



Noise Assessment of Proposed Mineral Extraction and Processing Operations

**Land at Mill Hill and Barton
in Fabis, Nottinghamshire**

GREENFIELD ASSOCIATES

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QUALITY MANAGEMENT

Report Title: Noise Assessment of Proposed Mineral Extraction and Processing Operations - Land at Mill Hill and Barton in Fabis, Nottinghamshire

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NON-TECHNICAL SUMMARY

1. Greenfield Associates are seeking planning permission for proposed mineral extraction and processing operations at Land at Mill Hill and Barton in Fabis, Nottinghamshire. Vibrock Limited have been commissioned to conduct a noise impact assessment of the proposals.
2. Existing sound levels have been measured at locations chosen to represent noise-sensitive premises in the vicinity of the proposed extraction and processing areas.
3. Predicted noise levels from proposed operations have been calculated at nearby noise-sensitive premises. These predictions are based on information provided by the applicant which include site layout details, phasing plans, required items of plant and intended methods of working.
4. The proposals have been assessed with reference to Planning Practice Guidance (PPG) to the National Planning Policy Framework (NPPF).
5. The proposed scheme is considered able to operate in accordance with the noise standards recommended within current Planning Practice Guidance for mineral sites.

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1.0 INTRODUCTION

1.1 Overview

- 1.1.1 Greenfield Associates are putting forward a proposal for mineral extraction and processing operations on land at Mill Hill and Barton-In-Fabis, Nottinghamshire.
- 1.1.2 It is understood that this report will accompany the application for planning permission that is to be submitted to the Mineral Planning Authority. Vibrock Limited were commissioned to undertake a noise assessment of the proposals.
- 1.1.3 This study benefits from a site inspection and sound level monitoring undertaken in September and October 2015. The purpose of this survey was to identify potentially noise-sensitive premises within the vicinity of the proposed quarry site and establish the background sound levels currently experienced at these locations.
- 1.1.4 An assessment of the potential impact of the scheme at the identified noise-sensitive premises has been made by comparison of predicted noise levels with relevant guidance and criteria.
- 1.1.5 Where necessary, suitable mitigation measures are recommended to control noise emissions from the site.
- 1.1.6 Further explanation of the terminology used within this report is provided in Appendix 1.

1.2 General Environs

- 1.2.1 The proposed site is located approximately 7km south west of Nottingham and to the north east of the village of Barton-In-Fabis.
- 1.2.2 Residential areas surrounding the site include the village of Barton-In-Fabis to the south-west and Clifton to the north-east providing the largest concentration of residential dwellings.
- 1.2.3 The site inspection highlighted a total of five properties which are deemed to be at closest approach to site; namely Fabis Barn, Chestnut Lane (south west), 14 Barbury Drive (south east), 1 Todd Close (south-east), Burrows Farm (east) and Midwicket Cottage, The Strand (north).
- 1.2.4 The main source of existing noise affecting the environs to the south of the site is road traffic activity along the nearby A453, Barton Road and Nottingham Road. The acoustic environment north of the site is influenced by consistent vehicle movements along the A6005, the local road and a nearby concrete batching plant.

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2.0 NOISE POLICY AND GUIDANCE

2.1 Noise Policy Statement for England (NPSE, 2010)

2.1.1 The NPSE sets out the Government's policy on noise and includes the long term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

2.1.2 This long term vision is supported by the following aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

2.1.3 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- NOEL (No Observed Effect Level) – this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
- LOAEL (Lowest Observed Adverse Effect Level) – this is the level above which adverse effects on health and quality of life can be detected.

2.1.4 Extending these concepts further, NPSE leads to the concept of a significant observed adverse effect level:

- SOAEL (Significant Observed Adverse Effect Level) – this is the level above which significant adverse effects on health and quality of life occur.

2.1.5 NPSE acknowledges that it is not possible to have a single objective noise-based measure that defines NOEL, LOAEL and SOAEL that is applicable to all sources of noise in all situations. It is therefore suggested that more specific advice from other applicable noise standards and guidance could be employed to determine suitable noise level criteria within the overall principles of the NPSE.

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2.2 National Planning Policy Framework (NPPF, 2012)

2.2.1 The NPPF sets out the Government's planning policies for England and how these are expected to be applied.

2.2.2 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 123 where it states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
 - Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
 - Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;
- and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.2.3 Specifically in relation to mineral sites, the NPPF provides guidance in paragraph 143 and 144 as follows:

In preparing Local Plans, local authorities should:

- set out environmental criteria, in line with the policies in this Framework, against which planning applications will be assessed so as to ensure that permitted operations do not have unacceptable adverse impacts on the natural and historic environment or human health, including from noise;
- when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction;

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In determining planning applications, local planning authorities should:

- give great weight to the benefits of the mineral extraction, including to the economy;
- ensure, in granting planning permission for mineral development, that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality;
- ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties.

2.3 Planning Practice Guidance (PPG, 2014)

- 2.3.1 PPG is written in support of the NPPF and provides an increased level of specific planning guidance.
- 2.3.2 PPG states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It is also suggested that noise should not be considered in isolation and separately from issues such as the economic, social and other environmental dimensions of proposed development.
- 2.3.3 Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:
- whether or not a significant adverse effect is occurring or likely to occur;
 - whether or not an adverse effect is occurring or likely to occur;
- and
- whether or not a good standard of amenity can be achieved.

