WHITESIKE AND BENTYFIELD MINING COMPLEX, ALSTON MOOR, CUMBRIA

DESK-BASED ASSESSMENT, ARCHAEOLOGICAL SURVEY AND WATCHING BRIEF

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Quality Assurance

This report covers works as outlined in the brief for the above-named project as issued by the relevant authority, and as outlined in the agreed programme of works. Any deviation to the programme of works has been agreed by all parties. The works have been carried out according to the guidelines set out in the Institute for Archaeologists (IfA) Standards, Policy Statements and Codes of Conduct. The report has been prepared in keeping with the guidance set out by NP Archaeology Ltd on the preparation of reports.

	01	**02**	**03**
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SUMMARY

In April 2011, NP Archaeology Ltd was commissioned by North Pennines AONB, to undertake a community-based project consisting of a desk-based assessment and an archaeological survey of three levels and a wheel pit at Whitesike and Bentyfield Mines, Alston Moor, Cumbria (NGR NY 7510 4250), as well as maintaining an archaeological watching brief during consolidation works to some of the structures on this complex which is designated as a Scheduled Ancient Monument.

Aspects of the Whitesike and Bentyfield Mining Complex are at immediate risk of further rapid deterioration. The main causes of this are stream erosion that is particularly affecting the dressing floor, and natural collapse of structural remains. The main aims of this project was to record four features to a Level 2/3 survey standard. Detailed recording was to be undertaken of three level entrances: Whitesike, Bentyfield Low and Bentyfield Levels, and the remains of the Bentyfield crushing mill wheel pit. A subsequent archaeological watching brief was to be conducted during the removal of unstable sections of masonry and consolidation of the Bentyfield mine shop, remedial works to Bentyfield Low Level, and groundworks associated with the construction of a new footpath and retaining walls along the Garrigill Burn.

The desk-based assessment involved the examination of all pertinent documents and cartographic sources in the Carlisle Archive Centre and Carlisle Local Studies Library as well as the consultation of the Cumbria County Council Historic Environment Record (HER) held at Kendal. The HER includes the locations and settings of Scheduled Ancient Monuments, Listed Buildings, Conservation Areas and other, non-designated archaeological remains. In addition, a number of published sources and several relevant web sites were also consulted to provide background information.

The desk-based assessment has shown that the there is the potential that the Whitesike Mine has been worked since the medieval period as a coin of William Rufus and other 'antiquated' iron tools were found within the area in the 19th century. The Whitesike and Bentyfield mines were worked in close association of one another. The Whitesike Mine was worked by the London Lead Company and consisted of the Browngill or Whitesike Level and the Colonel's Level as well as a third un-named level. Bentyfield Mine was worked partly by the London Lead Company and partly by the Alston Moor Company. This mine consisted of the Bentyfield Level that worked the vein of the same name as well as another level higher up the stream.

The archaeological survey consisted of the recording of the ground plan of Whitesike Mine Shop, the remains of the Bentyfield Crushing Mill wheel pit, and the elevations of three mine level entrances; Whitesike Level, Bentyfield Low Level and Bentyfield Level. A Level 2 building survey was also undertaken of Bentyfield Mine Shop prior to consolidation works.

The watching brief was undertaken over seven days between September 2011 and April 2012, during the consolidation of some of the mine features and construction of new foot paths and retaining walls. No new features were revealed during the watching brief which have not already been recorded in the HER or are shown on historical mapping, although it did allow for the opportunity to photograph and comment on the decayed state of many of the mine related structures, as well as the lime kiln and culverts.

The Whitesike and Bentyfield Mine Complex is a site of national interest, as shown by its designation as a Scheduled Ancient Monument. The present scheme of works on the site has been undertaken in order to stabilise and consolidate the remains of several of the structures, and to provide some measure of protection against water erosion, ensuring that the site retains evidence for its industrial past.

ACKNOWLEDGEMENTS

NP Archaeology Ltd would like to thank North Pennines AONB, for commissioning the project, and for all assistance throughout the work. NP Archaeology Ltd would also like to extend their thanks to Peter Jackson and the local volunteers who assisted on site.

NP Archaeology Ltd would also like to thank to Jo Mackintosh, Historic Environment Records Officer with Cumbria County Council and staff at the Carlisle Archive Centre and Local Studies Library for all their assistance throughout the project.

The desk-based assessment was undertaken by Jocelyn Strickland. The archaeological survey was conducted by Tony Liddell and Chris Muirhead, and the building survey of Bentyfield Mine Shop was undertaken by Fiona Wooler. The archaeological watching brief was undertaken by Ben Moore and Miranda Haigh. The report was written by Jocelyn Strickland and Fiona Wooler. The project was managed by Frank Giecco, Technical Director for NPA Ltd, who also edited the report.

1 INTRODUCTION

1.1 The area known as Whitesike and Bentyfield Mines has been affected by the progressive deterioration of the remains through weather and water erosion. The remains comprise various features of archaeological significance, including structural remains, and is designated as a Scheduled Ancient Monument (No. 29012).

1.2 NP Archaeology Ltd were commissioned by the North Pennines AONB to undertake a programme of archaeological works as part of a community based project on the site, prior to and during consolidation works to mine features which still survive.

1.3 The project comprised two distinct phases of investigation consisting of a desk-based assessment and on-site fieldwork (archaeological survey and watching brief): The desk-based assessment involved the consultation of Cumbria Historic Environment Record (HER) housed at Kendal, and the Carlisle Archive Centre and Carlisle Local Studies Library holding local historical information.

1.4 The on-site work consisted of the archaeological survey (Level 2/3) of four features at Whitesike and Bentyfield mines, consisting of three level entrances and the remains of a wheel pit, along with any other features of interest which could be observed during the survey work.

1.5 The archaeological watching brief was maintained during conservation works on Bentyfield Mine Shop, during the removal of unstable sections of the structure and its consolidation, during remedial works to the mine level entrances, and during the construction of a new footpath and retaining walls along sections of the Garrigill Burn.

2 METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 NP Archaeology Ltd were commissioned by the client to undertake a desk-based assessment and an archaeological survey, of three level entrances and the remains of a crushing mill wheel pit at Whitesike and Bentyfield Mines, Alston Moor, Cumbria (NGR NY 7510 4250). A Project Design, which outlined the aims and methodology for this scheme of archaeological work, was produced by NP Archaeology Ltd prior to the commencement of survey and consolidation works on site (Giecco 2011).

2.2 DESK-BASED ASSESSMENT

2.2.1 Several sources of information were consulted in order to achieve a full understanding of the nature of the existing resource regarding the geographical, topographical, archaeological and historical context of the site.

