

# Highthorn Surface Mine

## Operational Noise Assessment

Prepared on behalf of Banks Mining

### Issue 2

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# Executive Summary

This report provides a detailed noise assessment of the current proposal by Banks Mining to develop the Highthorn surface coal mine in the vicinity of Widdrington, Northumberland.

## Development proposals

Detailed information has been provided on the development, working and restoration of the site which would take place over a period of seven years. Extensive noise mitigation has been built into the design of the site, ranging from planning of site access, off-site road traffic routes, location of processing plant and the arrangements for the method of working. The workings are designed so that baffle mounds will be placed around the site boundaries in the initial stages as soils are removed. Work will then take place behind the baffle mounds to provide screening of the machinery, and as the main excavation is developed, the edges of the void will provide additional screening.

Short term operations will not take place during the evening and no work will take place during night periods. At night, only maintenance work will take place. Pumps and similar small items of plant may need to run continuously but will not be audible outside the site boundary. The noise calculations have been presented with extra noise abatement measures fitted to larger rigid body dumptrucks and mass excavators.

## Noise calculations

This information has been used to model and predict operational noise levels from the site at various critical phases in its life cycle. The predicted noise levels have been compared with measurements of the present ambient noise climate and with noise assessment criteria set out in *Planning Practice Guidance for Minerals – March 2014*, issued by the Department for Communities and Local Government, as refined by Northumberland County Council in recent planning consents for similar developments.

A detailed three-dimensional computer model of the project has been created to permit the prediction of noise levels at five critical stages in the life-cycle of the project.

The noise study shows that the proposed development will meet the proposed noise criteria at all times.

## Off-site road traffic

The change in noise arising from off-site road traffic is shown to be below 1 dB(A) along most of the route, and therefore negligible. Highthorn is not expected to commence coaling before Shotton has finished, so there will be no cumulative impact at Cambois on the Port of Blyth access. Accordingly, it is concluded that the proposal will not have any significant impact on road traffic noise.

## Cumulative noise impacts

The site is within 1 km of one proposed wind farm and the proposed Ferneybeds SCM and within 2 km of another proposed wind farm. The cumulative noise impact of these developments has been assessed. It was found to be small and within acceptable limits.

## Overall conclusion

The noise assessment detailed here shows that the proposed development as described will meet accepted noise criteria, both for on-site work, off-site road traffic and the cumulative effect of other proposed developments in the vicinity at all times. Any noise impact will therefore be fully within accepted limits.

# 1. Introduction

- 1.1 This report provides a detailed noise assessment of the current proposal by Banks Mining to develop the Highthorn surface coal mine at a site in the vicinity of Widdrington, Northumberland.
- 1.2 Detailed information has been provided on the development, working and restoration of the site which would take place over a period of about seven years, five of which will be coal extraction. This information has been used to model and predict operational noise levels from the site at various critical phases in its life cycle. The predicted noise levels have been compared with measurements of the present ambient noise climate and with noise assessment criteria set out in *Planning Practice Guidance for Minerals – March 2014*, issued by the Department for Communities and Local Government and used as the basis for noise limits in planning conditions proposed in this planning application in line with other Banks Mining developments in Northumberland. The numerical criteria in that revision are essentially the same as given in previous technical advice, with updated advice on the application of the criteria.
- 1.3 The generation of noise by off-site road traffic has also been considered.

## Experience

- 1.4 The work has been undertaken by Roger Tompsett, BSc(Eng), MIOA, a Director of NoiseMap Ltd, who is a member of the Institute of Acoustics and has over 30 years' experience in the modelling and assessment of noise from surface mineral workings. He was project manager of a government research project on this matter in the 1980s known as "Control of Noise from Surface Mineral Workings" which was published in 1990 and is the original author of the NoiseMap Environmental Noise Mapping software.

## 2. Scheme description

- 2.1 The proposed Highthorn surface coal mine is on a coastal site currently in agricultural use, bounded to the west by the A1068 road and to the east by a minor road running along the shoreline. To the south, the boundary runs across agricultural land some distance to the north of Cresswell village. Widdrington village is around 700 m to the north-west of the site boundary, and Widdrington Station village is a similar distance to the west of the site boundary. In addition, there are some isolated residential properties around the site boundary.
- 2.2 Along the coastline, there are a number of sensitive ecological sites, including Druridge Bay Nature Reserve, Cresswell Foreshore Nature Reserve, Druridge Pools Nature Reserve and Cresswell Pond Nature Reserve.
- 2.3 The land falls from west to east, from Widdrington village on a ridge of high ground around 40 m AOD, falling to about 3 m AOD at the coastal boundary.
- 2.4 The site would be accessed directly from the A1068.
- 2.5 The surface coal mine would be worked generally from north to south, with temporary overburden mounds to the north and west of the main excavation. Baffle mounds of top-soil and sub-soil would be placed around the other parts of the site boundary to provide visual, noise and dust screening of the main workings.
- 2.6 The site would be restored by removing the overburden mounds and replacing them into the final void and finally by removing the subsoil and top soil baffle mounds to restore the soil surface of the site.
- 2.7 The work will be undertaken by diesel-powered earth-moving machines. There will be a crusher/screen in the works compound area adjacent to the A1068 road access. This area will be screened by baffle mounds.