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- 2.3.4 The supporting 'Minerals' PPG is the current Government advice applicable to the control of noise from surface mineral workings in England and includes the following appropriate noise standards for 'normal operations';

"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 noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(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 the operations should not exceed 55dB(A) $L_{Aeq,1h}$ (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise 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 – 0700 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 42dB(A) $L_{Aeq,1h}$ (free field) at a noise sensitive property.

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, which may include some reversing beepers, may also require separate limits that are independent of background noise (e.g. L_{max} in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

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."

- 2.3.5 The same document includes instances where particularly noisy short-term activities may occur and the appropriate criteria for such circumstances;

"Activities such as 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 70dB(A) $L_{Aeq,1h}$ (free field) for periods of up to eight 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.

Where work is likely to take longer than eight 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".

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2.4 Public Open Spaces used for Relaxation and Public Rights Of Way

- 2.4.1 Attenborough Nature Reserve Footpath runs adjacent to the River Trent, which borders the proposed mineral extraction site.
- 2.4.2 Current guidance within PPG omits any reference to footpaths and bridleways with regards to noise. Previous Minerals Planning Guidance (MPG) 11, which has since been superseded, recommends that footpaths and bridleways should not normally be regarded as noise-sensitive.
- 2.4.3 However, MPG 11 goes on to suggest that open spaces which the public uses for relaxation (during likely periods of site operation) may be considered to be noise-sensitive in some circumstances.
- 2.4.4 MPG 11 stated that any noise limits would not be expected to be as low as at dwellings, and suggested that 65 dB $L_{Aeq,1h}$ during the normal working day was reasonable.
- 2.4.5 This guidance went on to conclude that MPAs should consider carefully the restrictions, which by treating open spaces as noise-sensitive, would have on the feasibility of the planned operation and should exercise flexibility.

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3.0 BASELINE CONDITIONS

3.1 Survey Methodology

- 3.1.1 Sound levels were measured over a duration of 4 hours between the hours of 10:00 – 14:00 on Wednesday 23 September and Thursday 15 October 2015.
- 3.1.2 These monitoring periods were chosen to measure typical background sound levels during the quieter parts of the day avoiding rush-hour periods when sound levels can become temporarily elevated.

3.2 Instrumentation

- 3.2.1 The following instrumentation was used during the survey:

Manufacturer	Type	Serial No.
Cirrus	Class 1 Integrating Sound Level Meter CR 811C	D21902FE
Cirrus	Class 1 Integrating Sound Level Meter CR 831B	C17699FF
Cirrus	Class 1 Integrating Sound Level Meter CR 831B	C18435FF
Cirrus	Class 1 Integrating Sound Level Meter CR 821C	D20171FE
Cirrus	Class 1 Integrating Sound Level Meter CR 831B	C18244FF
Cirrus	Class 1 Integrating Sound Level Meter: Optimus	G07137Z
Cirrus	Electronic Calibrator CR 511E	38520

- 3.2.2 Measurements at all monitoring locations were 'free field' (no vertical reflective surfaces within 3.5 metres of the microphone) and at a height of between 1.2 – 1.5 metres above ground level. During all measurements the microphones were protected with outdoor windshields.
- 3.2.3 The following set-up parameters were used on the sound level meters during all measurements:

- Main Descriptors: Broadband L_{Aeq} and L_{A90}
- Time Weighting: Fast
- Frequency Weighting: A
- Averaging-Integrating Period: 15 minutes
- Data Logging: Repeat (Contiguous)

- 3.2.4 With the equipment set up in the configuration used during measurement, field calibration checks were performed on site immediately before and after the survey period using a sound calibrator. No significant drift (i.e. no greater than ± 0.5 dB) in the calibration value was observed between the initial and final checks.

3.3 Observations

- 3.3.1 Weather conditions during the survey periods were dry and generally settled with average wind speeds of approximately $1 - 3 \text{ ms}^{-1}$ from a northerly direction. Temperatures ranged from $8 - 12^{\circ}\text{C}$.

3.4 Results

- 3.4.1 A description of the local daytime acoustic environment at each measurement location is provided in Tables 1a – 1e along with the measurement data collected during the survey.
- 3.4.2 The table below summarises the results of the baseline survey.

Location	Monitoring Period	Average $L_{Aeq,1h}$ dB(A)	Average $L_{A90,1h}$ dB(A)
1 Todd Close	10:00 – 14:00	57	50
14 Barbury Drive	10:00 – 14:00	51	45
Burrows Farm	10:00 – 14:00	51	41
Fabis Barn, Chestnut Lane	10:00 – 14:00	47	40
Middlewicket Cottage, The Strand	10:00 – 14:00	56	36

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4.0 SOUND LEVEL PREDICTIONS

4.1 Introduction

4.1.1 The level of sound in the local environs that arises from a site will depend on a number of factors. The more significant of which are:

- (a) The sound power levels (L_{WA}) of the plant or equipment used on site.
- (b) The periods of operation of the plant on site.
- (c) The distance between the sound source and the receiving position.
- (d) The presence or absence of screening effects due to barriers, or ground absorption.
- (e) Any reflection effects due to the façades of buildings, etc.

