, south-east end of tramway bank (F), looking S	-
2	354	Exposed flagstones (J), looking N	1m, 0.3m
2	355	Exposed flagstones (J), looking W	1m, 0.3m
2	356	Exposed flagstones (J), looking E	1m, 0.3m
2	357	Exposed flagstones (J), looking S	1m, 0.3m
2	358	Exposed flagstones (J), looking S	1m, 0.3m
2	359	Exposed flagstones (J), looking W	1m, 0.3m
2	360	Exposed flagstones (J), slab to north side, looking N	0.3m
2	361	Exposed flagstones (J), slab to north side, looking N	0.3m
2	362	Exposed flagstones (J), culvert to east, looking E	0.3m
2	363	Exposed flagstones (J), culvert to east, looking E	0.3m
2	364	Wall footings at base of spoil heap (G), north-east of flagstones (J), looking W	1m
2	365	Wall footings at base of spoil heap (G), north-east of flagstones (J), looking W	1m
2	366	Secondary spoil heap (O), south side of main spoil heap (G), looking E	-
2	368	Revetted structure (N), looking W	1m



2	369	Wall (L) towards east end of erosion channel, looking SW	1m
2	370	Wall (L) towards east end of erosion channel, looking W	1m
2	371	Possible culvert, south-east end of wall (L), looking SE	1m
2	372	General view of southern erosion channel, looking SW towards main revetment wall (K)	1m
2	373	Exposed flagstones and waste material below main revetment wall (K), looking S	1m
2	374	Exposed flagstones and waste material below main revetment wall (K), looking S	1m
2	375	Exposed stones in north side of erosion channel, below main revetment wall (K), looking NW	1m
2	376	Main revetment wall to east end of flagstones (K), looking W	1m
2	377	Main revetment wall to east end of flagstones (K), looking W	1m
2	378	Main revetment wall to east end of flagstones (K), looking W	1m
2	379	Main revetment wall to east end of flagstones (K), looking W	1m
2	380	Main revetment wall to east end of flagstones (K), looking W	1m
2	381	Main revetment wall to east end of flagstones (K), looking W	1m
2	382	Main revetment wall to east end of flagstones (K), looking W	1m
2	383	Main revetment wall to east end of flagstones (K), looking W	1m
2	384	Main revetment wall to east end of flagstones (K), looking W	1m
2	385	Exposed flagstones (K), looking E	1m, 0.3m
2	386	Exposed flagstones (K), looking S	1m, 0.3m
2	387	Exposed flagstones (K), looking S	1m, 0.3m
2	388	Exposed flagstones (K), looking E	1m, 0.3m
2	389	Exposed flagstones (K), looking N	1m, 0.3m
2	390	Exposed flagstones (K), looking NW	1m, 0.3m
2	391	Exposed flagstones (K), looking NW	1m, 0.3m
2	392	Exposed flagstones (K), looking N	1m, 0.3m
2	393	Exposed flagstones (K), looking E	1m, 0.3m
2	394	Exposed flagstones (K), looking S	1m, 0.3m
2	395	Exposed flagstones (K), looking S	0.3m
2	396	Exposed flagstones (K), looking S	0.3m
2	399	Exposed flagstones (K), looking S	0.3m
2	402	Exposed flagstones (K), looking S	0.3m
2	404	General view of south erosion channel with flagstones (K), looking E	1m
2	405	Secondary spoil heap (O), south side of main spoil heap (G), looking N	-
2	406	North face of wall (I), looking S	1m
2	408	North face of wall (I), looking S	1m
2	409	Estate track and wall (I), looking E	1m
2	410	South face of wall (I), looking N	1m
2	411	South face of wall (I), looking N	1m
2	412	South face of wall (I), looking NW	1m
2	413	Wall (I) with modern depression to east, looking E	1m
2	414	Modern depression to east of wall (I), looking NE	-
2	415	Spoil heap to east of wall (I), showing modern disturbance, looking E	-