### **Noise mitigation**

- 2.8 Noise mitigation has been a primary consideration in the design of this site, ranging from planning of site access, off-site road traffic routes, location of processing plant and the arrangements for the method of working. The workings are designed so that baffle mounds will be placed around the site boundaries in the initial stages as soils are removed. Work will then take place behind the baffle mounds to provide screening of the machinery, and as the main excavation is developed, the edges of the void will provide additional screening.
- 2.9 Broadband reversing alarms will be used to prevent the disturbance caused by the use of tonal bleeping alarms. Impulsive noise (e.g. from tipping of loads) will also be reduced as far as practicable, and will take place at locations distant from noise-sensitive receivers. These are not therefore expected to form a significant element of noise generated by the works.
- 2.10 Consideration has been given to the benefit of using additional noise abatement and attenuation measures on the large rigid body dump trucks and mass excavators, especially where these are used in exposed areas of the site such as during the construction and removal of the outer faces of overburden storage mounds.

## 3. National Planning Policy Framework

3.1 The National Planning Policy Framework states that minerals planning authorities should ensure that unavoidable noise emissions are controlled, mitigated or removed at source. It further recognises that minerals planning authorities should also establish appropriate noise limits for extraction in proximity to noise sensitive properties.

3.2 Those making development proposals should carry out a noise emissions assessment, which should identify all sources of noise and, for each source, consider the proposed operating locations, procedures, schedules and duration of work for the life of the operation. Proposals for the control or mitigation of noise emissions should consider:

- the main characteristics of the production process and its environs, including the location of noise-sensitive properties;
- proposals to minimise, mitigate or remove noise emissions at source;
- assessing the existing noise climate around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties;
- estimating the likely future noise from the development and its impact on the neighbourhood of the proposed operations;
- monitoring noise emissions to ensure compliance with appropriate environmental standards.

### Noise standards

#### Normal Operations

3.3 Under the heading 'What are the appropriate noise standards for mineral operators for normal operations?', Planning Practice Guidance [Revision Date: 06 03 2014] advises that mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background level ( $L_{A90,1h}$ ) by more than 10 dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10 dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from operations should not exceed 55dB(A)  $L_{Aeq, 1h}$  (free field).

3.4 For operations during the evening (1900-2200), the noise limits should not exceed the background level ( $L_{A90,1h}$ ) by more than 10dB(A) and should not exceed 55dB(A)  $L_{Aeq, 1h}$  (free field). For any operations during the period (2200 to 0700) [Night-time], noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event, the noise limit should not exceed 42 dB(A)  $L_{Aeq,1h}$  (free field) at a noise-sensitive property.

3.5 Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise ... may also require separate limits that are independent of background noise - e.g.  $L_{max}$  in specific octave or third-octave bands - and that should not be allowed to occur regularly at night.

3.6 The Guidance emphasises that care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed.

#### Short-term activities

3.7 Examples of short-term activities include soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance.

- 3.8 Increased temporary daytime noise limits of up to 70dB(A)  $L_{Aeq\ 1h}$  (free field) for periods of up to 8 weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.
- 3.9 Where work is likely to take longer than 8 weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A)  $L_{Aeq\ 1h}$  (free field) limit referred to above should be regarded as the normal maximum.
- 3.10 We would comment that this latest guidance has the same numerical limits as earlier guidance, whilst emphasising the need for flexibility so as not to impose unreasonable burdens on the mineral operator. The same applies at night, but with the additional consideration of reducing any adverse impacts to a minimum. The significance of adverse noise effects should also be considered.

### Approach agreed with Northumberland County Council on similar projects

- 3.11 The National guidance advises that some small variation in thresholds is justified in specific circumstances. Banks Mining has a track record of successful development and operation of surface coal mines in Northumberland. Recent planning consents for other sites in the County have recognised a more refined approach that divides work into three principal categories, each with separate noise limits as follows:
  - **Normal operations** – routine run-of-mine working;
  - **Short-term operations** – stripping and replacement of soils, soils and baffle mound construction and removal, permanent landform construction and construction and removal of the outer faces of overburden mounds and the construction of the site access road;
  - **Exceptional operations** - stripping and replacement of soils, soils and baffle mound construction and removal, permanent landform construction and construction and removal of the outer faces of overburden mounds and the construction of site access roads that result in noise levels likely to exceed the short-term noise limit, for up to 8 weeks per year.

Table 1: Noise limits agreed with Northumberland County Council on other projects

Time of day	Normal work $L_{Aeq}$ (1-h) (free field)	Short-term work $L_{Aeq}$ (1-h) (free field)	Exceptional work $L_{Aeq}$ (1-h) (free field)
Daytime (0700-1900)	$L_{A90}+10$ dB(A)	55 dB(A) $L_{Aeq}$ 1h (free field) but not less than normal limit	70 dB(A) $L_{Aeq}$ 1h (free field) for up to 8 weeks per year
Evening (1900-2200)	$L_{A90}+10$ dB(A) and not less than 42 dB(A)	No operations	No operations
Night (2200 – 0700)	42 dB(A) $L_{Aeq}$ 1h	No operations	No operations

### Ecological receptors

- 3.12 There are no regulatory standards applied to noise impacts for the protection of ecological receptors. Based on studies carried out by the University of Hull’s Institute of Estuarine and Coastal Studies, a noise level of 55 dB  $L_{Aeq}$  can be considered as a threshold at which disturbance of sensitive species of waders may occur. Passerines (perching birds) are generally thought to be less sensitive, although behavioural effects and in some species a reduction in breeding success can occur. This is probably a consequence of the masking effect of certain frequencies (e.g. from road traffic noise). The ‘A’ weighting used to adjust sound pressure levels to the frequency range of human hearing can be applied to birds, and is slightly precautionary.

## 4. Creation of Noise Model

### Modelling of Planning Phases (Scenarios)

4.1 Banks Mining engineers have provided details for the five major phases within the seven-year 'green-to-green' duration of the site, ranging from initial site preparation, through main production to final backfilling. For each stage, they have provided detailed topographical drawings of the baffle mounds, overburden mounds and excavation depths, along with detailed plant lists, haul routes, plant movement rates and speeds, and other working details.