4.1.2 The parameter that is in general use and is recommended internationally for the description of environmental noise at a receptor position is the equivalent continuous sound pressure level, L_{eq} (expressed in dB).

4.1.3 The L_{eq} describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others. Instead an A-weighting is applied to form the L_{Aeq} (expressed in dB(A)) as this is found to relate better to the loudness of the sound heard.

4.2 Noise-Sensitive Premises

4.2.1 This assessment report considers the potential noise impact of the proposals at the following receptor locations which are considered to be situated in closest proximity to the proposed site.

Assessment Location	Co-ordinates		Receiver Height (metres)
	X (Eastings)	Y (Northings)	
1 Todd Close	454146	333929	1.5
14 Barbury Drive	454479	333382	1.5
Burrows Farm	453605	333985	1.5
Fabis Barn, Chestnut Lane	452386	333000	1.5
Middlewicket Cottage, The Strand	452086	334468	1.5
Attenborough Nature Reserve Footpath	452487	333504	1.5

4.2.2 A plan showing the location of the above assessment locations is presented in Figure 1.

4.3 Prediction Methodology

- 4.3.1 The prediction method used in this study is based upon that outlined within British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Part 1: Noise*.
- 4.3.2 The most important elements of this standard used in this assessment are distance attenuation, site activity on-time, screening, ground absorption and angle of view corrections.
- 4.3.3 BS 5228 indicates that a barrier attenuation of 10 dB(A) can be used when the noise screen completely hides the source from the receiver and an attenuation of 5 dB(A) when the screen partially hides the source from the receiver.
- 4.3.4 For all noise prediction calculations, the ground absorption coefficient has been set to '1.0' representing soft ground. 'Soft' ground is taken to refer to surfaces which are absorbent to sound, e.g. grassland, cultivated land or plantations as opposed to 'hard' ground surfaces which reflect sound such as paved areas and rolled asphalt.
- 4.3.5 In accordance with BS 5228 methodology, the attenuation from screening and soft ground attenuation have not been combined (where applicable). Instead, either the attenuation from screening and hard ground propagation, or the attenuation provided by soft ground alone has been included in the calculation, whichever is the greater of the two.
- 4.3.6 The calculation methodology assumes ideal conditions for sound propagation. It should be noted that in practice measured levels are invariably lower than predicted levels due to the effects of interactions between such things as meteorological conditions and air absorption.

4.4 Plant Complement

- 4.4.1 Information regarding the proposed working of the site has been obtained including phasing and restoration plans. A list of proposed noise-generating plant, from which the noise predictions have been made, are presented in Table 2.
- 4.4.2 The sound power levels used are either from manufacturer data, Vibrock's sound level measurement database or information contained within Annex C of BS 5228 which presents current sound level data on specific items of site equipment and site activities.

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4.5 Noise Prediction Assumptions

4.5.1 The predictions are based on a number of assumptions as follows:

- Proposed contour data, phasing and restoration plans provided by Greenfield Associates.
 - Draft Plant Layout – Project No: LRS/BTN/103 dated 04/08/2015
 - Extraction Design Phases – Project No: LRS/BTN/101 dated 04/08/2015
 - Proposed Site Plan – Project No: LRS/BTN/103 dated 04/08/2015
- For the purposes of this prediction exercise, a number of on-time assumptions and plant movements have been made. These are detailed in Table 2.
- It has been assumed that the full plant complement will be deployed during both preparation/restoration operations and extraction/stockpiling operations. In order to further ensure that the predictions are worst-case, these operational scenarios also include the simultaneous haulage of material off-site.
- It is understood that up to 6 HGV's per hour may be required to transport material from the site. Hence, 12 movements per hour (6 in and 6 out) have been assumed along the quarry operator owned section of the site access road which runs from the proposed stockpiling areas to the site access point adjacent to the A453 off Green Street.
- All noise level predictions have been calculated with the combinations of plant working at the closest point to the receptor location. The predictions are therefore worst case scenarios which may be of relatively short duration. However, they indicate the potential highest L_{Aeq} noise level to which a particular property or group of properties may be exposed during the working of the site. By definition, the worst-case situation may occur intermittently over the lifetime of the site, but longer term noise levels perceived outside of the site boundary would normally be significantly less.

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5.0 NOISE ASSESSMENT

5.1 Introduction

- 5.1.1 Summaries of the worst-case noise level predictions from the proposed scheme during temporary operations and normal operations are given in section 5.2 and 5.3 below, together with an indication as to the difference between the predicted levels and the criteria recommended in PPG.

5.2 Short-Term Operations

- 5.2.1 PPG permits temporary noise limit of 70 dB(A) $L_{Aeq,1h}$ (free field) for periods of up to 8 weeks in a year to facilitate essential site preparation and restoration work. Temporary operations could also 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.

- 5.2.2 The table below presents an assessment of potential noise from temporary operations associated with the proposed scheme.

No.	Location	Predicted Worst-Case Site Noise Level (dB $L_{Aeq,1h}$)	Difference (dB(A))
			PPG Limit 70 $L_{Aeq,1h}$
1	1 Todd Close	41	-29
2	14 Barbury Drive	35	-35
3	Burrows Farm	52	-18
4	Fabis Barn, Chestnut Lane	54	-16
5	Middlewicket Cottage, The Strand	43	-27

- 5.2.3 In summary, the predicted noise levels indicate that, without exception, all short-term operations associated with the proposed scheme produce worst-case noise levels that are below the recommended temporary limit outlined in PPG.

