

## Nenthead Mine Water Treatment Scheme FAQs

Last updated November 2022

### Are there any alternative options to a mine water treatment scheme?

We have considered a full range of potential treatment technologies including established and more experimental systems. Globally, the most commonly used technology to remove metals at active mines is chemical dosing to raise the pH as this makes the metals form solids that can then be separated for disposal. The Wheal Jane treatment scheme in Cornwall is a typical example and is described at Wheal Jane mine water treatment scheme - Case study - GOV.UK ([www.gov.uk](http://www.gov.uk)).

Chemical dosing systems are industrial facilities requiring continuous input of chemicals, energy and supervision. They are expensive to build and operate and have a substantial carbon footprint. The proposed pumped-passive reactive media treatment pond system we are considering for Nenthead, has a lower whole life cycle cost (including carbon) to deliver the desired water quality improvements than any available alternative remedial method.

### Why can't you make the Nent Hags scheme bigger and treat the water there?

As part of the site selection process that was undertaken in 2016/17 there were some sites identified that would have been big enough to create a combined treatment scheme for the Caplecleugh and Hags water, however, these were all too close to houses and for this reason were not considered further.

In addition, taking the Nenthead mine water down to the Hags treatment site would mean that there is almost no water in the river during the summer months. This is because most of the water in the upper stretches of the river during the driest periods comes from the two adits at Nenthead. Although it is currently polluted with metals, removing this water would cause significant environmental harm and mean there is almost no dilution of the sewage works discharge and any other waste water discharges. Removing the metals from the mine water and then putting the water back in at the adits, is the best solution for the environment.

### What will the scheme look like? / How visible will the scheme be?

The schemes are designed to fit into the landscape as much as possible, whilst allowing us to be able to treat enough water to have a big enough impact on reducing the metal pollution levels in the watercourse.

Mine water treatment schemes require a small pumping station to pump contaminated water away from the river at old mining adits. The water is then pumped to a number of treatment ponds where it is filtered to remove the metals. These ponds can vary in size and number, depending on the size of the scheme required. The water is then passed through an area of reed wetland, for a final cleanse. The outline design plan which shows provisional location of the treatment ponds at Caplecleugh is available [here](#).

## **Are there alternatives to these schemes such as extensive tree planting to reduce the amount of water running off the land?**

The two types of metal pollution, point and diffuse, require different approaches to reduce their impact. It is not possible to stop the mine water coming out of the drainage tunnels since this is groundwater that is generated by rain percolating down into the mines and dissolving some of the metals that are contained in the rocks. Therefore, the only way to deal with the mine water pollution is to treat the discharges.

Tree planting is something that would help to reduce the impact of diffuse pollution whilst also enhancing biodiversity, helping with flood risks and capturing carbon dioxide from the atmosphere. We are working with the Tyne Rivers Trust and North Pennines AONB Partnership to identify areas that are suitable for planting trees. Planting trees on mine wastes is not always successful because the high metal concentrations in the soils can damage the trees. However, for the Nent Haggs project, we are working with the Tyne Rivers Trust (partly funded by Northumbria Water Group) to create an informal nature reserve, including trees and scrub, in the field in Nentsberry which contains our mine water pumping station.

The WAMM programme is also looking at opportunities to tackle diffuse pollution and manage surface water run off to prevent sediments being washed into the river Nent.

We have already put in place a number of interventions (for examples, see [here](#)). Some work has been carried out for us by the Tyne Rivers Trust using materials such as log barriers, stone revetments and willow hurdles, as well as GeoCoir matting to limit erosion by rivers, stabilise contaminated soils and encourage plants to grow (see [here](#) and [here](#)). The revegetation of former mining areas is a desirable outcome as this would bind the loose surface and reduce erosion of sediments into the watercourses. We are trialling different ways to do this at several sites in the area.

Lots of metal contaminated sediments are already in the river and gradually move downstream, and release metals, particularly in higher river flows. In 2017, we dredged more than a thousand tonnes of sediments, containing at least 30 tonnes of lead, cadmium and zinc from the river by the Nenthead sewage works. We have installed a new 'check weir' at Nenthall which is designed to capture about 1 tonne of metals each year.

As part of the Nenthead project, we are investigating how we can decrease the amount of metals that are washed out of the wastes by improving how surface water flows across the mine site after rainfall.

