

Appendix K

Cambrian Quarry Restoration

Noise & Vibration Management Plan

**Version 1.0 (Dated 18/02/2014)
2304/426/K**

ASH Resource Management (Cambrian Quarry) Ltd



Oaktree Environmental Ltd

Oaktree Environmental Limited -Registered in the UK - Company No. 4850754
Unit 5, Oasis Park, 19 Road One, Winsford Industrial Estate Winsford, Cheshire CW7 3PP

Tel: 01606 558833

Fax: 01606 861182

E-mail: sales@oaktree-environmental.co.uk Web: www.oaktree-environmental.co.uk

Document History:

Version	Issue date	Status	Notes
1.0	18/02/2014		

Author : Jan Edwards Senior Consultant

Contributors :

Reviewed by:

Introduction

This management plan sets out the risks posed by noise and vibration arising from the operation associated with the restoration of Cambrian Quarry near Gwernymyndd, and associated with the proposed, on site, mobile inert waste processing plant, and the measures in place to any risks associated with noise and vibration, which arise as a consequence of site operations.

Site Description

The application site referred to as Cambrian Quarry void forms part of a former limestone quarry and will be accessed via a new access road which forms part of the recent planning permission.

Identified Risks

Noise assessment monitoring and assessment of vibration impact of the proposed activities on site have been undertaken by independent specialists and the associated reports submitted as part of the Planning application. Copies of these reports have been attached to this management plan. In summary the reports conclude that predicted levels are below the levels stated in the relevant minerals planning documents and are below the levels which would have been generated from previous quarry blasting activity at the site.

Flintshire County Council are to include conditions in the planning permission to control noise levels from the site and to ensure noise levels do not exceed 55dB(LAeq) (1 hour) freefield at identified noise sensitive locations (The Old Chapel and Shama) and not in excess of 45dB(LAeq) (1 hour) freefield at identified noise sensitive locations ie the dwellings on Glyndwr Road east of the quarry.

Monitoring

To minimise the disturbance from operations on local residents Flintshire Council are likely to request noise monitoring measures to be implemented in accordance with a scheme to be submitted by the applicant and approved by the Local Planning Authority.

The scheme will cover:

- Noise monitoring locations
- Frequency of measurements
- Availability of results for inspection by the local planning authority
- Modelling procedures
- Procedures to be adopted if noise limits go above a certain level
- Prevailing weather conditions and comments on any significant noise
- Sources which are audible

The above will allow the effects of the proposed activities to be adequately monitored during the course of operations.

Proposed Actions

All reasonable steps to achieve quieter working while having regard to the principles of *BATNEC*. The recycling plant will initially be located within the southern part of the quarry, prior to relocating into the northern area, ensuring the height of 282 metres a.o.d. throughout the operational period, ensuring the plant is at least 10 metres below the top of the quarry face and thus maximising the attenuation afforded by the top of the face. The mobile plant used for the restoration operation (an excavator, dozer and compaction roller) would be used periodically throughout the week when sufficient material was available to progress an area for restoration. The recycling and mobile plant within the quarry is unlikely to be operated concurrently.

A number of actions will be undertaken by the operator to mitigate any possible problems arising from noise or vibration from the site. These primarily relate to fitting machinery with effective silencers and not fitting with audible reversing warning system. Also a strict regime of maintenance to ensure no potholes develop in the access road and specific site rules regarding waiting, stopping and starting of heavy vehicles in this area will be adhered to. Any complaints received will be recorded on the company's complaints form attached in Appendix 1 to this Noise & Vibration Management Report.

The existing screen mound which runs along the southern half of the eastern edge of the quarry void will be extended as far north as possible are further mitigating measures proposed as well as locating the new internal access road further into the site and within a cutting and a boundary wall to be constructed. All these would provide additional noise attenuation.

Investigation

If persistent complaints of noise or vibration are received further investigations will be undertaken to ascertain the validity of the complaints and identify the source of the noise or vibration. Recommendations arising from the investigation will be instigated as soon as practicable.

Action Plan

If there are persistent substantiated complaints of noise or vibration nuisance then consideration will be given to installing permanent noise/vibration monitoring equipment and instigating further infrastructure and practice improvements to mitigate the possibility of generating noise or vibration.

Other Measures

Instructions will be provided to the drivers of all vehicles delivering waste to the site on the need to avoid stopping and changing speed in the vicinity of the site entrance when entering the site all vehicles entering will be in a low gear travelling very slowly. Vehicles leaving the site will be instructed to avoid revving of engines whilst waiting.