Table 2: Phases (Scenarios) modelled

Phase	Phase Name
1	Commence coal extraction
2	Completion of Overburden Mound 1
3	Maximum Void – Overburden at its largest volume, Overburden Mounds 1 & 2 complete
4	Beginning the removal of Overburden Mound 1
5	Beginning the removal of Overburden Mound 2

4.2 This information has all been included in a detailed 3-dimensional computer noise model of the site and its surroundings, using the NoiseMap 5.1 environmental noise modelling system. NoiseMap was first developed to assist in research into noise from surface mineral workings and has been used for this purpose over the last 25 years with proven reliability. It has been constantly updated as Codes of Practice have developed.

### Calculation method

4.3 The method of calculation which has been adopted is that given at Appendix F of BS5228-1:2009 Code of Practice for noise and vibration control on construction and open sites – Noise 1: this is an Approved Code of Practice. It is implemented 'as written' in NoiseMap 5.1. Barrier attenuation was calculated using the procedure set out in 'Calculation of Road Traffic Noise', a well-validated statutory calculation method, as this is based on a frequency spectrum which is very similar to the diesel-engined plant used on this site. In tests it has been shown to provide a valid method of calculation in this situation.

4.4 The type of ground intervening between the source and receiver points also affects sound propagation. Where the ground is acoustically porous<sup>1</sup> (often misleadingly referred to as 'soft') this can result in greater attenuation than if the propagation is over impervious (hard) ground. BS5228 offers a procedure to deal with this effect and it has been applied where appropriate. In cases where there is barrier screening as well as 'soft' ground, both factors are considered but only the one that gives the greater attenuation is applied.

4.5 The atmosphere also absorbs some sound energy, but the effect is small at moderate distances and at lower frequencies, so this effect has been disregarded, giving a slightly higher predicted noise level than would be experienced in practice. Wind direction affects propagation of sound: for a given distance, noise levels are higher downwind of the source than upwind of the source. This is due to a tendency of the wind to bend sound waves back towards the ground. This effect is already included in both barrier attenuation and soft ground calculations, which were assessed in downwind conditions. This means that the predictions relate to conditions where the receiver is

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<sup>1</sup> Porous or 'soft' ground is that which can interact with sound waves. It can include grassland, ploughed land, uncompacted gravel, etc. Impervious or 'hard' ground is that which does not interact with sound waves, but only reflects them. It can include water, compacted earth, concrete etc.

downwind of the source. With other wind directions, the predicted noise levels will be higher than actually experienced. These effects combine to give a margin of safety in the calculations. In summary, the measured noise levels will tend to be lower than presented by the calculations.

### **Modelling process**

- 4.6 The model was created from digital mapping provided by Banks Mining, as far as practicable by automatic conversion from digital mapping.
- 4.7 A plant list was supplied with plant sound power levels for standard and noise-abated plant. This was imported directly into the noise model.
- 4.8 For each phase, a detailed written description was given of the process being undertaken by each item of plant. In subsequent discussion, the number of movements per hour and speed of plant was ascertained. Together, these were used to create a detailed 'activity' list for each phase, giving the plant to be used, the number of movements per hour and the speed.
- 4.9 For each phase, marked-up drawings were provided showing the various working zones, the movement of plant and the activities taking place. These were used to mark the location of haul routes and other vehicle tracks onto the three-dimensional model, so that activities could then be positioned correctly.
- 4.10 Whilst much of the activity consists of hauling soil, overburden and product over significant distances, other activity, such as excavating, loading vehicles and spreading material involves movements within a limited area. BS5228 provides a 'mobile plant on site' method which was used for such activities. A few activities, mainly associated with the process plant, are stationary, and BS5228 provides a separate method for these.

### **Category of work**

- 4.11 Minerals Planning Practice Guidance advises on noise limits, including for noisy short-term activities that cannot meet the limits set for normal operations. Examples include soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance. Increased temporary daytime noise limits of up to 70 dB(A) LAeq 1h (free field) for periods of up to 8 weeks may be appropriate in some cases. Accordingly, it is necessary to distinguish between the main work and such short-term activities.
- 4.12 This was done in NoiseMap by assigning a 'Category' to the activity, as follows:
- Category 1 – Main Work
  - Category 2 – Short-term/Exceptional Work
- 4.13 This allows the separate contribution of noise from the two categories of activity to be presented, in addition to the total noise level.

### **Model verification**

- 4.14 After the noise model was created, extensive verification was undertaken. After checking horizontal alignments by visual comparison with source maps, vertical alignment was checked by using NoiseMap's 'View-As-Colour' (Thematic viewing) function.
- 4.15 Then haul routes were thoroughly checked using the View-As-Colour function to check for any errors or inconsistencies in road gradient, traffic flow rate, traffic speed, percentage of heavy vehicles, carriageway type (one-way or two way), road surface and ground type.
- 4.16 Barriers and receiver points were checked in a likewise manner and as a final check, cross-sections of the scheme and its surroundings were generated. This allowed the consistency of height and location assumptions to be closely verified.

4.17 When verification was complete, a number of test calculations were run to check and eliminate any other input errors, including a comparison between scenarios to detect any inconsistencies.