## **Access**

### **Will there be any traffic restrictions?**

Any traffic management measures required as part of the construction of a scheme at Caplecleugh will be communicated to residents with appropriate notice and we will aim to minimise disruption to the community and traffic.

### **Will the access track up to Handsome Mea be impacted?**

We have not yet reached a point in the programme where we have the full details available to answer this question. However, the current proposal is to install the pipeline transporting mine water to and from the treatment scheme beneath the access track from the adits to Handsome Mea (past the heritage buildings) which would mean restricting access during construction.

We are interested to hear people's views on which parts of the site are used most frequently by the public as we would like to minimise disruption if we can whilst also keeping everyone safe. Notification of any closure will be given in advance.

### **Will the mine tunnels still be accessible to explore after construction?**

We will not prevent access to the mine workings.

## **Construction**

### **What impact will there be on the community whilst construction is underway?**

We will need to explain to Cumbria County Council how we will minimise disruption to the community during construction and when operating the scheme before they will grant planning permission. Past experience of construction in sensitive locations will be taken into account when we are choosing the contractor to build the scheme.

We do usually need to put in place traffic management to help keep you and our contractors safe on site. We will always aim to do this for the shortest time and give local residents plenty of notice.

The project is not yet developed to the stage that we can say where we would install site cabins, nor how long the scheme would take to build. Once we have more information, we will share this with the community and ask for feedback although we will be constrained by technical factors and budget.

### **Will local construction companies/ workforce be used?**

Because this is funded by Government, we must go through a formal procurement process to demonstrate that the appointed contractor will deliver value for money. This includes various technical and financial considerations. We are keen to encourage support for local businesses although we are constrained by national Government procurement rules.

At the Nent Hags scheme, our contractor, I&H Brown has employed 1 local person who is being supported to gain construction related training and qualifications. Materials are being sourced locally where it is possible, and most of the workers live close enough to commute to site each day. Staff who live further away have been staying in local hotels during the working week.

### **Will the site/area still be accessible during construction?**

To keep the public and our staff safe, areas of the site will be fenced off during construction. We will endeavour to limit public access as little as possible. More details of these areas and when they will be inaccessible will be shared as we develop a final scheme design.

### **Where will the construction site compound be located?**

We are still investigating the best location for a site compound during construction and this will be confirmed as we develop final designs over the next year, and gain input from construction contractors. It is likely to be inside of the quarry access road, just off the A689. We will provide more information as firm options are developed.

### **How will construction traffic be managed?**

We will be required to put in place a construction traffic management plan to support construction activities. This will be used to hold contractors to account and provide a clear indication to the local community on additional traffic expected and how it will be managed to keep disruption to a minimum. We will provide more information as this plan is developed.

## **Permissions and Permits**

### **How do you manage potential conflicts of interest in the permitting process?**

The WAMM (Water and Abandoned Metal Mines) programme deals with polluting discharges from historic metal mines where the operator no longer exists. The clean-up stage usually involves capturing and treating the polluted water then releasing it back into the environment -and this requires both an abstraction licence and a discharge permit from the Environment Agency (EA).

#### **The permitting process:**

The EA's National Permitting Service (NPS) determine all applications to abstract water and discharge effluent back into the environment following formal operating instructions. The permitting staff decide whether to allow the proposed abstraction or discharge and what conditions to apply.

- The abstraction licence is issued under the Water Resources Act 1991 and
- The water discharge activity or groundwater activity permit is issued under the Environmental Permitting (England and Wales) Regulations 2016.

Sometimes the EA itself is the applicant, for example if there is a request to discharge effluent to the environment from one of our fish laboratories or if we need to spray herbicide to protect watercourses from unwanted growth. In these cases, the decision is signed off by a Deputy Director. For treatment schemes under the WAMM programme the Coal Authority are the applicant who will be operating the scheme. This means the Coal Authority application will be determined following the same process as that for any other external operator.

### **What other permissions will the construction work require?**

Discharge of treated mine water will require an Environmental Permit from the Environment Agency.

Land Drainage consent from Cumbria County Council will be required where construction work is carried out within 8m of the River Nent.

A Scheduled Monument consent will be required from Historic England for any work that may impact the designated site.

### **How will abstraction and impoundment of water be managed?**

Consent will be needed from the Environment Agency to allow for the abstraction of the mine water. An application for this will be submitted to and must be issued by the Environment Agency before the scheme can begin to operate.