2.2.2 The desk-based assessment included the following:

- the collation and assessment of any relevant information held in the Cumbria County Council Historic Environment Record (HER), at Kendal, in order to identify important sites and to assess the potential of known sites;
- the consultation of documentary collections including trade directories, miscellaneous records, and histories;
- an assessment of relevant published sources including articles in national, regional and local journals;
- an assessment of relevant unpublished documents including, where appropriate, reports compiled by heritage conservation professionals and student theses;
- collation and assessment of cartographic information relevant to the area in order to identify historical land use, boundaries, trackways and early buildings and to provide as assessment of potential extent of disturbance to the archaeological resource caused by intrusive features;
- an assessment of the topography of the area through maps to assess the archaeological potential of areas not identified through the Historic Environment Record, and to determine any constraints to archaeological site survival;

- the assessment of all available aerial photographs that show the proposed development area.

2.2.3 The study area consisted of a broad overall history of this area of Alston Moor, with an additional detailed 500m radius, centred on the Whitesike and Bentyfield mining complex, which was studied in more depth. The principal sources of information were the Historic Environment Record (HER), historical maps and secondary sources. The following resources were consulted:

- *Historic Environment Record (HER)*: the HER is a database of sites of archaeological and/or historical interest located within the county (excluding the Lake District National Park). This was consulted in order to obtain information on the location of all designated sites such as Listed Buildings, Scheduled Ancient Monuments and Conservation Areas, and the locations of non-designated sites which are of historical or archaeological interest. A brief record including grid reference and description was obtained for the various sites within the study area, and are listed in *Appendix 1*. Aerial photographs of the area, if available, were studied in order to identify any potential archaeological features within or near the vicinity of the study area;
- *Carlisle Archive Centre and Carlisle Local Studies Library:* the archives at Carlisle Archive Centre and the Local Studies Library were searched for information on the study area. In particular, the First, Second, Third and Fourth Editions of the Ordnance Survey mapping were checked, and a search was made of the local history books and pamphlets held within their collections;
- *Online Sources:* an online search was undertaken of records held by the Archaeology Data Service (ADS), managed by York University to look at sites within a wider search radius.
- Several secondary sources and journals, such as *British Mining*, were consulted.

2.2.4 The desk-based assessment was undertaken in accordance with the *Standard and Guidance for Archaeological Desk-Based Assessment* (IfA 2008a).

2.3 THE ARCHAEOLOGICAL SURVEY

2.3.1 The purpose of the archaeological survey was to record four features to a Level 2/3 survey standard, as defined by English Heritage (2007), with the assistance of local volunteers. Detailed recording of three mine level entrances was undertaken: Whitesike Level, Bentyfield Low Level and

Bentyfield High Level, as well as the remains of Bentyfield Mine crushing mill wheel pit.

2.3.2 The standing elevations of the mine entrances and the outlines of the crushing mill wheel pit were subject to a measured survey using a Trimble 3605 Reflectorless Total Station. The survey recorded the outlines of the walls and all significant structural detail, a nominal scale of 1:20 was adopted for the survey. This scale is considered most appropriate for showing elevation detail clearly and accurately. All coordinates and levels were generated in metres to three decimal places, and presented as easting, northing and height; the coordinates were expressed as Ordnance Survey National Grid (OSNG) and heights as Ordnance Survey height datum.

2.3.3 The elevation drawings of the three mine entrances were compiled using the survey data obtained from site and high resolution digital photography, to produce rectified photographs.

2.4 WATCHING BRIEF

2.4.1 During the conservation works on Bentyfield Mine Shop, a watching brief was maintained during the removal of unstable sections of the structure and its consolidation. A watching brief consists of a formal programme of observation and investigation conducted during any operation carried out for non archaeological reasons. Reasonable access to the site for the purposes of monitoring the watching brief was afforded to the attendant archaeologist. The observation involved the systematic examination and accurate recording of all archaeological features, horizons and artefacts identified during the works (IfA 2008b). The attendant archaeologist recorded all observations on standard pro-forma sheets, backed up with a photographic record, which was incorporated into the final archive for the project.

2.5 THE ARCHIVE

2.5.1 A full professional archive has been compiled in accordance with the Project Design and according to the Archaeological Archives Forum recommendations (Brown 2007). Copies of the report will be sent to the Cumbria County Council HER, where viewing will be available upon request.

2.5.2 NP Archaeology Ltd and Cumbria County Council Historic Environment Service support the **O**nline **A**cces**S** to the **I**ndex of Archaeological Investigation**S** (**OASIS**) project. This project aims to provide an on-line index and access to the extensive and expanding body of grey literature, created as a result of developer-funded archaeological work. As a result,

details of the results of this project will be made available by NP Archaeology Ltd, as a part of this national project under the unique identifier **nparchaeo1-108340**.

3 BACKGROUND

3.1 LOCATION AND GEOLOGICAL CONTEXT

3.1.1 The Whitesike and Bentyfield mining complex is located within the remote moorland summits of the North Pennines, 0.8 kilometres north-east of Garrigill (Figure 1). The North Pennines is located at the northern end of the Pennine Chain and forms a separate and distinct area of moorland (Countryside Commission 1998). Whitesike Mine is located to the east of the B6277 Alston to Middleton road with the Bentyfield Mine situated approximately 500m east. Levels for both of the mines are located to the north and south of the Garrigill Burn. The crushing mill wheel pit is located on the south side of Garrigill Burn, opposite a former quarry (Figure 2).

3.1.2 The underlying geology consists of a succession of Carboniferous sedimentary rocks that consist of limestones, sandstones and shales known as the Alston Block. Underneath the Carboniferous rocks are the older, mainly Ordovician age, mudstones and volcanic rock (*ibid*).

3.2 HISTORICAL BACKGROUND

3.2.1 *Introduction:* this historical background is compiled mostly from secondary sources, and is intended only as a brief summary of historical developments specific to the study area. The location of known sites within 500m of Whitesike and Bentyfield Mines are depicted on Figure 3 and summarised in Appendix 1.

3.2.2 *Prehistoric (up to 43AD):* there is some evidence of prehistoric occupation in the area of Alston Moor, although none is recorded in the Historic Environment Record within the site boundary or wider study area. In 1935 two small Bronze Age barrows were excavated at Kirkhaugh, to the north-west of Alston. One of the burial mounds contained the remains of an unburnt burial, flint and a gold earring. The other barrow contained an empty cist as well as a single broken stone rubbing tool indicating that the cist had been opened as some point (Robertson 1999a).