## 5. Noise Survey Results

- 5.1 In addition to the noise model, a noise survey was conducted at the locations listed in Table 3.
- 5.2 It may be noted that the evening and night periods defined in the EU Environmental Noise Directive (END) and some more recent guidance, are slightly different from those in the Minerals Guidance. In the END, evening is from 19:00 to 23:00 and night is from 23:00 to 07:00. Thus, night is a 9-hour period in the Minerals Guidance, but an 8-hour period in the END. It is important to bear in mind the distinction, which is recognised in Table 3.
- 5.3 Measurements were repeated at Blakemoor Farm to verify the results. The differences between the two sets of results are within the expected range, and the average has been used for determining noise limits.
- 5.4 Measurements Warkworthlane Cottage were also checked by using a close-by proxy location, as it was considered that extraneous noise may have affected the original measurement. The repeat showed somewhat lower background levels especially in the daytime and evening, and these lower levels have been used to set the criteria.

**Table 3: Measured Noise Levels**

	Location	Date	LAeq,16hr	LAeq,8hr	LAeq,Day (Minerals)	LAeq, Eve (Minerals)	LAeq,Nt (Minerals)	LA90,Day (Minerals)	LA90,Eve (Minerals)	LA90,nt (Minerals)
1	Druridge Farm Cottages	8/3/14 to 21/4/14	55	48	55	49	47	41	38	36
2	Hemscott Hill Farm	21/1/15 to 24/1/15			44	39	37	39	34	33
3	Blakemoor Farm	8/7/14 to 30/9/14	44	41	45	40	41	36	34	33
3	Blakemoor Farm	21/1/15 to 22/1/15			44	44	41	39	39	36
4	The Kennels	31/10/13 to 7/2/14	51	43	51	46	43	41	40	38
5	Warkworthlane Cottage	8/2/14 to 25/2/14	55	49	56	52	49	50	46	39
5	Warkworthlane Cottage	12/11/14			48	44	42	44	41	38
6	Highthorn	30/10/13 to 6/2/14	51	44	52	47	44	45	41	36
7	Hagg Farm Cottages	30/10/13 to 6/2/14	57	50	58	54	51	48	41	34
8	Houndalee Cottages	12/11/13 to 15/2/14	62	55	63	57	55	51	44	38
9	Widdrington Village (School Row)	24/1/14 to 13/4/14	55	50	57	48	50	46	36	33
10	Stonecroft				51	47	46	39	36	32
11	High Chibburn	8/3/14 to 12/3/14	57	44	58	49	44	40	36	34
12	Chibburn Farm	12/4/14 to 6/7/14	52	46	53	49	46	44	39	32

## 6. Noise Criteria

- 6.1 Based on the noise survey results set out in Table 3 and the recommendations for noise limits agreed with NCC taking into account the advice of the Planning Practice guidance, summarised in Table 2, a set of noise criteria are proposed as shown in Table 4. All these criteria are the free-field sound level expressed in terms of the  $L_{Aeq, 1h}$  index. These have been derived as follows:
- 6.2 The first column headed Day (normal) is the criterion for normal operations in terms of the free-field sound level expressed in the  $L_{Aeq, 1h}$  index. It is derived from the measured  $L_{A90}+10$  dB(A), in accordance with advice. For Blakemoor Farm, the average of the two surveys was used.
- 6.3 The second column, headed Day (short-term), is the criterion for certain soil moving and mounding operations where lower limits are not practicable. It is 55 dB  $L_{Aeq, 1h}$  or the normal Day-time limit (whichever is the higher).
- 6.4 The third column Day (Exceptional) is the criterion for certain soil moving and mounding operations where lower limits are not practicable, for a period of not more than 8 weeks in any one year. It is 70  $L_{Aeq, 1h}$  in accordance with advice.
- 6.5 The fourth column, headed Eve, is the criterion for evening operations. It is based on the evening level of  $L_{A90}+10$  dB(A), but not less than 42 dB  $L_{Aeq, 1h}$ . At this site, the criterion exceeds 42 dB  $L_{Aeq, 1h}$  at all locations.
- 6.6 The fifth column, Night, is the recommended criterion of 42 dB  $L_{Aeq, 1h}$  for night.

**Table 4: Proposed Noise Criteria**

Receiver Num	Receiver Name	Day (normal)	Day (short-term)	Day (Exceptional)	Eve	Night
		$L_{Aeq, 1h}$	$L_{Aeq, 1h}$	$L_{Aeq, 1h}$	$L_{Aeq, 1h}$	$L_{Aeq, 1h}$
1	Druridge Farm Cottages	51	55	70	48	42
2	Hemscott Hill	49	55	70	44	42
3	Blakemoor Farm	48	55	70	47	42
4	Kennels Cottage	51	55	70	50	42
5	Warkworthlane Cottage	54	55	70	51	42
6	Highthorn	55	55	70	51	42
7	Hagg Farm Cottages	55	55	70	51	42
8	Houndalee Cottages	61	61	70	54	42
9	Widdrington Village	56	56	70	46	42
10	Stonecroft	49	55	70	46	42
11	High Chibburn	50	55	70	46	42
12	Chibburn Farm	54	55	70	49	42
13	Ellington Caravan Park (Caravans)	54	55	70	51	42
14	Ponds at Hemscott Hill	55	55	70	55	55
15	Cresswell Pond NR	55	55	70	55	55
16	Druridge Bay NR	55	55	70	55	55
17	Druridge Pools NR	55	55	70	55	55

- 6.7 For the ecological receptors, (numbers 14 to 17) a blanket limit of 55 dB  $L_{Aeq}$  has been set, as described in section 3 of this report. The day, evening and night periods are as defined in the Planning Practice Guidance.
- 6.8 The Caravan Park is also treated as a noise-sensitive receptor. As the caravan park is immediately adjacent to Warkworthlane Cottages and in agreement with the caravan park owners the same noise criteria have been applied.