Conclusion

The site operations as proposed following the above measures should minimise any adverse noise impact on local residents.

APPENDIX 1

Complaint Monitoring Report

APPENDIX 2

Noise Assessment Report Undertaken by ANV

February 2013

APPENDIX 3

Assessment of the Vibration Impact of the Infilling of Cambrian Quarry

**Carried out by VIBROCK
(R13.7822/2/DW)
Date of Report: 20 August 2013**

ASH RESOURCE MANAGEMENT (CAMBRIAN QUARRY) LTD

CAMBRIAN QUARRY LANDFILL

Complaints Report Form

Date Recorded	Reference Number
Name and address of caller	
Telephone number of caller	
Time and Date of call	
Nature of complaint (noise, odour, dust, other) (date, time, duration)	
Weather at the time of complaint (rain, snow, fog, etc.)	
Wind (strength, direction)	
Any other complaints relating to this report	
Any other relevant information	
Potential reasons for complaint	
The operations being carried out on site at the time of the complaint	
Follow Up	
Actions taken	
Date of call back to complainant	
Summary of call back conversation	
Recommendations	
Change in procedures	
Changes to Written Management System	
Date changes implemented	
Form completed by	
Signed	
Date completed	

Complaint recording procedure.

- 1) Any complaints received will be recorded on form RF/7. This form will normally be completed, signed and dated by the Site Manager, if they are not available the Office Manager will complete the form.
- 2) The name, address and telephone number of the caller will be requested.
- 3) Each complaint will be given a reference number.
- 4) The caller will be asked to give details of:
 - the nature of the complaint;
 - the time;
 - how long it lasted;
 - how often it occurs;
 - is this the first time the problem has been noticed; and
 - what prompted them to complain
- 5) The person completing the form will then, if possible, make a note of :
 - the weather conditions at the time of the problem (rain, snow, fog etc.)
 - strength and direction of the wind; and
 - the activity or activities taken place on the site at the time the noise was detected, particularly anything unusual.
- 6) The reason for the complaint will be investigated and a note of the findings added to the report.
- 7) The caller will then be contacted with an explanation of the source of the complaint if identified and the action taken to prevent a recurrence of the problem in future.
- 8) If the caller is unhappy about the outcome or unwilling to identify themselves the caller will be invited to contact Natural Resources Wales and or the Local Authority.

Following any complaint the relevant management plan(s) will be reviewed to ensure appropriate actions are in place to counter any problems.

ANV

**Acoustics Noise
and Vibration**

Acoustic Consultants

Beaufort Court
17 Roebuck Way
Milton Keynes
MK5 8HL
Tel 01908 642811
Fax 01908 642800

NOISE ASSESSMENT

PLANNING APPLICATION FOR THE RESTORATION OF CAMBRIAN QUARRY BY THE IMPORTATION AND RECYCLING OF INERT MATERIALS

**ASH RESOURCE MANAGEMENT
(CAMBRIAN QUARRY) LTD**

FINAL REPORT

FEBRUARY 2013

NOISE ASSESSMENT

**PLANNING APPLICATION FOR THE
RESTORATION OF CAMBRIAN QUARRY BY
THE IMPORTATION AND RECYCLING OF
INERT MATERIALS**

**ASH RESOURCE MANAGEMENT
(CAMBRIAN QUARRY) LTD**

FINAL REPORT

FEBRUARY 2013

This report has been prepared using all reasonable skill, care and diligence within the resources and brief agreed with the client.
Acoustics Noise and Vibration (ANV) accept no responsibility for matters outside the terms of the brief or for use of this report, wholly or in part, by third parties.

CONTENTS

1.	Introduction	1
2.	Scope of the Assessment	2
3.	Noise Units and Standards	3
3.1	Noise Units	3
4.	Applicable Standards	4
4.1	Minerals Planning Guidance MPG 11	4
4.2	Minerals Technical Advice Note 1	4
5.	Existing Noise Environment	5
5.1	General Format for Environmental Noise Assessment	5
5.2	Identification of Potentially Affected Noise-Sensitive Locations	5
5.3	Noise Measurements	5
5.4	Discussion of Existing Noise Environment	7
6.	Assessment Criteria	9
7.	Assessment	10
7.1	Potential Sources of Impact	10
7.2	Calculated Noise Levels	11
7.3	Assessment of Noise from Site Operations	12
8.	Noise Control During Site Operations	14
9.	Summary	16
	References	
	Figures	
	Appendices	

1. INTRODUCTION

Acoustics Noise and Vibration ('ANV') has been appointed by ASH Resource Management (Cambrian Quarry) Ltd ('ASH'), to carry out a noise assessment in relation to the proposed operations associated with the restoration of Cambrian Quarry.