3.2.3 William Wallace, a local mining expert of the late 19th century, stated that he owned a polished stone hatchet that was found '*two or three feet below the surface of an ancient landslip*' located to the west of Nenthead (Wallace 1890). Flint implements including a flint knife and a piece of worked flint have been found in the Nenthead area (Thain 1999).

3.2.4 *Romano-British (c.43-410AD):* a Roman fort was established at Whitley Castle, approximately three kilometres to the north-west of Alston, during

the late 1st century AD. This Roman fort was built adjacent to the Maiden Way, a Roman road that ran from *Bravoniacum* at Kirkby Thore in Cumbria, to *Carvoran* near Greenhead in Northumberland. One of the reasons for siting a fort at this location may have been that the Romans were utilising the lead resources in the area as the remains of the smelting process have been recovered at Whitley Castle. The remains of lead objects and minerals dating to the Roman period have also been found at Whitley Castle (Robertson 1999b).

3.2.5 Excavations at the Roman fort at *Corstopitum* at Corbridge revealed metal objects that included both smelted lead and raw and partly smelted ore. Further examination of these objects showed that the ore was rich in silver. Amongst the mixed material were fragments of a mineral wax that was associated with some of the lead veins at Alston Moor. This suggests that the lead ore on Alston Moor was being exploited during the Roman occupation (Raistrick and Jennings 1983).

3.2.6 A Roman *Aureus* coin of the 3rd century reign of *Julia Domna* was also found at an un-named location at Garrigill (Shotter 1989).

3.2.7 *Early medieval (c.410-1066AD):* little is known of the Alston Moor area during the early medieval period. Place name evidence suggests that the area was occupied by the Normans, Angles and later Vikings; however, there is little physical evidence. Garrigill, referred to historically as *Geraldsgill*, is thought to derive from an Old French personal name of Germanic origin, *Gerard*, and Old Norse *gill*, meaning ravine or gully (Lee 1998).

3.2.8 *Medieval (1066-1485AD):* at the time of the Conquest Alston Moor was controlled by Scotland. In 1092 new rulers took control of Carlisle and established a new English settlement and a mint was established at Carlisle (Robertson 1999a).

3.2.9 Mining activity on Alston Moor was first noted in the 1130 Pipe Roll during the reign of Henry I. The Pipe Roll was a record of royal revenue by which the burgesses of Carlisle account to the Exchequer for 100*s.* rent for a silver mine (Raistrick and Jenning 1983). By rights, Alston was part of the diocese of Durham and should have been in the County of Northumberland; however, Henry I detached it and placed the mines under the control of the sheriff of Carlisle. By 1135 silver from Alston Moor was being sent to the mint at Carlisle (Walton 1946).

3.2.10 In 1209 Alston Moor was granted by King William of Scotland to William de Veteriponte, a prince of Scotland. The grant covered Tynedale, Arlington, Aldenstone (Alston) and Kirkhalgh. The king of England must have reserved the rights to the mines as the mines or miners were listed in

the *Inquisition Post-Mortem* of the Alston Moor estates of the Veteripontes (Raistrick and Jenning 1983).

3.2.11 At different times, control of Alston Moor was split between the Scottish and English thrones and the de Veteriponte family. A hearing of 1279 shows that Scotland owned the land but England owned the mineral rights. It remained this way into the 15th century. By this time the Stapleton family, who controlled the mining franchise, inherited the lordship in 1426 that dissolved the Scottish/English separation. However, Alston Moor continued to suffer a series of raids and counter-raids by English and Scottish Kings (Robertson 1999a).

3.2.12 Evidence of mining from the medieval period was found within the present site boundary. A 19th century find of Norman coins in workings at Whitesike Lead Mine (Figure 3, Site 2) and Browngill Mine (Site 3) suggests that this area may have formed part of the '*silver mines of Carlisle*.' The coins were allegedly dated to William Rufus. '*Antiquated*' iron tools were also said to be found within the area (Wallace 1890).

3.2.13 *Post-medieval to Modern (1485AD to present):* by 1471 the estate and mining lease passed to the Hilton family. The Hilton family sold Alston to Sir Francis Radcliffe, of Dilston, Earl of Derwentwater in 1618 where it remained in the family until 1716. In 1664 Sir Francis leased to George Bacon of Broadwood Hall, Allendale '*all the lead ore in the manor of Aldstone Moor for three years, at the sum of 37/- for every bing load of lead ore that is, or shall be gotten, within the said liberties, during the said tern, being fifths or otherwise to the said Francis*' (Critchley 1984).

3.2.14 On October 24th, 1716 Sir James Radcliffe (grandson of Francis) was beheaded for his part in the 1715 Jacobite Rebellion and his lands were seized by the Crown until they were given to Greenwich Hospital in 1735. The governors of Greenwich Hospital let the mines on working leases to the London Lead Company and other lead companies (Forrest *c.*1970).

3.2.15 The London Lead Company (LLC) was formerly known as the Quakers or the Quaker Company and at a later date the Governor and Company. The origins of the company are unknown although it is traditionally believed that two Quaker women visited the area in the 17th century, where they were struck by the level of poverty of the miners and upon their return to London suggested to their friends '*what a kindness it would be to subscribe a little capital to furnish the miners with regular employment. Upon this a number of Friends raised a sum of money in £5 shares and from this beginning the London Lead Company was born*' (Thain 1999).

3.2.16 In 1692 the London Lead Company obtained a charter for smelting down lead with pit and seal coal. From 1695-1704 their works were stopped as the

company collapsed. In 1704-1705 the company amalgamated with the Royal Copper Mine Company in Wales and the Ryton Smelting Company in Alston Moor (Wallace 1890).

3.2.17 Around 1716 the London Lead Company worked Browngill and Thortergill Sike veins and purchased the lease of Blaygill mine. Around the same time the Governor and Company (LLC) applied for grants to Redgroves (Rampgill), Thortergill Sike, Browgill, Blaygill and Windy Brow veins. However, they did not succeed in obtaining grants for any of the veins with the exception of Windy Brow (Wallace 1890).

3.2.18 During the 18th century the London Lead Company became one of the largest mine owners in the Alston Moor area employing hundreds of miners (Marshall and Davies-Shiel 1977). In 1706 the London Lead Company had begun work on Browngill and Thortergill Sike veins. At this time the level was driven 300 yards and was within 60 fathoms of the Browngill vein. The miners were working in three shifts and hoped to complete the level in less than one year. This level is now known as the Whitesike Level (Forrest *c.*1970).

3.2.19 Prior to the Greenwich Hospital, Browngill Mine was leased by The Quaker Company (LLC) and a Mr. Bacon. In August of 1736 Greenwich Hospital was to let Browngill Mine to Colonel Liddle, the Quakers (LLC) and a G. Mowbray. At this time this mine contained no washers and only six miners. Bentyfield Mine (Site 1) was leased by Colonel Liddle and also contained no washers and six miners (Wallace 1890).