## 7. Receiver results

- 7.1 The Noise Model was run for each of the five phases set out in Table 1 above. The noise predictions were made for 17 free-field receiver locations, which include all the noise measurement points and some additional noise-sensitive ecological locations in areas around and adjacent to the site. The noise prediction locations are for 1.2 m above ground level, to correspond with the noise measurement points.
- 7.2 The predictions have been presented with extra noise abatement measures fitted to larger rigid body dumptrucks and mass excavators.
- 7.3 As discussed above, certain short-term operations can provide long-term benefits to noise-sensitive receivers, but might not be practicable within the usual noise limits. Guidance permits the relaxation of noise limits for such short-term works. Accordingly, the noise predictions distinguish between Main (long-term) works and Short-term works, and these are shown in the tables of results, along with the total resulting noise level.
- 7.4 All noise predictions are made in terms of the Equivalent Continuous Sound Level ( $L_{Aeq}$ ), in each case averaged over a 1-hour period. The  $L_{Aeq}$  is the steady level which, over the 1-hour averaging period, would contain the same sound energy as the actual, varying sound level. In other words, it is a form of measurement of the average sound level. This unit was chosen in the technical guidance because it gives a reasonable indication of the response of a recipient to the actual varying noise level.
- 7.5 The results of the noise predictions are set out in Appendix A of this report.
- 7.6 The tables of results show the noise criteria and predicted noise levels for each of the modelled phases. The noise criteria have been derived as set out earlier in this report.
- 7.7 For comparison with these criteria, it has been assumed that working would continue in the same manner in each period of the day. Accordingly, the predicted noise levels are the same in each period of the day.
- 7.8 Short term work will not take place in the evening period and the site will not be worked at night although maintenance will take place. This may require the occasional movement of a vehicle within the works compound, although the maintenance will be done within a building. The only other equipment running on the site at night will be pumps, generators and other small items that will not be audible beyond the site boundary. Accordingly, night-time activity is not considered significant for noise.

## 8. Discussion of results

### **Phase 1 Commence main excavation**

- 8.1 At this phase, the main excavation commences, but some topsoil and subsoil is moved to create and extend the baffle mounds. It is therefore a mixture of long-term and short-term work. The main (long-term) work is well within the normal day-time and evening criteria at all locations. The short-term work is also within the short-term criterion during the day time, but would be slightly above the short-term criterion during the evening. Short term operations will not take place during the evening and no work will take place during night periods.

### **Phase 2 Main Working Cuts 2 & 3**

- 8.2 The main working continues southwards, as long-term work, with some soil stripping in advance of the main excavation constituting short-term work. The main (long-term) work is well within the normal day-time and evening criteria at all locations. The short-term work is also well within the short-term criterion during the day time and also within the normal evening criterion.

### **Phase 3 Main Working Cuts 7 & 8**

- 8.3 The main working continues southwards, as long-term work, with some soil stripping in advance of the main excavation constituting short-term work. The main (long-term) work is well within the normal day-time and evening criteria at all locations. The short-term work is also well within the short-term criterion during the day time and also within the normal evening criterion.

### **Phase 4 Main Working Cuts 15 & 16**

- 8.4 The main working continues southwards, as long-term work, with some soil stripping in advance of the main excavation constituting short-term work. The main (long-term) work is well within the normal day-time and evening criteria at all locations. The short-term work is also well within the short-term criterion during the day time and also within the normal evening criterion.

### **Phase 5 Backfilling Final Void from OBM2**

- 8.5 Site restoration commences with backfilling the final void. This constitutes long-term work. The main (long-term) work is well within the normal day-time and evening criteria at all locations. Removal of the outer edge of the overburden mound has been included in the assessment for main (long-term) work. Accordingly, no work has been included in the 'short-term' category in this phase.

## 9. Road Traffic Noise

- 9.1 A Transport Statement produced by Fairhurst in June 2015, Reference 100073/603, gives an assessment of road traffic flows that are anticipated as a result of the Highthorn project. The statement indicates that the project would generate in the order of 150 staff vehicle movements and 300 heavy haulage vehicle movements each working day.
- 9.2 Table 6.1 of the Transport Statement summarises the changes in 2-way traffic flows expected on the off-site haulage routes. These have been used to assess the changes in 'Basic Noise Level' using the methodology set out in Technical Memorandum 'Calculation of Road Traffic Noise' (CRTN) (Department of Transport, 1988) which is the statutory method of assessing road traffic noise in accordance with the Noise Insulation Regulations 1988 (as amended). Traffic speeds have been taken from the speed limits and road characteristics as prescribed in CRTN.
- 9.3 The 'Basic Noise Level' given by CRTN is the noise level in terms of the  $L_{A10}$  (18-hour) noise index at a reference distance of 10 m from the edge of the road in question, although changes of noise

level arising from changes in traffic flow on that road would be the same at any reasonable distance from that road. The change in noise level assessed in terms of the  $L_{Aeq}$  index would also be substantially the same.

9.4 Table 6.1 of the Transport statement gives the flows over the 12-hour day-time period that off-site haulage would take place, and these are summarised in Table 5 below. The changes averaged over the 18-hour period would be slightly less than this.