## **Protecting the Local Environment**

### **How does the Nent compare, in terms of wildlife (fish, insects, birds, mammals) with similar unpolluted rivers?**

The EA carried out fish and invertebrate (river flies) surveys in 2017 and 2018, these surveys showed that fish do live in the river however the populations of Brown trout in the River Nent were about half that of a similar unpolluted "control" catchment. The Brown Trout population was found to consist of older fish (1-2 years) and no juvenile fish (0+ years) were found in the main River Nent compared to 11 in the control catchment. The juvenile fish in the River Nent are thought to live in tributaries where the metal concentrations are lower.

There is a similar story for river-flies with the surveys finding a lower number of different invertebrate families present than expected. Although there are river flies such as mayflies and caddisflies in the River Nent, the overall river fly community is less diverse and abundant (less flies) than there would be if the river was not polluted by metals.

There have been no similar comparative studies carried out for other wildlife, however assessment surveys undertaken prior the Nent Hagsgs planning application identified some key bird species in the vicinity including curlews, oyster catchers, skylarks, swifts and great tits. Members of the project team have seen dippers near the Nenthead sewage works. Otters, water voles and bats have been recorded in the catchment.

There are also interesting flora in the area, for example, “calaminarian grasslands” consist of metal tolerant plants that are not found in catchments where there is no metal pollution. These plants, flowers, grasses and lichens grow in soil that has a high metal content having accumulated over the centuries of mining activity. Cleaning up the river is unlikely to affect most of these calaminarian grasslands since they are outside the river channel. However, we are monitoring the Blagill SSSI (Site of Special Scientific Interest) downstream of Foreshield Bridge since the metal tolerant species grow on gravels in the river channel. We are trying to improve the habitat for calaminarian grasslands at several projects in the area.

### **In what way are you expecting it to improve following the commissioning of the Nentsberry scheme later this year? How will the Nenthead scheme further improve it?**

We expect the treatment schemes to remove at least 70% of the zinc and cadmium from each of the mine water discharges (there is very little lead in either discharge) and most likely more than 90%. The Nenthead discharges (Caplecleugh and Rampgill) currently discharge around 4.5 – 5 tonnes of zinc per year and Hagsgs discharges around 3 tonnes per year.

Once the Hagsgs scheme is completed, we expect to quickly see a very significant decrease in pollution by concentrations of zinc and cadmium in the River Nent under lower river flow conditions. There will be less improvement at higher river flows although this is when the river is already less polluted. We expect the same to be true if the Nenthead scheme is granted planning permission. Over time, we would expect the ecological populations of fish and invertebrates to become larger and more diverse, healthier and more resilient but this may take several years.

These improvements in the River Nent will also improve water quality in 60km of the South Tyne, helping to create a healthier environment for fish and the river flies which support the aquatic food web.

### **What about the protected status of the land and the history here?**

The Nenthead mining complex is one of the most intact and important mining landscapes in the North Pennines. Much of the site is designated as a Scheduled Monument, the underground workings in the Smallcleugh Mine are a Site Special Scientific Interest due to the geology, and there are important metal-tolerant ‘calaminarian’ vegetation around the site.

We have been in discussion with Historic England, Natural England, Cumbria County Council and the Nenthead Mines Conservation Society for advice on what we are permitted to build in the area, and to understand how we can best mitigate any impacts of work on the protected land.

### **What is the impact of lead, cadmium and zinc in the River Nent?**

There are two sources of metal pollution in rivers impacted by abandoned metal mines, point sources and diffuse sources. Point sources are those such as the Hagsgs and Caplecleugh minewater discharges, these drain water through the tunnels created by the miners (these are sometimes known

as adits). The water picks up metals as it flows through these tunnels which are discharged directly into the river all year round, although flows can vary because of rainfall.

Diffuse sources are a little more varied and include things like mining waste heaps (spoil heaps) or old processing areas that contain elevated levels of metal in the soils. These sources are usually only active during and following wet weather when rainwater filters through these areas and picks up metals or directly erodes them and carries metals that are both dissolved and attached to particles into the river.

The combination of these sources means the concentration of these metals in the River Nent is always significantly above the Environmental Quality Standard (EQS). The EQS is set by Government based on toxicity testing to prevent harm to aquatic life. If the measured concentration in a water sample is higher than the EQS, then the river is legally considered to be polluted.

However, measured metal concentrations vary in response to rainfall and river flow as dilution by cleaner water means they are lower at high river flows. The most environmental harm occurs in dry conditions when there is less dilution of the metals discharged from the drainage tunnels.