The assessment is required as part of a formal Environmental Statement, which is being prepared to accompany a Planning Application for inert materials recycling and infilling to restore the former quarry.

ASH are proposing to utilise an existing recycling plant, currently operating at another site within the quarry, with materials brought onto site using four axle HGV tipper lorries.

2. SCOPE OF THE ASSESSMENT

This assessment includes:

- a description of the noise units referred to;
- establishment of the existing baseline situation;
- an assessment of the existing noise environment at potentially affected noise sensitive locations;
- standards for the assessment of noise from site operations;
- predicted noise levels from the proposed operations; and
- an assessment of the predicted levels against the proposed noise criteria; and
- recommendations for the control and mitigation of noise from site operations.

3. NOISE UNITS AND STANDARDS

3.1 Noise Units

Decibels (dB)

Noise can be considered as ‘unwanted sound’. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

A-Weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit that has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

Units Used to Describe Time-Varying Noise Sources (L_{Aeq} , L_{Amax} , L_{A10} , and L_{A90})

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax S}$, or Slow, is averaged over 1 second. All L_{Amax} values referred to in this report are Fast.

The L_{A10} is the noise level exceeded for 10% of the measurement period. It has been used in the UK for the assessment of road traffic noise.

The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise that is present even during the quieter parts of measurement period.

4. APPLICABLE STANDARDS

4.1 Minerals Planning Guidance MPG 11

The guidance used to assess noise from quarry operations is provided in Minerals Planning Guidance (MPG) 11 [1]. Sections 31 to 42 of this guidance, which contain advice on noise limits, were superseded in 2004 with guidance contained in Minerals Technical Advice Note (MTAN) 1 [2], although the remainder of MPG 11 remains current.

The remaining sections of MPG11 contain advice on the requirements for noise monitoring, calculation of noise levels and on noise abatement controls and consideration of this has been made within this report.

4.2 Minerals Technical Advice Note 1

MTAN 1, published in 2004, replaced Sections 31 to 42 of MPG 11 and seeks that:

“the aggregates industry should aim to keep noise emissions to a level that reflects the highest possible environmental standards, taking all reasonable steps to achieve quieter working while having regard to the principles of BATNEEC – the best available techniques not entailing excessive cost.”

MTAN 1 advises that noise limits should relate to background noise levels, subject to a maximum daytime noise limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ where background noise levels exceed 45 dB (A). 55 dB L_{Aeq} is the lower limit of the daytime noise levels where serious annoyance is caused. Where background noise levels are less than 45 dB(A), noise limits should be defined as background noise levels plus 10 dB(A).

Night-time working limits should not exceed 42 dB $L_{Aeq, 1 \text{ hour}}$ at noise sensitive properties.

Daytime working is defined as 07:00 – 19:00 hours and night-time as 19:00 – 07:00 hours.

During temporary or short-term operations, higher levels may be reasonable, but should not exceed 67 dB $L_{Aeq, 1 \text{ hour}}$ for periods of up to 8 weeks in a year specified at noise sensitive properties.

5. EXISTING NOISE ENVIRONMENT

5.1 General Format for Environmental Noise Assessment

An environmental noise assessment of a potentially noisy proposal consists of the following steps:

- i) identification of potentially affected noise-sensitive locations (in particular dwellings);
- ii) assessment of the existing noise environment at potentially affected noise-sensitive locations;
- iii) establishment of suitable assessment criteria;
- iv) prediction of noise levels from the proposed activities; and
- v) assessment of predicted levels against criteria, taking into account the existing noise environment where appropriate, and proposing mitigation where necessary.

5.2 Identification of Potentially Affected Noise-Sensitive Locations

During site visits carried out in 2012, the following dwellings were identified as being the potentially most likely to be affected by noise from the proposed restoration of Cambrian Quarry:

- i) Sharma and The Old Chapel at the northern end of Glyndwr Road, which would be potentially affected by the vehicles accessing the quarry along the new access; and
- ii) The dwellings to the east of the quarry along Glyndwr Road, which include Hillside and Ael-y-bryn and would be potentially most affected by the operations within the quarry.

The potentially affected locations are shown on Figure 1.

5.3 Noise Measurements

Unattended Noise Survey

In order to evaluate the existing noise environment at the dwellings which would be potentially affected by the reopening of the quarry, unattended noise surveys were carried out between 1 – 7 August 2012.