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5.3 Mineral Extraction, Processing and Restoration Operations

Residential Receptors

- 5.3.1 Subject to a maximum daytime limit of 55 dB $L_{Aeq,1h}$ (free field) for normal operations, PPG permits a noise limit at noise sensitive property that does not exceed the background level by more than 10 dB(A). Where this poses an unreasonable burden on the operator the limit should be as near the $L_{A90} + 10$ dB(A) criteria as practicable during normal working hours (07:00 – 19:00) and should not exceed 55 dB(A) $L_{Aeq,1h}$ (free field).
- 5.3.2 The table below presents an assessment of potential noise from normal operations associated with the proposed scheme.

No.	Location	Background Noise Level $L_{A90, T}$ dB	Predicted Worst-Case Site Noise Level (dB $L_{Aeq,1h}$)	Difference dB(A)	
				L_{A90}	PPG Limit 55 $L_{Aeq,1h}$
1	1 Todd Close	50	41	-9	-14
2	14 Barbury Drive	45	39	-6	-16
3	Burrows Farm	41	49	+8	-6
4	Fabis Barn, Chestnut Lane	40	50	+10	-5
5	Middlewicket Cottage, The Strand	36	41	+5	-14

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- 5.3.3 The assessment presented in the table above indicates that worst-case noise levels associated with proposed extraction and processing operations do not exceed the background by more than 10 dB(A) and are also within the maximum 55 dB limit outlined in PPG.
- 5.3.4 In addition to the above, noise level predictions have also been made to the boat houses / lodges to the north of the application site, the nearest of which is 350 metres north of Phase 5. Utilising the existing noise level data obtained at Middlewicket Cottage, The Strand, the nearest baseline survey location, an assessment against PPG criteria has been made as shown overleaf.

Location	Background Noise Level $L_{A90, T}$ dB	Predicted Worst-Case Site Noise Level (dB $L_{Aeq,1h}$)	Difference dB(A)	
			L_{A90}	PPG Limit 55 $L_{Aeq,1h}$
Clifton Lodges	36	46	+10	-9

- 5.3.5 The assessment presented in the table above indicates that worst-case noise levels associated with the extraction and processing operations are also not expected to exceed the background by more than 10 dB(A).

Public Open Spaces

- 5.3.6 As outlined in Section 2.4 of this report, previous Minerals Planning Guidance (MPG 11) suggested that whilst footpaths and bridleways should not normally be regarded as noise-sensitive, open spaces which the public uses for relaxation may be considered to be noise-sensitive in some circumstances.
- 5.3.7 The table below presents an assessment of potential noise from normal operations associated with the proposed scheme at the nearby Attenborough Nature Reserve.

Location	Predicted Worst-Case Site Noise Level (dB $L_{Aeq,1h}$)	MPG 11 Criterion	Difference dB(A)
Attenborough Nature Reserve Footpath – Closest Approach	55	65	-10

- 5.3.8 The assessment presented in the table above indicates that worst-case noise levels associated with the proposed scheme are expected to remain within the adopted MPG 11 criterion of 65 dB.

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6.0 CUMULATIVE IMPACT

6.1.1 Cumulative effects are defined as those that result from additive impacts caused by other past, present or reasonably foreseeable actions together with the proposed scheme itself.

6.1.2 The cumulative impact of mineral development can be a material consideration when determining individual planning applications, particularly when parts of a mineral planning authority area may have been subjected to successive mineral development over a number of years.

Mineral Development

6.1.3 The closest currently operational quarry to the proposed development site lies in excess of 5km away. It is understood that there are also no consented development proposals for other mineral schemes within the immediate vicinity of the proposed quarry site. The cumulative impact of mineral development is therefore not considered to be significant.

Other Development

6.1.4 Although not mineral development, it is understood that there is a current outline proposal for a large mixed-use development known as Fairham Pastures, to the south-east of the proposed quarry site.

6.1.5 It is understood that the proposed Fairham Pastures site, would comprise up to 3000 dwellings and approximately 20 hectares of employment development. In addition it is proposed that the development will also include a local centre, primary schools, sports facilities, and strategic green infrastructure.

6.1.6 As the scheme is residential led, any potential noise impacts associated with the proposed employment use are likely to be controlled within the confines of the mixed-use development boundary. It is therefore envisaged that the key 'off-site' noise emissions associated with the mixed-use scheme are likely to materialise during the required construction phase.

6.1.7 The noise assessment submitted in support of the outline application at Fairham Pastures indicates that construction noise impacts are likely to be localised and generally controlled in accordance with the guidance presented within BS 5228. A range of measures can be adopted as part of an environmental management plan to ensure that the construction of the proposed mixed-use scheme is appropriately controlled ensuring minimal noise impact to established residential dwellings.

6.1.8 The compliance with applicable technical guidance during both the construction of the Fairham Pastures development and the operation of the proposed quarry site indicates that potential cumulative impacts are not likely to be significant.