- Zinc concentrations vary between 7 and 153 times the EQS
- Cadmium concentrations vary between 11 and 39 times the EQS
- Lead concentrations vary between 1.2 and 15 times the EQS

### **How does the metal affect fish and other river life?**

The presence of fish in the River Nent shows that although zinc concentrations are so high that fish would not be expected to survive, the population has been able to adapt to some extent after being exposed to toxic levels for many decades. However, chronic (long-term) exposure to concentrations below the directly toxic level can still have detrimental effects since the metals can “bio-accumulate” inside fish and the river-flies which lie at the bottom of the river food chain. The high metal levels in fish tissues can affect the number of eggs they are able to produce, the number of eggs that hatch, the quality of the offspring, and can reduce their lifespan.

Surveys in 2017 and 2018 showed populations of Brown Trout in the River Nent were about half that of a similar control catchment. The Brown Trout population was found to consist of older fish (1-2 years), no juvenile fish (0+ years) were found in the main river Nent compared to 11 in the control catchment. The juvenile fish are thought to exist in “nurseries” in tributaries where there is less metal pollution. Once mine water treatment schemes decrease metal concentrations in the River Nent, juvenile fish are expected to survive more easily although this is expected to take time (4-5 years).

There is a similar story for river-flies (invertebrates) with surveys in 2017 and 2018 finding a lower number of different invertebrate families present than expected. There are a variety of mechanisms by which metals impact on invertebrate communities. Some species are more sensitive to metal concentrations and simply will not be able to survive when concentrations are too high, other species are more tolerant and can cope with high metal concentrations but will bioaccumulate metals over time. This can affect the health of some species as the coping with high metals can take extra energy. Since invertebrates spend much of their life cycle living in the river sediments, and some ingest sediment particles, they can be impacted by metal concentrations in the sediments as well as the river water.

Salmon populations in the River South Tyne are generally good but not in all areas. However, water quality in the South Tyne fails the Environmental Quality Standard for cadmium and zinc until the confluence with the River North Tyne near Hexham.

### **What is being done to protect the metalliferous plants?**

As part of our planning application submissions for the schemes we will include a full Environmental Impact Assessment and Habitat Regulation Assessment which determines what protected species

are in the area and set out how any impacts from construction work as part of the scheme will be mitigated.

A scoping EIA was completed in 2019, where Calaminarian grassland was identified in a number of locations across the area. The grassland is in part the reason for designation of several of the nature conservation sites locally. Through scoping assessment, it has been determined that development of a scheme may impact on the Calaminarian grassland to a certain extent however, most of the protected habitat lies outside the current footprint. The assessment therefore recommended that as part of a scheme, habitat creation and/ or management should be considered to support the grassland.

The WAMM Programme has a good track record of protecting and enhancing calaminarian grassland habitats and lichens when carrying out construction at sensitive sites in the Nent, South Tyne (Garrigill) and West Allen catchments.

### **Have you carried out a full environmental audit on the maintenance and operation of a scheme?**

An environmental audit will be carried out as part of the scheme design, and to meet the Government's Net Zero targets. This will include the costs (money and environmental) and benefits (including biodiversity and the potential to generate electricity with the treated water) to operate the scheme. Although some energy will be required to pump the mine water to the treatment ponds, the scheme relies on natural biogeochemical reactions to remove the metals.

### **What are you doing to protect red squirrels?**

As part of our early investigations, we completed ecological surveys, and these will be repeated during 2022. The timing of the surveys this year will be completed later than normal to reflect the variation in climate in Nenthead and the impact this has on wildlife. Contact has recently been made with the local red squirrel group and our ecology reports will include a section specifically on red squirrels.

## **Safety**

### **If you are putting big ponds on site, how will you ensure the area remains safe once work has been completed?**

As part of the planning application, we will need to satisfy CCC that we can build and operate the scheme safely. The Coal Authority will be responsible for operating the scheme and will make sure there is appropriate signage and monitoring to protect public safety.

### **Have you considered the safety of transporting, storing and using hydrogen peroxide as part of the treatment scheme?**

We know that dosing with hydrogen peroxide will work and that the operational risks, including transport, delivery, storage and use, can be managed safely. This is already done at several Coal Authority mine water treatment schemes.

We are considering alternatives that will achieve the same outcome but cost less to operate. Options include filters that capture the hydrogen sulphide from the air before it causes an odour nuisance.