3.2.20 Colonel Liddle received a grant for Browngill and Thortergill Sike veins and began to make a considerable length of level from Garrigill Burn in order to drain these veins. This level was known as the Colonel's Level (Wallace 1890). The Colonel's Level was located at the confluence of the Souther Gill and Garrigill Burn and was a second level to Whitesike Mine (Fairburn 1993). This level originally began as a water level around 1736 and worked the Browngill vein in the shale above the Great Limestone stratum (Forrest *c.*1970). In spite of his investment he failed to make a success of his mine. By 1745 the London Lead Company owned the lease to Thortergill Sike (Forrest *c.*1970).

3.2.21 The Bentyfield and Whitesike Mines were worked in close association with each other. Whitesike Mine was worked by the London Lead Company and Bentyfield was partly worked by the London Lead Company and partly by the Alston Moor Company.

3.2.22 By 1800 Bentyfield and Whitesike Mines had grown considerably. Garrigill Burn was subjected to a lot of mining activity. When the burn was used to capacity, a reservoir was built that was located within easy reach of both

mines and between Garrigill Burn and the fell road to Nenthead. Short watercourses ran from the reservoir to the mine dressing floors (Forrest *c.*1970).

3.2.23 Bentyfield vein has been worked along the upper course of the Garrigill Burn. The main access to this vein was the Bentyfield Level. This level followed the vein from 925 feet (282 metres) where it then crosscut the Sun Vein (Fairburn 1993). This level was located upstream from the road at the bed of the burn on the right hand bank, opposite a lime kiln (Site 5) and a quarry. The level can be entered for a short distance and has then collapsed. There is a possibility that an engine pump is still within the mine. Wallace stated that a hydraulic engine was put in the mine and when the mine closed it was left behind. Another level to Bentyfield Mine is located higher upstream. On the left bank was a tall building that was once Bentyfield mine shop (a lodging house for miners) (Forrest *c.*1970). This once two-storey building stands nearly to eaves level on the south side (SM No. 29012). Beyond this is a now waterlogged level (*ibid*).

3.2.24 Bentyfield vein was worked from these two levels on the banks of the Garrigill Burn in the middle of the 1800s. Thomas Shaw of Shield Hill leased the mine and was joined by the Jobling's who had the mine at Calvert and the smelt mill, both at Tynehead. The mine at Bentyfield during the 1880s employed a large number of men (around 60) and ceased to work around 1890 (*ibid*).

3.2.25 The London Lead Company drove levels from Garrigill Burn in a south-easterly direction to intersect the ore seams which had been revealed by vertical whimsy shafts. The main level was near Middleton Road, known as the Whitesike Level. This was driven eastwards along Old Groves Cross Vein to reach Browngill Vein after 671m (Fairburn 1993, SM No. 29012). On the right bank were the bing steads at the washing floor and then there was a level entrance, now blocked. Beyond this were the remains of the blacksmiths and joiner shops located side by side. Higher up the burn were two further levels, one of which was the Colonel's Level (Forrest *c.*1970). The Whitesike workings extended as far east as Longholehead Whimsey (NGR NY 7710 4225) where the workings from Nenthead joined those of Whitesike Mine. It is thought that most of the work at this level, on the Browngill Vein, is '*ancient*' and began as surface shafts. The production of lead concentrates between 1848 and 1882 under the London Lead Company totalled 7,322 tons with a yield of seven ounces of silver per ton in the 1860s (Dunham 1990).

3.2.26 Earlier phases of Browngill Mine consisted of bell-pits, shafts and dressing waste tips along the vein that were replaced in the 18th century by adit

mines driven from the valley to the north. These include the well-preserved Whitesike floor, a good example of a small 19th century washing floor (Plate 1). The ruined remains of a wheelpit at Whitesike and Bentyfield lead mines and ore works provide evidence for a waterwheel that was used to power a crushing mill that broke up the ore prior to processing on the dressing floor. The dressing floor has been damaged by severe stream erosion; however, an area survives that retains stratified deposits 1.5 to 2 metres deep. A second dressing floor retains evidence of timbers, iron pipes and other features (NP Archaeology forthcoming).

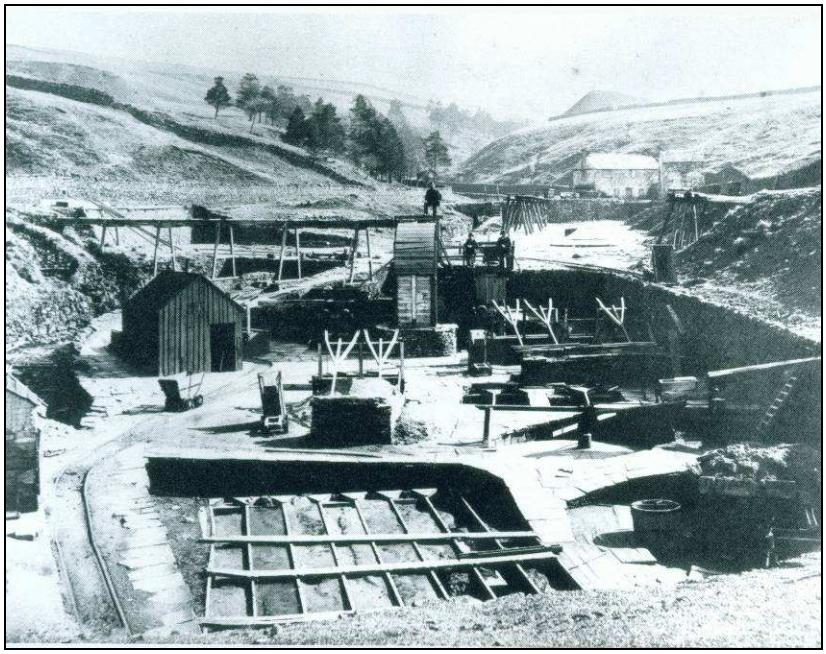

Plate 1: *Whitesike Dressing Floor* c. *1900*

3.2.27 In 1857 Browngill Mine was leased to the Governor and Company and produced 129 tons and 9 cwts (a hundred weight) of lead ore, 90 tons and 6 cwts of lead. Bentyfield, South vein, West End produced 97 tons, 4 cwts of lead-ore and 72 tons, 18 cwts of lead (Notes on Alston Moor housed at the Kendal HER). A year later Browngill produced 401 bings (defined as one cart load or stack) and 2 cwts of lead ore. Bentyfield Sun Vein, West End produced 271 bings, 6 cwts and Bentyfield East End produced 311 bings and 5 cwts (Notes on Alston Moor housed at the Kendal HER).