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7.0 ECOLOGICAL CONSIDERATIONS

7.1 Introduction

- 7.1.1 Whilst the impact of noise on humans is widely researched and well-established, in relative terms, the impact of noise of wildlife is understood to a far lesser degree and a strong evidence base does not exist regarding the potential impact of anthropogenic noise on non-marine species.
- 7.1.2 The impact of noise on ecological receptors is complex and to date there exists no specific guidance relating to acceptable levels of noise at such sites thus making the assessment and identification of potential adverse effects extremely difficult.
- 7.1.3 It should also be noted that, although noise assessment protocols which identify noise levels and limits are crucial in the enforcement of human protection, their applicability to the evaluation of impacts on wildlife is limited. Given the distinct behavioural and physiological differences that exist between humans and wildlife (and between animal species themselves) it is also not possible to infer the impacts of noise on wildlife from the human literature.
- 7.1.4 In addition to the restricted hours of operation and the progressive phased working of the site, it is proposed that the site operator adopt a best practicable means approach by implementing the measures outlined in Section 8.2 to minimise the potential noise impact at nearby areas of ecological interest.

7.2 Areas of Ecological Interest

- 7.2.1 The Mill Hill and Barton In Fabis application site has various Local Wildlife Sites and Sites of Special Scientific Interest within its vicinity, namely; Brandshill Wood (LWS), Clifton Wood (LWS), Mill Hill Spinney (LWS), Attenborough Gravel Pits (SSSI) and Holme Pit (SSSI). In order to give consideration to the potential noise impact of the proposed working of the application site on these areas and the wildlife within them, noise level predictions have been made and are shown below.
- 7.2.2 As the quarry progresses through the various phases of mineral extraction, noise emitting plant will be situated in ever changing areas of the quarry, this means that giving a single figure value for the received noise level within the woodlands surrounding the application site is not possible. As the woodlands span vast areas, it is also recognised that the received noise levels within them will differ, due to varying distance to the application site.

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- 7.2.3 In order to give a representation of 'worst case' noise levels, calculations have been made with noise emitting plant working at the closest possible point of the application site to the closest point of each area of ecological interest. This predicted 'worst case' level is only likely to occur for a short duration in relation to the working lifetime of the application site. As noise emitting plant moves further from the areas of ecological interest, noise levels will decrease as the separation distance becomes greater.

7.3 Brandshill Wood

- 7.3.1 At the closest point of Brandshill Wood to the application site, noise levels are predicted to reach a maximum level of 68 dB(A), during the closest of excavation operations in Phase 1.

7.4 Mill Hill Spinney

- 7.4.1 At the closest point of Mill Hill Spinney to the application site, noise levels are predicted to reach a maximum level of 53 dB(A), during the closest of operations in Phase 1.

7.5 Clifton Wood

- 7.5.1 At the closest point of Clifton Wood to the application site, noise levels are predicted to reach a maximum level of 53 dB(A), during the closest of excavation operations in Phase 1.

7.6 Attenborough Pits

- 7.6.1 At the closest point of Attenborough Pits to the application site, noise levels are predicted to reach a maximum level of 56 dB(A), during the closest of excavation operations in Phase 4.

7.7 Holme Pit

- 7.7.1 At the closest point of Holme Pit to the application site, noise levels are predicted to reach a maximum level of 45 dB(A), during the closest of excavation operations in Phase 2.

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8.0 RECOMMENDATIONS

8.1 Noise Limits

- 8.1.1 PPG recommends 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 noise level ($L_{A90,1h}$) by more than 10 dB(A) during normal daytime working hours (0700 - 1900).
- 8.1.2 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 the operations should not exceed 55 dB(A) $L_{Aeq,1h}$ (free field).
- 8.1.3 Based on the results of the baseline survey and subsequent assessment the following noise limits are recommended.

No.	Location	Site Noise Limit dB $L_{Aeq,1h}$ (free-field)
1	1 Todd Close	55
2	14 Barbury Drive	55
3	Burrows Farm	51
4	Fabis Barn, Chestnut Lane	50
5	Middlewicket Cottage, The Strand	46

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- 8.1.4 In addition to the above, it is also recommended that potentially noisy short-term operations such as topsoil and subsoil stripping and other works in connection with landscaping, shall not exceed 70 dB $L_{Aeq,1h}$ free field at any inhabited property and be limited to a period not exceeding 8 weeks in a year at any one property.

8.2 General Mitigation and Control Measures

8.2.1 With regards to general site activities, the following noise control measures should be considered to demonstrate that best practicable means are being implemented and to minimise the potential off-site noise impact:

- (a) All construction plant and equipment should comply with EU noise emission limits;
- (b) Ensure machinery is regularly well maintained and where appropriate fitted with exhaust silencers;
- (c) Avoid unnecessary revving of engines and switch off equipment when not required;
- (d) Adhere strictly to the stated operating hours of the site.
- (e) Operatives should be trained to employ appropriate techniques to keep site noise to a minimum, and should be effectively supervised to ensure that best working practice in respect of noise reduction is followed.
- (f) Good relations with people living and working in the vicinity of site operations should be established and maintained throughout the duration of site operations. Good relations can be developed by keeping people informed of progress and by treating any complaints fairly and expeditiously.
- (g) Select plant and equipment which is inherently quiet where appropriate. For example, compressors should be sound reduced models with sealed acoustic lining, pneumatic tools should be fitted with manufacturer specified silencers or mufflers;
- (h) Keep internal haul routes well maintained;
- (i) Minimise drop heights of materials, line the inside of chutes and hoppers with attenuating materials to reduce impact noise;

8.2.2 Audible reversing warning systems on mobile plant and vehicles should be of a type which, whilst ensuring that they give proper warning, have a minimum noise impact on persons outside the site.