Rion NL-32 Class 1 Sound Level Meters were used for the survey, which were calibrated before and after the exercise using a Rion NC-74 Class 1 Sound Level Calibrator. The instruments were also fitted with sound recording cards, which allowed sample recordings of the noise environment to be obtained during the survey period.

Measurements were taken at three locations along the quarry boundary, representative of the closest dwellings to the proposed activity. The monitoring locations are indicated on Figure 1.

At each position, the microphone was positioned at a height of 1.3 metres above local ground level at a free-field position (i.e. at least 3.5 metres from a reflecting surface such as a building facade).

Measurements were made over contiguous 15 minute periods during the survey period, with the results subsequently analysed into hourly periods for reporting purposes using the Rion AS-60 Data Analysis software package.

Weather conditions during the survey period were mixed, with dry conditions followed by periods of rain. Wind speeds remained generally light throughout the survey.

The results of the monitoring at each location are discussed below.

Position 1- Adjacent to Ael-y-bryn

This monitoring location was at the top of the existing quarry face on the boundary with Ael-y-bryn. This location was considered to be representative of the noise environment at the dwellings adjacent to the quarry along Glyndwr Road.

The results obtained at this location are presented in Appendix A, with a graphical representation on Figure 2. A summary of the daytime noise levels, when the proposed quarry would operate, are provided in Table 5.1 below.

Date	Free-field Noise Levels [dB]	
	Period L_{Aeq}	Average L_{A90}
Wednesday 1/8/12	46.4	38.2
Thursday 2/8/12	39.9	33.9
Friday 3/8/12	40.0	32.8
Saturday (4/8/12) (a.m.)	39.9	32.4
Monday 6/8/12	45.2	38.9
Average	42	35

Table 5.1 Summary Results of Measurements Made Adjacent to Ael-y-bryn

Position 2- Access Road Adjacent to Ael-y-bryn

This monitoring location was along the existing access road adjacent to the dwelling, set down approximately 6 metres below the ground level at the dwelling.

The results obtained at this location are presented in Appendix B, with a graphical representation on Figure 3. A summary of the daytime noise levels, when the proposed quarry would operate, are provided in Table 5.2 below.

Date	Free-field Noise Levels [dB]	
	Period L_{Aeq}	Average L_{A90}
Wednesday 1/8/12	43.0	35.2
Thursday 2/8/12	37.8	31.9
Friday 3/8/12	38.2	30.7
Saturday (4/8/12) (a.m.)	38.1	29.1
Monday 6/8/12	43.2	36.7
Average	40	33

Table 5.2 Summary Results of Measurements Made on Access Road

Position 3- The Old Chapel, Glyndwr Road

This monitoring location at this position was located within the site opposite The Old Chapel, with the instrument set at the same distance back from the road as the facade of the dwelling.

The results obtained at this location are presented in Appendix C, with a graphical representation on Figure 4. A summary of the daytime noise levels, when the proposed quarry would operate, are provided in Table 5.3 below.

Date	Free-field Noise Levels [dB]	
	Period L_{Aeq}	Average L_{A90}
Wednesday 1/8/12	56.3	46.1
Thursday 2/8/12	56.2	45.3
Friday 3/8/12	56.2	45.0
Saturday (4/8/12) (a.m.)	55.0	41.9
Monday 6/8/12	56.2	46.7
Average	56	45

Table 5.3 Summary Results of Measurements Made Adjacent to The Old Chapel

5.4 Discussion of Existing Noise Environment

Existing noise levels at the dwellings along Glyndwr Road adjacent to the main quarry are low, as the properties are remote from any major noise sources. The principal influences on the noise environment at these dwellings were associated with the occasional vehicles travelling along the road and more distant road traffic on the main road network. Given the distances to the main roads, the noise levels varied from day to day, principally based upon the direction of the wind.

Noise levels were higher at the northern end of the quarry, adjacent to The Old Chapel. Noise levels at this location are principally influenced by the road traffic travelling along the A494 Ruthin Road to the north, with vehicles also passing along Glyndwr Road during the day. Given the proximity to the A494, noise levels were generally more constant throughout the survey period.

6. ASSESSMENT CRITERIA

Noise limits have been proposed in accordance with the guidance contained in MTAN1, based upon a limit 10 dB(A) above the typical background noise levels. Given the rural surroundings the limits would be achieved where possible, however, it is likely that there would be periods during the restoration where this may not be achievable. During these periods, the principles of BATNEEC would be adopted to ensure that noise levels would be minimised and remain within acceptable daytime noise standards as recommended by the World Health Organisation [3].