3.2.28 In 1993 Fairburn stated that the Alston to Yad Moss road passes over the extensive waste heaps from Whitesyke dressing floor. The Garrigill Burn has been culverted in order to dispose of the wastes. Little remains of the dressing floors. There were remains of around ten bouse steads (storage bays) and the outline of what Fairburn thought was a wheel pit. Timber planking protruded from the ground suggesting that some of the floor may

be covered by wastes. At this time Bentyfield Level was open and fitted with a gate. The mine shop was located beside the level. Most of the dressing floors for this mine were gone as they were largely supported on culverting that had been washed away. A waste heap was located on the south side of the burn. Below the waste heap was a waterwheel associated with the dressing floor. In fields to the south of Bentyfield Mine were a line of shafts and a partly filled in opencut that follows the line of the Bentyfield Sun Vein that crosses the burn at this point (Fairburn 1993).

3.2.29 In 1993 Colonel's Level was open and gated, however the entrance had collapsed. The line of the level could be followed up the fields by the line of ventilation shafts. About 198m upstream were the remains of coal workings, present on either side of the burn (*ibid*).

3.2.30 In 2002 the only remaining above ground structures at Whitesike Mine were the bingsteads and numerous retaining walls associated with the dressing floor. Earthworks were also visible around the entrance to the Browngill Level that were thought to be the remains of two stone buildings of probable 19th century date. The only major structure surviving at Bentyfield Mine at this time was the former mine shop. Very little of the dressing floor survived, but what remained contained complex deeply stratified archaeology over two metres deep (Flush *et al.* 2002).

4 ASSESSMENT RESULTS

4.1 INTRODUCTION

4.1.1 The assessment results are based on primary documents, most notably historical maps, and on the secondary sources that are referred to in Section 3.2 above. The results are presented according to the archive from which they were consulted. There were a total of 13 HER records for the study area defined as a 500m radius centred on the Whitesike and Bentyfield Mining Complex. A list of the HER sites identified by the assessment is given in Appendix 1 and illustrated on Figure 3.

4.2 HISTORIC ENVIRONMENT RECORD (HER)

4.2.1 *HER:* there were a total of 13 HER records within the study area (defined as a 500m radius around the mining complex). All of these related to the mining industry; the majority of which dated to the post-medieval period. The only exceptions to this were the Whitesike Lead Mine (the site boundary) (HER No. 5898), Browngill Mine (HER No. 10447), and the Garrigill Burn Field Boundary (HER No. 40524) that date to the medieval period.

4.2.2 *Listed Buildings:* there were no listed buildings within the present site boundary or wider search radius.

4.2.3 *Conservation Areas:* Whitesike and Bentyfield Mines are not located within a conservation area; however, they are located within an Area of Outstanding Natural Beauty (AONB).

4.2.4 *Scheduled Ancient Monuments (SAM):* the Whitesike and Bentyfield mining complex is a Scheduled Ancient Monument (No. 29012). This was the only Scheduled Ancient Monument within the 500m search radius.

4.2.5 *Aerial Photography:* there were no aerial photographs that pertained to the site boundary within the HER.

4.2.6 *Previous Archaeological Investigations:* in 2003 an archaeological walkover survey and watching brief were undertaken between Nenthead and Alston, prior to the installation of the Hardedge Water Supplies Pipeline. A total of 62 sites were identified during the walkover survey, almost all of which were related to mining. A watching brief was undertaken at Whitesike Mine. No evidence of archaeological deposits, finds or features were noted. There was evidence that the ground had been previously disturbed most probably in conjunction with the construction of the road and/or lay-by. The underlying deposits were thought to be mining spoil (OAN 2004).

4.3 CARTOGRAPHIC SOURCES

4.3.1 A search of maps recording the Whitesike and Bentyfield Mines on Alston Moor was carried out at Carlisle Archive Centre. Only those that reveal the area around the mining complex sites and of direct relevance have been included (Appendix 2).

4.3.2 *Early 19th century Map of the Manor of Alston Moor (undated) (Figure 4):* this undated map shows *White Syke* mine to the south of the Nenthead and Garrigill Road. To the east of this was what appeared to be a single building, possibly a mine shop. Further east of this, also on the south side of the road, was the Browngill Shop. To the north of the road were the Thortergill Syke and Browngill Syke mines. Bentyfield was not shown on this mapping.

4.3.3 *First Edition Ordnance Survey Map, 1867 (Figure 5):* at the time of the First Edition Mapping the Whitesike and Bentyfield mines were still in operation. This mapping shows the location of two levels, an aqueduct and sluice, as well as a lime kiln (HER No. 19274) associated with Whitesike Lead Mine. Adjacent to the westernmost level was a standing building, presumably Whitesike Mine Shop. At this time there were also two levels associated with the Bentyfield Lead Mine at the extreme east end of the survey area. To the south of these mining complexes was a reservoir. To the north of Whitesike Mine was another lead mine with a single level.

4.3.4 *Second Edition Ordnance Survey Map, 1899 (Figure 6):* by the time of the Second Edition mapping both the Whitesike and Bentyfield Mines were annotated as disused. There were four levels shown in close proximity to the Whitesike Mine, two close to the road (both of which are not labelled on the First Edition Ordnance Survey map), one beside the mine shop, and the easternmost shown close to an 'Old Limekiln', presumably the site of Browngill Lower Level. A quarry was shown on this mapping, most probably associated with Bentyfield Mine. This quarry must have started following the First Edition mapping, as it was not shown at that time and depleted or no longer worked by the time of the Second Edition mapping as it was annotated as *old* by this time. The lead mine was no longer annotated to the north of the mines, although a single level was still shown.

5 ARCHAEOLOGICAL SURVEY

5.1 The site was visited over two days in June 2011 and March 2012 in order to survey the outline of the crushing mill wheel pit at Bentyfield Mine, and the elevations of three mine shop levels. In addition, the mine shop at Whitesyke Mine was also surveyed.

5.2 Due to the precarious nature of the ground around the site of the crushing mill wheel pit, and the rubble of the decayed remains, it was difficult to obtain accurate surveys of the surviving walls (Plate 2).

5.3 The results of the archaeological survey at the Whitesike and Bentyfield Mine Complex are produced as Figures 7 to 10, and are included in Appendix 2 of this report.

5.4 During the survey of the site in June 2011, Bentyfield Mine Shop was subject to a building survey based on an English Heritage Level 2 Survey (2006), in order to record the structure prior to consolidation works. The mine shop is located at the eastern end of the survey area, on the north side of Garrigill Burn, with Bentyfield Low Level mine entrance located just to the east (Figure 2).