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9.0 SUMMARY

- 9.1 Vibrock Limited were commissioned to undertake a noise assessment to accompany a planning application for proposed mineral extraction and processing operations on land at Mill Hill and Barton in Fabis, Nottinghamshire.
- 9.2 Noise levels have been measured at five noise-sensitive locations around the proposed quarry site in order to characterise the existing acoustic environment.
- 9.3 A series of noise predictions, based upon the methodologies outlined in BS 5228 and including the assumptions embodied in Section 4 of this report, have been made to the identified noise-sensitive locations and these have been assessed against the noise standards outlined within current planning practice guidance.
- 9.4 It should be noted that all the predicted noise levels in this report refer to worst-case scenarios, when operations are undertaken at their closest distances to sensitive properties and therefore have the greatest influence on the noise levels at these locations. These worst case noise scenarios may only last for a few weeks or even days throughout the envisaged working life of the site.
- 9.5 From the results discussed in earlier sections it is apparent that calculated worst-case noise levels from the proposed scheme:
- (a) Without exception do not exceed the 55 dB $L_{Aeq,1h}$ criterion, considered, when necessary, as an upper limit in PPG;
 - (b) Do not exceed the existing background noise level by more than 10 dB(A) at all locations;
 - (c) Without exception do not exceed the 70 dB $L_{Aeq,1h}$ criterion considered a justifiable temporary limit for short-term operations in PPG;
 - (d) Do not exceed the 65 dB $L_{Aeq,1h}$ criterion of MPG11 for spaces which the public uses for relaxation.
- 9.6 With the noise control recommendations implemented and the exercise of reasonable engineering control over general site operations, it is considered that the proposed scheme could be worked by the operator in line with Planning Practice Guidance for mineral sites.

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10.0 REFERENCES

1. Noise Policy Statement for England. Government Department for Environment, Food and Rural Affairs. March 2010.
2. National Planning Policy Framework – Department for Communities and Local Government. March 2012.
3. Planning Practice Guidance: Noise – Department for Communities and Local Government. December 2014.
4. Planning Practice Guidance: Minerals – Department for Communities and Local Government. October 2014.
5. British Standard 7445-1:2003 *Description and measurement of environmental noise – Part 1 Guide to quantities and procedures*. British Standards Institution 2003.
6. British Standard 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Part 1: Noise*. British Standards Institution 2014
7. MPG 11 Minerals Planning Guidance: *The control of noise at surface mineral workings*, April 1993.