**Table 5: Road Traffic Noise**

Road link	Baseline Traffic Flow (0700 – 1900)				Baseline Noise Level	With Development Noise Level		Noise Change
	(Veh)	(Veh)	Speed	LA10 (18h)		% HGV	LA10 (18h)	
	Total	HGVs			%HGV			km/h
1. A1068 (Houndalee)	6,649	381	5.7	97.0	70.7	9.8	71.5	0.8
2. A1068 (South of Mile Road)	8,807	457	5.2	97.0	71.8	8.3	72.5	0.7
3. A1068 (north of Ellington)	9,092	179	2.0	97.0	71.3	5.1	72.1	0.7
4. A1068 (south of Ellington)	13,185	482	3.7	97.0	73.3	5.8	73.8	0.5
5. A189 (QEII Park)	11,119	409	3.7	80.0	71.0	6.2	71.6	0.6
6. A189 Single cway (north of Summerhouse Lane)	16,331	819	5.0	70.0	72.0	6.7	72.5	0.5
7. A189 Dual (north of B1334)	21,776	583	2.7	97.0	75.3	4.0	75.6	0.3
8. A189 Dual (south of B1334)	34,598	888	2.6	97.0	77.3	3.4	77.5	0.2
9. C415 (Cambois)	3,174	727	22.9	50.0	66.5	29.6*	67.7*	1.2*
10. C403 (Cambois)	1,552	761	49.0	50.0	65.9	57.3*	67.3*	1.3*
11. C125 (East of Linton jctn)	2,175	134	6.2	70.0	63.5	17.5	66.0	2.5
12. C125 (West of Linton jctn)	1,054	69	6.5	70.0	60.5	27.3	64.6	4.1

\* See text for further explanation

9.5 Table 5 of this report shows that along most of the route, the change of noise level would be less than 1 dB(A). The Department of Transport’s Design Manual for Roads and Bridges (Volume 11, Section 3, Part 7, Table 3.1) states that changes of less than 1 dB(A) are negligible both at the time they occur and in the long term. A change of between 1 and 3 dB(A) is minor at the time it occurs and negligible in the long term. A change of between 3 and 5 dB(A) is moderate at the time it occurs and minor in the long term.

9.6 Along most of the route, changes in levels of road traffic noise are below 1 dB(A), and therefore negligible.

9.7 Based on the Transport assessment, the C415 and C403 at Cambois have increases of about 1.3 dB(A). However, this does not take into account the fact that the Shotton site (which uses these same roads to access the Port of Blyth) would have finished coaling by the time that Highthorn would start. Since Highthorn would generate 300 movements per day rather than 380 movements per day for Shotton, Highthorn will not cause any increase in noise at Cambois, and indeed a slight reduction relative to existing levels is to be expected here.

9.8 The C125 East of Linton Junction will have an increase of 2.5 dB(A) and west of Linton Junction, 4.1 dB(A). This is because existing traffic flows are low on these roads. However there is little or no noise-sensitive property adjacent to these roads and these increases will not have a significant effect.

9.9 Accordingly, it is concluded that the proposal will not have any significant impact on road traffic noise.

## 10. Cumulative effects

- 10.1 A number of other developments are expected to take place in the vicinity of Highthorn.
- 10.2 **Ferneybeds surface coal mine.** This lies immediately to the south of Widdrington Station village and to the immediate west of Highthorn SCM on the opposite side of the A1068 at Lances Hill. Since Ferneybeds SCM covers a large area of around 1.5 km east to west and 1 km north to south, its activity will be at a significant distance from receptors affected by Highthorn, with the exception of The Willows and Hagg Farm Cottages. The predicted noise levels for Ferneybeds is up to 45 dB at The Willows, and Highthorn gives a similar level. This would give a cumulative level of up to 48 dB(A) if both maxima occurred at the same time (which is not likely). Since the daytime criterion for Hagg Farm Cottages is 55 dB(A) in the day and 51 dB(A) in the evening, then even if the two maxima occur at the same time, the noise level will be within the criterion. The cumulative effect of these two developments will not therefore cause an exceedance of noise criteria.
- 10.3 **Sisters Wind Farm.** This is a short distance north of Ferneybeds SCM, about 1 km west of Widdrington village and a similar distance north-west of Houndalee Cottages, a receptor considered in the Highthorn noise assessment. Wind Farms are subject to more stringent noise criteria owing to their permanent nature and the fact that noise emissions are independent of the time of day. The Sisters Wind Farm noise report assesses the Noise Immision Level (i.e. the noise received from the wind farm) to be up to about 35 dB at Houndalee Farm and up to about 37 dB at Castle Mound (Widdrington). This is about 10 dB(A) below the noise level from Highthorn SCM, which is around 46 dB(A) and 49 dB(A) respectively in Phase 1. Accordingly, there will be negligible cumulative effect on noise levels.
- 10.4 **Blue Sky Wind Farm.** This is about 1 km north-west of Widdrington Village, and about 1 km west of Chibburn Farm, a receptor considered in relation to Highthorn SCM. We do not currently have a noise report for this development, but it is reasonable to assume that noise levels would be no higher than those referenced for Sisters Wind Farm. Accordingly, we would consider that there will be negligible effect on cumulative noise levels. Moreover, given their positions relative to most of the receptors, it is clear that generally when a receptor is downwind of one source, it is upwind of another, thus reducing the accumulation of noise.
- 10.5 In summary, it can be stated that the cumulative noise impact of these developments will be small and within acceptable limits.



# 11. Conclusion

- 11.1 This report provides a detailed noise assessment of the current proposal by Banks Mining to develop the Highthorn surface coal mine in the vicinity of Widdrington, Northumberland.

## **Development proposals**

- 11.2 Detailed information has been provided on the development, working and restoration of the site which would take place over a period of seven years. Extensive noise mitigation has been built into the design of the site, ranging from planning of site access, off-site road traffic routes, location of processing plant and the arrangements for the method of working. The workings are designed so that baffle mounds will be placed around the site boundaries in the initial stages as soils are removed. Work will then take place behind the baffle mounds to provide screening of the machinery, and as the main excavation is developed, the edges of the void will provide additional screening.
- 11.3 Short term operations will not take place during the evening and no work will take place during night periods. At night, only maintenance work will take place. Pumps and similar small items of plant may need to run continuously but will not be audible outside the site boundary. The noise calculations have been presented with extra noise abatement measures fitted to larger rigid body dumptrucks and mass excavators.