5.5 The mine shop is constructed of roughly coursed and squared masonry, with alternating blocks used for the quoins although these are not well-dressed as is often seen on vernacular buildings. The walls measure approximately 0.60m in width, and the structure is roughly square in plan, each wall measuring *c.*6.08m externally.

5.6 The building is presently roofless and, at the time of survey, was surrounded externally by scaffolding, which made clearly photographing the external elevations difficult (Plates 3 and 4). The building was formerly of two stories, although most of the stonework for the upper level has either fallen away or been deliberately pushed into the interior. The roof is missing , with the material presumably removed for reuse elsewhere. It is unclear what form the original roof took due to the lack of the full height of the end walls, but it is presumed it would have been gabled, and covered in either slate or stone flagstones.

5.6 The main elevation of the former mine shop faces to the south, and contains evidence for a centrally-placed doorway with windows to either side, now all blocked. The ground floor windows measure *c.*0.80m in width and the doorway measures *c.*1.12m. At first floor level there are the remains of two windows (Plates 5 and 6).

5.7 The east elevation is relatively featureless apart from a square feature near the base of the wall, which may have been used to house a flue for a

blacksmiths forge, a common feature of mine shops located close to the level, as repairs to tools could be undertaken promptly, although no clear evidence for a forge was noted internally (Plates 7 and 8).

5.8 The west elevation contains evidence for a former doorway or opening at ground floor level, although it is now blocked up with masonry (Plates 9 and 10). To its north side there is a vertical break in the masonry where a boundary wall to the rear of the property meets the north-west corner of the building (Plate 11). This boundary wall heads northwards for a short distance before turning eastwards and enclosing an area to the north side of the property (Plate 12). The north wall of the mine shop is now largely lost.

5.9 The interior of the building could be observed from the north side, where demolition/natural degradation of the masonry allows for access to the top of the north wall, and also at the time of the site visit by the scaffolding platform. It was possible to note a former fireplace in the west wall of the building, at first floor level, in the form of two vertical stone uprights (Plate 13). Just visible in the north internal wall were four square niches, although there may have been more now obscured by the rubble (Plate 14). These were set below the level where joists for the first floor would have been located, and were interpreted as possible lockers for lamps, helmets or other items associated with the mine.

5.10 The interior of the building was largely filled with rubble derived from the walls of the mine shop; therefore the ground floor surface was not visible (see watching brief section below). The only feature of note was an L-shaped line of stonework which may have been part of a blacksmiths forge (Plate 15).

Plate 2: *Surveying of the remains of the crushing mill wheel pit, June 2011*

Plate 3: *View looking north showing Bentyfield Mine Shop*

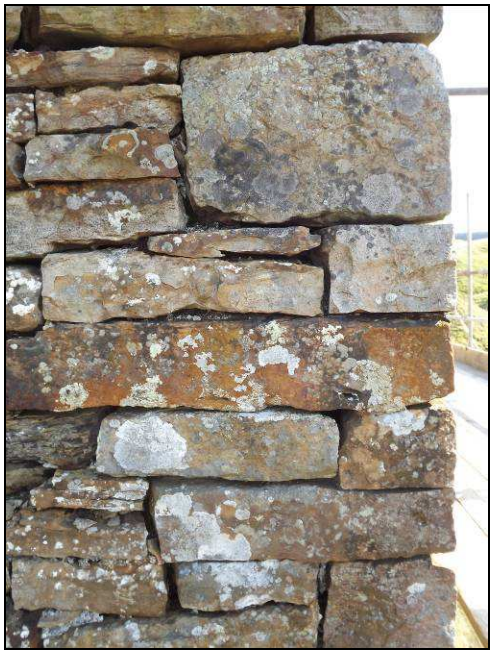

Plate 4: *Detail of quoins, Bentyfield Mine Shop*

Plate 5: *South elevation of Bentyfield Mine shop showing the two first floor windows*

Plate 6: *One of the two blocked windows in the south elevation of Bentyfield Mine Shop (Scale = 1m)*

Plate 7: *East elevation of Bentyfield Mine Shop*

Plate 8: *Detail of square feature in east wall of Bentyfield Mine Shop (Scale = 1m)*

Plate 9: *West elevation of Bentyfield Mine Shop*

Plate 10: *Detail of blocked door or opening, east elevation of Bentyfield Mine Shop (Scale = 1m)*

Plate 11: *West elevation showing vertical break in masonry between the mine shop and the boundary wall to the north (Scale = 1m)*

Plate 12: *View looking south from the higher ground showing the north side of Bentyfield Mine Shop*

Plate 13: *View looking west showing the evidence for a first floor fireplace, Bentyfield Mine Shop*

Plate 14: *Detail of four visible niches in the north internal wall of the former mine shop*

Plate 15: *View looking east showing an L-shaped line of stonework within the interior of the former mine shop*

6 THE WATCHING BRIEF

6.1 INTRODUCTION

6.1.1 The archaeological watching brief was undertaken over seven days between September 2011 and April 2012. The watching brief involved the archaeological supervision of works associated with the construction of a new bridge at the east end of the site, immediately to the south of Bentyfield Mine Shop; the removal of soil and rubble at the entrance to Browngill Low Level; and the clearance of rubble from within the interior of Bentyfield Mine Shop.

6.1.2 During the days on site for the watching brief, the attendant archaeologists also took the opportunity to make observations and take photographs of the remains of other features on site, which are not the subject of the present project.

6.2 BENTYFIELD LOW LEVEL

6.2.1 In October 2011, a community excavation led by Peter Jackson of the North Pennines Heritage Trust, consisted of the clearance of soil, turf and rubble build-up which stood to a height of *c.*1.5m and measured *c.*1-2m in width, in front of the entrance to Bentyfield Low Level. During this clearance work it was noticeable that the eastern retaining wall for the level entrance was relatively well-preserved, although the west retaining wall was in a more precarious state (Plates 16 and 17).

6.2.2 Following the clearance of the entrance to the mine level, a plastic pipe disguised by a masonry structure was inserted into the mouth to allow for drainage in November 2011 (Plates 18 and 19).

6.2.3 During the works at Bentyfield Low Level, no archaeological features were noted apart from those relating to the mine entrance, and no archaeological finds were retrieved.

6.3 BENTYFIELD CRUSHING MILL WHEEL PIT

6.3.1 The Bentyfield crushing mill wheel pit is located on the south side of the Garrigill Burn, and is orientated roughly north-west to south-east. The walls are heavily degraded through natural hillwash and water erosion (Plates 20 and 21). The walls of the wheel pit were noted to be constructed of coursed masonry, seemingly unbonded, and the pit itself measured *c.*1.31m.