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FIGURE 1

Assessment Locations

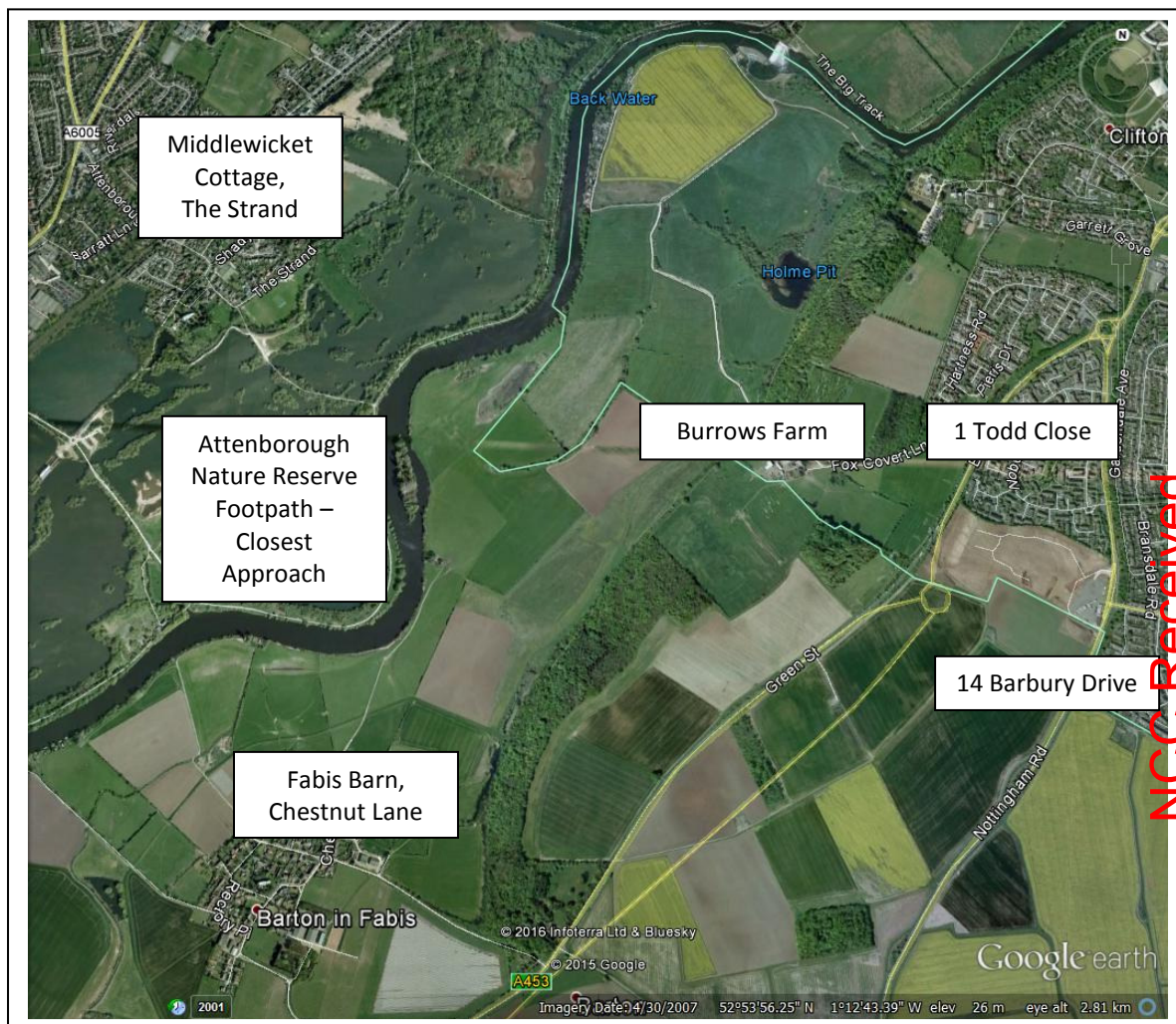


TABLE 1a

Survey Data – Location 1 (1 Todd Close)

Date and Start Time	Duration (T)	L _{Aeq, T} dB(A)	L _{A90, T} dB(A)
15/10/2015 10:00	15 min	57.5	50.5
15/10/2015 10:15	15 min	56.1	48.5
15/10/2015 10:30	15 min	57.6	51.0
15/10/2015 10:45	15 min	58.1	51.0
15/10/2015 11:00	15 min	59.3	47.0
15/10/2015 11:15	15 min	56.4	47.5
15/10/2015 11:30	15 min	57.4	50.5
15/10/2015 11:45	15 min	57.1	50.5
15/10/2015 12:00	15 min	57.3	50.5
15/10/2015 12:15	15 min	59.0	52.5
15/10/2015 12:30	15 min	58.5	51.0
15/10/2015 12:45	15 min	57.3	51.5
15/10/2015 13:00	15 min	57.3	50.5
15/10/2015 13:15	15 min	57.2	49.5
15/10/2015 13:30	15 min	56.4	48.5
15/10/2015 13:45	15 min	55.6	48.5
Average Hourly Level			
		57	50
<p><i>Note: The acoustic environment at this location is dominated by sound from continuous road traffic using the A453 along with road traffic movements on the local road network. Other notable sound sources included frequent birdsong and intermittent residential activity.</i></p>			

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TABLE 1b

Survey Data – Location 2 (14 Barbury Drive)

Date and Start Time	Duration (T)	L _{Aeq, T} dB(A)	L _{A90, T} dB(A)
15/10/2015 10:00	15 min	51.8	46.0
15/10/2015 10:15	15 min	52.4	47.5
15/10/2015 10:30	15 min	50.7	46.0
15/10/2015 10:45	15 min	52.3	46.5
15/10/2015 11:00	15 min	50.8	46.0
15/10/2015 11:15	15 min	50.4	46.0
15/10/2015 11:30	15 min	51.0	44.5
15/10/2015 11:45	15 min	50.0	45.5
15/10/2015 12:00	15 min	53.7	46.0
15/10/2015 12:15	15 min	49.4	43.5
15/10/2015 12:30	15 min	49.6	44.5
15/10/2015 12:45	15 min	51.3	45.0
15/10/2015 13:00	15 min	51.3	46.5
15/10/2015 13:15	15 min	50.1	45.0
15/10/2015 13:30	15 min	52.8	44.5
15/10/2015 13:45	15 min	49.5	44.0
Average Hourly Level		51	45
<p><i>Note: The acoustic environment at this location is dominated by sound from continuous road traffic using the A453 along with road traffic movements on the local road network. Other notable sound sources included frequent birdsong and intermittent residential activity.</i></p>			

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TABLE 1c

Survey Data – Location 3 (Burrows Farm)

Date and Start Time	Duration (T)	L _{Aeq, T} dB(A)	L _{A90, T} dB(A)
23/09/2015 10:00	15 min	50.6	40.7
23/09/2015 10:15	15 min	51.9	41.5
23/09/2015 10:30	15 min	50.6	41.0
23/09/2015 10:45	15 min	49.7	41.3
23/09/2015 11:00	15 min	47.3	40.5
23/09/2015 11:15	15 min	54.8	39.5
23/09/2015 11:30	15 min	47.8	42.5
23/09/2015 11:45	15 min	48.6	40.5
23/09/2015 12:00	15 min	45.4	39.5
23/09/2015 12:15	15 min	57.9	40.5
23/09/2015 12:30	15 min	43.6	38.5
23/09/2015 12:45	15 min	48.9	41.5
23/09/2015 13:00	15 min	51.1	39.5
23/09/2015 13:15	15 min	45.6	39.5
23/09/2015 13:30	15 min	49.4	41.5
23/09/2015 13:45	15 min	52.4	40.5
Average Hourly Level			
		51	41
<i>Note: The acoustic environment at this location is dominated by sound from distant road traffic using the A453. Other notable sound sources included farming activity and frequent birdsong.</i>			