## **Noise calculations**

- 11.4 This information has been used to model and predict operational noise levels from the site at various critical phases in its life cycle. The predicted noise levels have been compared with measurements of the present ambient noise climate and with noise assessment criteria set out in *Planning Practice Guidance for Minerals – March 2014*, issued by the Department for Communities and Local Government, as refined by Northumberland County Council in recent planning consents for similar developments.
- 11.5 A detailed three-dimensional computer model of the project has been created to permit the prediction of noise levels at five critical stages in the life-cycle of the project.
- 11.6 The noise study shows that the proposed development will meet the proposed noise criteria at all times.

## **Off-site road traffic**

- 11.7 The change in noise arising from off-site road traffic is shown to be below 1 dB(A) along most of the route, and therefore negligible. Highthorn is not expected to commence coaling before Shotton has finished, so there will be no cumulative impact at Cambois on the Port of Blyth access. Accordingly, it is concluded that the proposal will not have any significant impact on road traffic noise.

## **Cumulative noise impacts**

- 11.8 The site is within 1 km of one proposed wind farm and the proposed Ferneybeds SCM and within 2 km of another proposed wind farm. The cumulative noise impact of these developments has been assessed. It was found to be small and within acceptable limits.

## **Overall conclusion**

- 11.9 The noise assessment detailed here shows that the proposed development as described will meet accepted noise criteria, both for on-site work, off-site road traffic and the cumulative effect of other proposed developments in the vicinity. Any noise impact will therefore be fully within accepted limits.



# Appendix A Noise Criteria and Prediction Comparison

Table 6: Comparison of Noise Criteria and Predictions – Phase 1

Highthorn Phase 1		Noise Criteria					Predicted noise level Attenuated Plant		
		Day	Day	Day	Eve	Night	Main work L <sub>Aeq</sub>	Short- term work L <sub>Aeq</sub>	All work L <sub>Aeq</sub>
Receiver Num	Receiver Name	Normal L <sub>Aeq</sub>	(short- term) L <sub>Aeq</sub>	(Excep- tional) L <sub>Aeq</sub>	L <sub>Aeq</sub>	L <sub>Aeq</sub>			
1	Druridge Farm Cottages	51	55	70	48	42	42.8	50.2	50.9
2	Hemscott Hill	49	55	70	44	42	42.9	38.8	44.3
3	Blakemoor Farm	48	55	70	47	42	35.2	35.0	38.1
4	Kennels Cottage	51	55	70	50	42	39.5	38.2	41.9
5	Warkworthlane Cottage	54	55	70	51	42	37.9	41.0	42.7
6	Highthorn	55	55	70	51	42	41.8	47.0	48.2
7	Hagg Farm Cottages	55	55	70	51	42	37.0	45.1	45.7
8	Houndalee Cottages	61	61	70	54	42	41.2	47.3	48.2
9	Widdrington Village (School Row)	56	56	70	46	42	40.5	48.6	49.2
10	Stonecroft	49	55	70	46	42	43.8	54.4	54.8
11	High Chibburn	50	55	70	46	42	42.9	52.3	52.8
12	Chibburn Farm	54	55	70	49	42	29.9	38.9	39.4
13	Ellington Caravan Park	54	55	70	51	42	40.6	43.1	45.1
14	Ponds, Hemscott Hill	55	55	70	55	55	44.4	37.1	45.1
15	Cresswell Pond	55	55	70	55	55	42.1	40.3	44.3
16	Druridge Bay NR	55	55	70	55	55	34.0	42.2	42.8
17	Druridge Pools NR	55	55	70	55	55	40.7	46.4	47.4

Table 7: Comparison of Noise Criteria and Predictions – Phase 2

Highthorn		Noise Criteria					Predicted noise level Attenuated Plant			
		Day	Day	Day	Eve	Night	Main work	Short-term work	All work	
Phase 2	Receiver Num	Receiver Name	Normal LAeq	(short-term) LAeq	(Exceptional) LAeq	LAeq	LAeq	LAeq	LAeq	
	1	Druridge Farm Cottages	51	55	70	48	42	41.1	26.1	41.3
	2	Hemscott Hill	49	55	70	44	42	41.4	31.4	41.8
	3	Blakemoor Farm	48	55	70	47	42	38.6	23.7	38.7
	4	Kennels Cottage	51	55	70	50	42	40.1	29.4	40.4
	5	Warkworthlane Cottage	54	55	70	51	42	39.6	30.6	40.2
	6	Highthorn	55	55	70	51	42	42.9	32.6	43.3
	7	Hagg Farm Cottages	55	55	70	51	42	41.8	28.1	42.0
	8	Houndalee Cottages	61	61	70	54	42	45.7	38.2	46.4
	9	Widdrington Village (School Row)	56	56	70	46	42	32.8	23.0	33.3
	10	Stonecroft	49	55	70	46	42	35.5	25.9	35.9
	11	High Chibburn	50	55	70	46	42	36.1	25.5	36.5
	12	Chibburn Farm	54	55	70	49	42	< 20	< 20	< 20
	13	Ellington Caravan Park	54	55	70	51	42	41.1	32.5	41.7
	14	Ponds, Hemscott Hill	55	55	70	55	55	42.6	28.7	42.8
	15	Cresswell Pond	55	55	70	55	55	41.7	29.6	41.9
	16	Druridge Bay NR	55	55	70	55	55	< 20	20.2	21.0
	17	Druridge Pools NR	55	55	70	55	55	38.6	24.4	38.7