6.3.2 Consolidation works at the site of the wheel pit consisted of the construction of new retaining walls to its east side (Plate 22).

6.4 BENTYFIELD MINE SHOP

6.4.1 The interior of the former mine shop, located at the east end of the survey site, was cleared out by local volunteers in November 2011. Following the removal of the rubble which covered most of the interior of the building, it was possible to note that the original floor surface, presumably stone flagstones, had been removed and the compacted earth surface on which the flags would have been laid was exposed (Plates 23 and 24).

6.4.2 The removal of the rubble did not provide any further information on the L-shaped walls noted to have existed prior to the consolidation works (see Plate 15 above); therefore its function is still unclear. It does not appear, however, to have been original to the structure as no flagstones were noted beneath its base suggesting that the L-shaped feature was inserted after the floor was removed.

6.4.3 The niches noted in the north wall prior to the removal of the internal rubble were clearly visible once the masonry had been cleared. It was noted that at least seven of these niches were present (Plate 24).

6.4.4 No archaeological finds were retrieved during the removal of the rubble from the interior of the mine shop.

6.5 CONSTRUCTION OF NEW FOOTPATH, RETAINING WALLS AND FOOTBRIDGE

6.5.1 Part of the consolidation works at the Whitesike and Bentyfield Mine Complex involved the construction of a new footpath along the north side of Garrigill Burn, the reconstruction of sections of retaining walls, and the construction of a new footbridge at the east end of the site. A watching brief was maintained during sections of these works but no features of note were revealed, although the footpath itself was constructed on the existing ground surface, with little in the way of ground intervention (Plates 25 to 28).

6.6 FEATURES OBSERVED DURING THE WATCHING BRIEF

6.6.1 During the days on site for the watching briefs, several surviving features of note were observed which related to the mine workings of the Whitesike and Bentyfield Mine Complex. These do not include those already referred to above.

6.6.2 Situated on high ground to the north side of Garrigill Burn, and to the north of Whitesike Mine dressing floor, is a circular stone-built mine shaft cap of approximate 1.85m diameter, and which stands to a height of approximately 1m. The stonework of the mine shaft cap has been bonded with what appears to be modern cement, suggesting that this may either be

a recent capping, or the stonework has been replaced or repointed (Plates 29 and 30). A drainage gully was noted to run into the north-east side of the mine shaft cap, which was lined with thin stone slabs. It is possible this gully is a later addition, possibly cut to drain the fields to the north. This site was recorded as 'Feature 5' during the watching brief.

6.6.3 Evidence for Whitesike Mine Shop was noted on the south side of Garrigill Burn, in the location of where buildings are shown on historical mapping. The surviving remains consisted of the lower courses of the south and east external walls (*c.*0.80m thick) along with two internal walls extending northwards from the south wall. Very little else survives apart from a spread of building material and a possible section of the north wall which contains a hole in the coursed masonry, possibly associated with a flue for a heater (Plates 31 and 32). This site was recorded as 'Feature 1' during the watching brief.

6.6.4 Located immediately to the west of the remains of Whitesike Mine Shop is the entrance into Whitesike Level (Plates 33 and 34). This entrance was reputedly reconstructed in 1982, and is therefore in good condition and well intact. The aperture measures *c.*3m in width and stands to a height of *c.*2.15m. The level entrance is constructed of long stone slabs of varying sizes. The site was recorded as 'Feature 2' during the watching brief.

6.6.5 To the west of the site of Whitesike Mine Shop and Whitesike Level, is a long section of walling orientated east to west, on the south side of Garrigill Beck. This appears to have been the south retaining wall for a set of bouse teams (or bingsteads), where lead ore would have been stored in a series of bays. The Second Edition Ordnance Survey map of 1899 shows this feature just to the west of the level entrance, and to the east of the 'Aqueduct' (see Figure 6) The structural remains of these storage bays consist of masonry walls which stand to a maximum height of 2m. Set in the south walls are a series of sloping backs (shoots) which may have related to the tipping of lead ore which had been extracted from the mine and transported by trackway into these storage bays, each sloped back representing one bay (Plates 35 and 36).

6.6.6 Little survives of Whitesike Dressing Floor, which is the area shown in the foreground on Plate 1. The south wall is still relatively extant and contains various square apertures which appear to have related to the timber frames and mechanisms utilised for the dressing processes (see Plate 1) (Plate 37). Part of the wheel pit which is visible on Plate 1 appears to still survive to the east side of the dressing floor area (Plate 38). As a whole, the dressing floor at Whitesike, as shown in *c.*1900, has largely disappeared (Plate 39).

6.6.7 The Second Edition Ordnance Survey map of 1899 shows that between Whitesike and Bentyfield Mines, the Garrigill Burn was partly culverted (see Figure 6). During the site visits for the present project, it was noted that these culverted sections have been mostly washed away, apart from a small section close to the site of the Old Limekiln, and the culvert which runs under the road from Alston to Middleton in Teesdale (Plates 40 to 42).

6.6.8 An opening was noted to still be visible just above the main culvert which runs over the road to the west side of Whitesike Mine, although the entrance is presently largely obscured by spoil (Plate 43). This may have been mistakenly labelled as a 'Level' on the Second Edition Ordnance Survey map of 1899 (see Figure 7), however it is set within a large area of spoil and may have actually been an access tunnel to allow the tipping of spoil on the other side of the road.

6.6.9 The 'Old Limekiln' which is annotated on the Second Edition Ordnance Survey map of 1899, to the east side of Whitesike Mine, and on the north side of Garrigill Burn, was noted to still be partially extant, with the sides and the central arch still visible (Plate 44). This lime kiln is presently recorded in the HER database as No. 19274 'Whitesike Lime Kiln.