To provide an idea of the likely quantities of hydrogen peroxide that will need to be stored on the site, the Nent Haggs scheme, which will treat up to 10l/s, will have 35% hydrogen peroxide stored in two 1000litre tanks. Transport, delivery, and storage of hydrogen peroxide to the site will be done in line

with industry standards. Our current expectation is that about 4000litres of hydrogen peroxide will need to be stored on site for the Nenthead mine water treatment scheme.

### **What about our mental health?**

We understand that there will be some disruption whilst construction is underway. The proposed site identified is situated away from residential properties and the proposed installation of the pipeline is such that there should be little or no requirement for road closures. These decisions, we hope, will go some way to reducing the disruption to the local community. We will need to satisfy Cumbria County Council that we will minimise disruption to the community during construction and when operating the scheme before they will grant planning permission.

Whilst there may be a need to temporarily close parts of Nenthead Mine Site for safety whilst construction is underway, it is not our intention to close any part of the mine site permanently. The area will still be available for recreational purposes once a scheme is operational. The long-term benefits of completing the scheme mean that the area and river will be better quality for generations in the future. As part of the overall Environmental Impact Assessment which covers both construction and operation of a scheme we will include consideration of health impacts.

We will do our best to make sure the local community is made aware of what is proposed at each stage of the work, so it is clear what disruption there will be and why. We recognise that engagement has been intermittent over the past few years, and we have actively been working to improve this. Both the Coal Authority and Environment Agency have employed engagement support specialists to improve communications.

## **Scheme Operation and Maintenance**

### **Have you considered the local weather and wind conditions on the operation of a treatment scheme so close to the village?**

We asked specialist advisors to model the impact of odour from a scheme in Nenthead. The model included assessment of hydrogen sulphide generated by the mine water treatment ponds, with and without Hydrogen peroxide dosing. The odour modelling also considered the direction of prevailing winds based on the nearby Warcop Met Office data and concluded that, with controls working as expected, residents would not be impacted by any odour nuisance. This approach and underlying data were accepted by Eden District Council Environmental Health for the Nent Haggs scheme.

In August 2022, we installed a new weather station near to the site to supplement the Met Office data we have used so far. We will ask odour modelling specialists to review the new weather station data, and to specifically address questions about the potential impacts of temperature inversions and other meteorological impacts locally specific to Nenthead.

If the treatment scheme layout changes, we will need to repeat the odour modelling, and we intend to share any new assessment when it is ready.

### **Will sub-zero temperatures have an impact on the operation of the scheme?**

Our monitoring shows the average mine water temperature is 8 to 9 Celsius and the minimum is 5 (Rampgill) and 7 (Caplecleugh). This water will be transferred in an underground pipeline which will provide some insulation from the elements and prevent it freezing.

An ice layer forms on the Handsome Mea reservoir each winter but there is no evidence that this interferes with water flowing out of the reservoir to the hydro-electric scheme or via the outfall.



Operation of the treatment ponds will not be affected if ice forms on the pond surface. However, we expect that colder temperatures will mean slightly less efficient removal of metals as the microbial activity within the reactive media layer will be slower at lower temperatures.

### **What contingency plans do you have in place in case of an emergency?**

The mine water capture system will be designed so that if the pumps and any back-up systems fail, then the mine water would discharge to the river as it does now. In this scenario, the water in the treatment ponds would slowly fall to a pre-set level.

Contingency plans will be developed as part of the design process and the potential for winter impacts on access, electricity and other factors will be explicitly considered.

### **How will the treatment beds be maintained?**

We will be frequently monitoring water levels in the treatment ponds along with metal concentrations in the original mine water and the treated water. These data will tell us how the system is performing and particularly whether the permeability or metal removal are decreasing. If performance decreases too much then maintenance will be carried out. Maintenance of the treatment ponds is likely to be required every few years. This will involve turning the material over with a rotovator under water. Completing this under water will prevent the maintenance activity from causing odours.

Full replacement of the treatment media will likely need to be carried out approximately every 20 years and disposal of waste sediment, which would be similar to industrial effluent sludge, will follow regulations at that time. Under current regulations this would see the waste material go to landfill or another permitted waste site.