Table 8: Comparison of Noise Criteria and Predictions – Phase 3

Highthorn Phase 3		Noise Criteria					Predicted noise level Attenuated Plant		
		Day	Day	Day	Eve	Night	Main work LAeq	Short-term work LAeq	All work LAeq
Receiver Num	Receiver Name	Normal LAeq	(short-term) LAeq	(Exceptional) LAeq	LAeq	LAeq			
1	Druridge Farm Cottages	51	55	70	48	42	40.3	38.4	42.5
2	Hemscott Hill	49	55	70	44	42	43.2	41.5	45.4
3	Blakemoor Farm	48	55	70	47	42	37.9	27.8	38.3
4	Kennels Cottage	51	55	70	50	42	40.1	36.5	41.7
5	Warkworthlane Cottage	54	55	70	51	42	39.7	35.6	41.2
6	Highthorn	55	55	70	51	42	40.6	34.9	41.6
7	Hagg Farm Cottages	55	55	70	51	42	38.9	35.3	40.5
8	Houndalee Cottages	61	61	70	54	42	40.9	34.5	41.8
9	Widdrington Village (School Row)	56	56	70	46	42	33.7	28.5	34.8
10	Stonecroft	49	55	70	46	42	35.5	31.8	37.1
11	High Chibburn	50	55	70	46	42	37.2	34.4	39.0
12	Chibburn Farm	54	55	70	49	42	< 20	< 20	< 20
13	Ellington Caravan Park	54	55	70	51	42	41.9	38.5	43.5
14	Ponds, Hemscott Hill	55	55	70	55	55	42.6	39.3	44.2
15	Cresswell Pond	55	55	70	55	55	41.7	38.8	43.5
16	Druridge Bay NR	55	55	70	55	55	< 20	< 20	< 20
17	Druridge Pools NR	55	55	70	55	55	38.1	35.6	40.0

Table 9: Comparison of Noise Criteria and Predictions – Phase 4

Highthorn Phase 4		Noise Criteria					Predicted Noise Levels		
		Day	Day	Day	Eve	Night	Attenuated Plant		
		Normal	(short-term)	(Exceptional)			Main work	Short-term work	All work
Receiver Num	Receiver Name	LAeq	LAeq	LAeq	LAeq	LAeq	LAeq	LAeq	
1	Druridge Farm Cottages	51	55	70	48	42	37.3	35.8	39.6
2	Hemscott Hill	49	55	70	44	42	43.8	39.4	45.2
3	Blakemoor Farm	48	55	70	47	42	36.0	32.8	37.7
4	Kennels Cottage	51	55	70	50	42	42.0	37.5	43.3
5	Warkworthlane Cottage	54	55	70	51	42	41.4	38.8	43.3
6	Highthorn	55	55	70	51	42	44.1	38.6	45.2
7	Hagg Farm Cottages	55	55	70	51	42	40.8	37.6	42.5
8	Houndalee Cottages	61	61	70	54	42	42.8	37.8	44.0
9	Widdrington Village (School Row)	56	56	70	46	42	35.1	32.0	36.8
10	Stonecroft	49	55	70	46	42	37.3	28.8	37.9
11	High Chibburn	50	55	70	46	42	37.5	29.0	38.1
12	Chibburn Farm	54	55	70	49	42	< 20	< 20	< 20
13	Ellington Caravan Park	54	55	70	51	42	44.8	40.2	46.1
14	Ponds, Hemscott Hill	55	55	70	55	55	39.6	34.7	40.8
15	Cresswell Pond	55	55	70	55	55	42.6	37.9	43.9
16	Druridge Bay NR	55	55	70	55	55	< 20	< 20	< 20
17	Druridge Pools NR	55	55	70	55	55	35.0	33.8	37.5

Table 10: Comparison of Noise Criteria and Predictions – Phase 5

Highthorn Phase 5  Receiver Num    Receiver Name		Noise Criteria					Predicted Noise Level		
		Day	Day	Day	Eve	Night	Attenuated Plant		
		Normal	(Short-term)	(Exceptional)			Main work	Short term work	All work
		LAeq	LAeq	LAeq	LAeq	LAeq	LAeq	LAeq	LAeq
1	Druridge Farm Cottages	51	55	70	48	42	38.0	-	38.0
2	Hemscott Hill	49	55	70	44	42	43.0	-	43.0
3	Blakemoor Farm	48	55	70	47	42	40.1	-	40.1
4	Kennels Cottage	51	55	70	50	42	38.4	-	38.4
5	Warkworthlane Cottage	54	55	70	51	42	43.0	-	43.0
6	Highthorn	55	55	70	51	42	48.6	-	48.6
7	Hagg Farm Cottages	55	55	70	51	42	43.9	-	43.9
8	Houndalee Cottages	61	61	70	54	42	41.8	-	41.8
9	Widdrington Village (School Row)	56	56	70	46	42	31.3	-	31.3
10	Stonecroft	49	55	70	46	42	38.0	-	38.0
11	High Chibburn	50	55	70	46	42	37.9	-	37.9
12	Chibburn Farm	54	55	70	49	42	< 20	-	< 20
13	Ellington Caravan Park	54	55	70	51	42	44.3	-	44.3
14	Ponds, Hemscott Hill	55	55	70	55	55	35.4	-	35.4
15	Cresswell Pond	55	55	70	55	55	43.1	-	43.1
16	Druridge Bay NR	55	55	70	55	55	< 20	-	< 20
17	Druridge Pools NR	55	55	70	55	55	35.5	-	35.5