Plate 16: *Detail of the entrance to Bentyfield Low Level prior to remedial works in October 2011 (Scale = 1m)*

Plate 17: *View looking east showing the eastern retaining wall for Bentyfield Low Level (Scale = 1m)*

Plate 18: *Bentyfield Low Level during clearance work in October 2011 (Scale = 1m)*

Plate 19: *Detail of modern drainage structure inserted into the mouth of Bentyfield Low Level in October 2011*

Plate 20: *View looking south-east showing the remains of Bentyfield crushing mill wheel pit*

Plate 21: *Detail of wheel pit on south side of Garrigill Burn*

Plate 22: *Consolidation works to the east side of Bentyfield crushing mill wheel pit*

Plate 23: *Interior of Bentyfield Mine Shop following removal of rubble*

Plate 24: *View looking north showing the interior of Bentyfield Mine Shop following clearance*

Plate 25: *View looking east showing the construction of the new footpath along the north bank of Garrigill Burn*

Plate 26: *Detail of a new section of the footpath along the north side of Garrigill Burn*

Plate 27: *Detail of the newly constructed footpath along the north side of Garrigill Burn, with the former quarry visible left of photograph*

Plate 28: *New bridge over the Garrigill Burn located close to Bentyfield Mine Shop*

Plate 29: *View looking west showing the mine shaft cap on the north side of Garrigill Burn*

Plate 30: *Detail of mine shaft cap (Scale = 1m)*

Plate 31: *View looking east showing the remains of Whitesike Mine Shop*

Plate 32: *Detail of a section of possible north wall of Whitesike Mine Shop which contains a square aperture (Scale = 1m)*

Plate 33: *Detail of the entrance to Whitesike Level (Scale = 1m)*

Plate 34: *View looking south showing the Whitesike Mine Level adjacent to the remains of Whitesike Mine Shop, south side of Garrigill Burn*

Plate 35: *Long masonry wall along the south side of Garrigill Burn, remains of bouse teams at Whitesike Mine*

Plate 36: *Detail of part of the south wall of the bouse teams or bingsteads, Whitesike Mine (Scale = 1m)*

Plate 37: *South retaining wall of Whitesike Dressing Floor (Scale = 1m)*

Plate 38: *View looking east showing the east wall of the dressing area at Whitesike with what survives of the wheel pit (Scale = 1m)*

Plate 39: *View looking east showing the area of Whitesike Dressing Floor*

Plate 40: *View looking west showing part of the culvert to allow a track to cross the Garrigill Burn*

Plate 41: *View looking west showing the large culvert under the road from Alston to Middleton in Teesdale*

Plate 42: *Detail of large culvert under road to west side of Whitesike Mine*

Plate 43: *View looking west showing the main culvert under the road*

Plate 44: *Remains of lime kiln on north side of Garrigill Burn close to Whitesike Mine*

Plate 45: *Quarry site on the north side of Garrigill Burn, between Whitesike and Bentyfield Mines*

7 CONCLUSION

7.1 The desk-based assessment has shown that the there is the potential that the Whitesike Mine has been worked since the medieval period as a coin of William Rufus and other 'antiquated' iron tools were found within the area in the 19th century. The Whitesike and Bentyfield mines were worked in close association of one another. The Whitesike Mine was worked by the London Lead Company and consisted of the Browngill or Whitesike Level and the Colonel's Level as well as a third un-named level. Bentyfield Mine was worked partly by the London Lead Company and partly by the Alston Moor Company. This mine consisted of the Bentyfield Level that worked the vein of the same name as well as another level higher up the stream. Remains of the Mine Shop are still present.

7.2 The archaeological survey consisted of the recording of the ground plan of Whitesike Mine Shop, the remains of the Bentyfield Crushing Mill wheel pit, and the elevations of three mine level entrances; Whitesike Level, Bentyfield Low Level and Bentyfield Level. A Level 2 building survey was also undertaken of Bentyfield Mine Shop prior to consolidation works.

7.3 The watching brief was undertaken over seven days between September 2011 and April 2012, during the consolidation of some of the mine features and construction of new foot paths and retaining walls. No new features were revealed during the watching brief which have not already been recorded in the HER or are shown on historical mapping, although it did allow for the opportunity to photograph and comment on the decayed state of many of the mine related structures on the Whitesike and Bentyfield Mine Complex, including culverts and the lime kiln.

7.4 The Whitesike and Bentyfield Mine Complex is a site of national interest, as shown by its designation as a Scheduled Ancient Monument. The present scheme of works on the site has been undertaken in order to stabilise and consolidate the remains of several of the structures, and to provide some measure of protection against water erosion, ensuring that the site retains evidence for its industrial past.

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APPENDIX 1: GAZETTEER OF SITES

Known HER sites within 500m of the Whitesike and Bentyfield Mining Complex

ID	HER No	Site Name	Description	NGR (N)	NGR (Y)	Period
1	5897	Bentyfield Lead Mine, Alston Moor	An important series of levels driven from Garrigill Burn to exploit the Bentyfield and Bentyfield Sun Veins, Thortengill Sike Vein and Browngill Veins. The remains of the mine shop remain fairly intact. Scheduled Ancient Monument No. 29012	375420	542550	Post-medieval
2	5898	Whitesyke Lead Mine, Alston Moor	An important series of mine levels. No buildings are intact and little remains of the dressing floors. Scheduled Ancient Monument No. 29012	375100	542500	Medieval/ Post-medieval
3	10447	Browngill Mine, Alston Moor	Extensive shaft/mine workings, now disused, that spread from Bentyfield Lead Mine and Whitesike Mines	376000	542700	Medieval/ Post-medieval
4	17632	Thorter Gill Lime Kiln, Alston Moor	A collapsed lime kiln with a quarry upstream and several associated lead mines	375100	542400	Post-medieval
5	19274	White Sike Lime Kiln, Alston Moor	A lime kiln annotated on OS maps at this grid reference. May be within the Scheduled area of Whitesike Mine	375237	542553	Post-medieval
6	40517	Garrigill Burn Pit, Alston Moor	Pit and associated spoil heap	375752	542361	Post-medieval
7	40520	Garrigill Burn Mine, Alston Moor	A pit formed by a circular conical mound, evidently capped	375628	542240	Post-medieval
8	40521	Bentyfield Mines, Alston Moor	A pair of pits: one formed by a conical mound with a central depression and the other with a three metre deep depression and spoil heap to the east	375553	542414	Post-medieval
9	40522	Garrigill Burn Mines, Alston Moor	A group of six pit shafts each consisting of a conical mound with a central depression	375750	542445	Post-medieval
10	40523	Garrigill Burn Mines, Alston Moor	Two pits. One of which consists of a low spoil mound with a central depression and the other is on the edge of the beck, also with a central depression	375586	542449	Post-medieval
11	40524	Garrigill Burn Field Boundary, Alston Moor	A ruined field boundary of medieval or post-medieval date	375570	542436	Medieval

ID	HER No.	Site Name	Description	NGR (N)	NGR (Y)	Period
12	40525	Whitesike Mine, Alston Moor	An extensive area of mine workings that consists of several bell pits with large spoil heaps and a dam with an associated pond	375400	542400	Post-medieval
13	40526	Garrigill Burn Mines, Alston Moor	A group of mine workings that consist of a conical mound with a central depression that has been capped with concrete sleepers. The second area is formed by a group of shallow hollows surrounded by a crescent-shaped bank	375544	542207	Post-medieval

APPENDIX 2: FIGURES