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TABLE 1d

Survey Data – Location 4 (Fabis Barn, Chestnut Lane)

Date and Start Time	Duration (T)	$L_{Aeq, T}$ dB(A)	$L_{A90, T}$ dB(A)
15/10/2015 10:00	15 min	49.6	41.0
15/10/2015 10:15	15 min	46.6	42.5
15/10/2015 10:30	15 min	44.0	41.5
15/10/2015 10:45	15 min	50.4	41.5
15/10/2015 11:00	15 min	42.4	40.0
15/10/2015 11:15	15 min	45.9	41.0
15/10/2015 11:30	15 min	44.1	39.5
15/10/2015 11:45	15 min	51.4	39.5
15/10/2015 12:00	15 min	47.9	40.0
15/10/2015 12:15	15 min	46.9	40.5
15/10/2015 12:30	15 min	44.5	38.0
15/10/2015 12:45	15 min	47.4	38.0
15/10/2015 13:00	15 min	46.3	40.0
15/10/2015 13:15	15 min	45.7	41.0
15/10/2015 13:30	15 min	46.9	41.0
15/10/2015 13:45	15 min	46.9	40.5
Average Hourly Level		47	40
<p><i>Note: The acoustic environment at this location is dominated by sound from road traffic on the local road network. Other notable sound sources included dog barking, aircraft movements, residential activity, leaf rustle and birdsong.</i></p>			

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TABLE 1e

Survey Data – Location 5 (Middlewicket Cottage, The Strand)

Date and Start Time	Duration (T)	$L_{Aeq, T}$ dB(A)	$L_{A90, T}$ dB(A)
15/10/2015 10:00	15 min	55.7	34.5
15/10/2015 10:15	15 min	41.7	34.5
15/10/2015 10:30	15 min	53.0	37.0
15/10/2015 10:45	15 min	48.9	36.5
15/10/2015 11:00	15 min	59.1	37.0
15/10/2015 11:15	15 min	42.1	35.0
15/10/2015 11:30	15 min	42.2	37.0
15/10/2015 11:45	15 min	46.4	35.5
15/10/2015 12:00	15 min	49.2	33.5
15/10/2015 12:15	15 min	44.8	35.0
15/10/2015 12:30	15 min	47.9	36.5
15/10/2015 12:45	15 min	50.8	33.0
15/10/2015 13:00	15 min	66.2	34.5
15/10/2015 13:15	15 min	53.8	37.0
15/10/2015 13:30	15 min	55.6	37.0
15/10/2015 13:45	15 min	54.5	37.5
Average Hourly Level		56	36
<i>Note: The acoustic environment at this location is dominated by sound from road traffic on the A6005 and local road network. Other notable sound sources included dog barking, aircraft movements, residential activity, leaf rustle and birdsong.</i>			

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TABLE 2

List of Proposed Plant and Assumptions

Plant Description	Quantity	Sound Power Level (dB(A))	Activity On-time (%)	Source
Short-term Operations				
Komatsu PC290 Excavator	1	104	75	Manufacturers Data
Bulldozer	1	107	75	BS 5228 (Table C2, Ref' 11)
Bell 25D Dump Truck	2	107	75	Manufacturers Data
Normal Mineral Extraction, Processing and Restoration Operations				
Komatsu PC290 Excavator	2	104	75	Manufacturers Data
Bell L2106E Shovel	1	106	75	Manufacturers Data
Terex Primary Screen	1	97	100	Measurement Database
Terex Sand Screen	1	91	100	Measurement Database
Lignite Sand Pump	1	94	100	Measurement Database
Feed Hoper Conveyor Drive Unit	1	97	75	BS 5228 (Table C10, Ref' 22)
Field Conveyor Rollers	1	81	75	BS 5228 (Table C10, Ref' 23)
Feed Hopper	1	96	75	Measurement Database
Bell 25D Dump Truck	3	107	75	Manufacturers Data
Bulldozer	1	107	75	BS 5228 (Table C2, Ref 11)
HGV	12 per hour	106	-	BS 5228 (Table C11, Ref' 17)

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APPENDIX 1

Terminology and Definitions

Acoustic Environment

Sound from all sound sources as modified by the environment.

Sound Power Level, L_{WA}

Ten times the logarithm to the base 10 of the ratio of the sound power radiated by a sound source to the reference sound power, determined by use of frequency-weighting network “A” (see BS EN 61672-1), expressed in decibels.

Equivalent Continuous A-weighted Sound Pressure Level

Value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval T , has the same mean square sound pressure as a sound under consideration whose level varies with time.

A-weighting

A-weighting is used to replicate this sensitivity by modifying the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system.

Ambient Sound Level

Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

Site Attributable Sound Level (also referred to as ‘site noise’ or ‘specific sound level’)

Sound in the neighbourhood of a site that originates from the site.

Background Sound Level

A-weighted sound pressure level of the residual sound at the assessment position with no operation occurring at the proposed site. Defined in terms of the $L_{A90,T}$.

Free-field

External sound field in which no significant sound reflections occur (apart from the ground).

NOTE Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field.

Noise-Sensitive Premises (NSPs)

Any occupied premises outside a site used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in noise level.

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