The sulphides in the treatment media are primarily bound as metal sulphide minerals; when exposed to air the sulphide will begin to be oxidised to sulphate rather than creating hydrogen sulphide gas. Since this oxidation is likely to release some of the metals that have accumulated, we will need to take this into account when removing any treatment media. Our experience at the Force Crag scheme is that disturbing the treatment media when it is covered by water does not cause odours.

We expect that if planning permission is granted by Cumbria County Council, there would be conditions requiring prior approval of the proposed approach to managing the reactive media. Such a condition was attached to the Nent Hags scheme.

### **How will the safety of the site be maintained when it isn't a staffed site?**

There will be remote monitoring of key systems through our telemetry network and alarms will be triggered if action is needed at any time of the day or night. This includes problems with the pumps or odour dosing equipment, or if anyone breaks into the buildings. We are considering if safety fencing is needed around the treatment ponds. Before submitting a planning application, we will discuss this with the landowner and other stakeholders such as the North Pennines AONB Partnership.

### **How will you know if the treatment scheme is working?**

The Coal Authority, as operators of the scheme will carry out their own monitoring to assess the effectiveness of the treatment scheme. This would include inlet and outlet samples as a minimum and is likely to start off relatively intensively when the scheme is first switched on and then reduced in frequency as the scheme moves into its fully operational phase. This monitoring will show the amount of metal removed by the scheme. We expect the scheme to remove at least 70% of the zinc and cadmium, and potentially more than 90%.

The Environment Agency regularly carry out monitoring at a number of points along the River Nent, which includes taking samples of water to assess the levels of pollutants in the river. This data will tell

us, over a longer period, how effectively the mine water treatment schemes are working. We expect to quickly see a very significant decrease in pollution by zinc and cadmium under lower river flow conditions although it will have less impact at higher river flows when the severity of pollution is less. Over time, we would expect the ecological population to become healthier and more resilient but this may take several years.

### **How long will it take to see results from the mine water treatment scheme?**

Once fully operating, the various proposed interventions in the headwaters of the South Tyne catchment are expected to improve river water quality immediately. However, we acknowledge that it is likely to take around 20 years for the metal concentrations in the sediment that accumulates in the Tyne estuary to decrease to the Action Levels set by Government for disposal to sea.

This is being factored into how sediment in the estuary shipping berths is managed, for example through the “River Tyne Restoration Facility” proposed by Newcastle City Council and described at Levelling Up Fund bids | Newcastle City Council. Newcastle City Council has stated that their proposed facility will safeguard existing economic activity which contributes £139m annually to the regional economy, and will help to attract further inward investment and new employment opportunities.

The Tyne headwater remedial measures proposed through the WAMM Programme will help to protect this economic activity as well as delivering significant environmental benefits.

### **How can we trust that Hydrogen sulphide levels will not be a problem?**

We understand the concern about the potential release of hydrogen sulphide. However, the proposed design includes control systems to prevent hydrogen sulphide causing an odour nuisance; these systems are widely used by other industries across the world. We are committed to ensuring that the treatment scheme does not cause an odour nuisance. This will be set out in our application for planning permission (as was done for the Nent Haggs scheme). Cumbria County Council and Eden District Council will need to be satisfied with our proposed design and mitigation measures before permission will be granted. We will prepare an Odour Management Plan that will formally explain how we are going to monitor odours at the site, which will include permanent monitoring equipment and “sniff testing”, in accordance with the Environment Agency’s technical guidance. Although we do not expect the scheme to cause an odour nuisance, the odour management plan will set out how members of the public can report any odours to us so that we can take action. In the unlikely event that the scheme does cause an odour nuisance, we would switch the treatment ponds off until a solution can be put in place. Our Force Crag scheme has no odour control systems and so does sometimes generate odours, however over the past 8 years of operations, we have demonstrated that switching off the mine water flows stops any odours within a very short period (hours).

### **How noisy will the pumping station be?**

We would expect there to be minimal noticeable noise from the pumps. The pumps at Nenthead will make a similar noise to those at Nent Haggs. As part of the Nent Haggs Environmental Statement, we estimated that the pumps would emit a sound level of 60 dB per unit which is the equivalent of normal conversation or background music. By putting the pumps inside an insulated stone building, this noise is reduced by 20Db to leave a residual sound that is expected to be quieter than the hum from a refrigerator. Once the location of the proposed Nenthead pump building is finalised, we will carry out a baseline noise survey to inform the final design. We will also carry out a noise impact assessment to ensure the residual noise is acceptable. We will share this with the public in advance of submitting the planning application.