The proposed normal working criteria, presented in terms of a freefield noise limit as required by the MTAN 1 guidelines, are presented in Table 6.1.

Location	Average Daytime Free-field L_{A90} Noise Levels [dB]	Daytime Criterion dB $L_{Aeq, 1 \text{ hour}}$ Freefield
Dwellings on Glyndwr Road east of the Quarry	35	45
The Old Chapel and Sharma	45	55

Table 6.1: Assessment Criteria for Potentially Most Affected Dwellings

For all temporary operations, an assessment criterion of 67 dB $L_{Aeq, 1 \text{ hour}}$ freefield, has been adopted for the assessment as per the requirements of the MTAN 1 guidance.

7. ASSESSMENT

7.1 Potential Sources of Impact

It is proposed to construct a new access into the quarry, which will turn off Glyndwr Road close to The Old Chapel. The initial stretch of the access road would be two way and beyond there it would generally be single width and be signal controlled, with the northern control point close to the property.

Based upon the anticipated tonnage to be imported on an annual basis, it is anticipated that on average there would be 3 to 4 in/outbound trips per hour (30 – 40 two way trips per weekday), with a maximum of 7 to 8 trips per hour during a busy contract period. All the vehicles accessing the quarry would be four axle HGV tipper lorries.

It is proposed to restore the quarry in 5 main phases, as indicated on plans ASH/CQ/08a-f, which are provided within the main ES.

The processes carried out within the main quarry would be split into two main areas.

During phases 1 – 4, there would be a recycling area, containing a crusher and screens, which would operate throughout the week and would be used to screen some of the imported materials. It is proposed that the recycling plant would initially be located within the southern part of the quarry, prior to relocating into the northern area, ensuring that the height of the plant was maintained at a maximum ground level of 282 metres a.o.d. throughout the operational period, ensuring that the plant was at least 10 metres below the top of the quarry face and thus maximising the attenuation afforded by the top of the face. The recycling plant would not operate within the quarry during Phase 5 when the overall level of the quarry floor is raised.

The second operation would be associated with the mobile restoration plant, which would include an excavator, dozer and compaction roller. This plant would be used periodically throughout the week, when sufficient material was available to progress an area for restoration.

The recycling and mobile plant within the quarry would not be operated concurrently. It is proposed that there would only be three personnel on site operating the plant, and generally it is likely that either the recycling or mobile restoration plant would be working at one time.

It is proposed that the recycling plant currently in use at the existing ASH recycling facility at Deeside would be brought into the quarry and source term noise levels have been measured adjacent to this plant. Where items of mobile plant were not operational within the existing facility, source terms have been assumed from measurements obtained previously by ANV.

Table 7.1 lists the plant assumed for the calculations along with the source term information.

Item of Plant	Noise Level [dB(A)]	Distance [m]	Index
Crusher and Excavator	84.1	10	L _{Aeq}
Loading Shovel	70.0	10	L _{Aeq}
Power Screen	76.5	10	L _{Aeq}
HGV Movement (Laden)	83.4	10	SEL
HGV Movement (Unladen)	77.4	10	SEL
HGV Tipping	92.9	10	SEL
Dozer / Compactor	79.2	10	L _{Aeq}

Table 7.1: Noise Source Terms for Equipment Likely to be used on Site

The proposed operational hours at the quarry would be 07:00 – 17:00 hours Monday to Friday and 07:00 – 13:00 hours on Saturdays, with no working on Sundays or Bank Holidays.

7.2 Calculated Noise Levels

Noise levels have been predicted for the principal items of plant likely to be used during normal operations.

Noise levels have been calculated using the methodology described in BS 5228:Part 1 [4]. Where barrier performances have been calculated, the methodology described in a ‘Calculation of Road Traffic Noise’ (CRTN) [4] has been adopted and assuming a maximum attenuation of 20 dB(A) from the quarry face.

Estimated worst-case noise levels, based on a realistic operating scenario, have been compared to the criteria described in Section 6 in order to determine whether mitigation is likely to be necessary to achieve the standards of noise required by the MTAN1 guidelines.

The predicted levels are worst case because:

- i) It has been assumed that the main items of plant will operate 100% of the time;
- ii) Calculations have been made upon the restoration levels at the end of each phase; and
- iii) the need for mitigation has been determined on the basis of the shortest distance/minimum attenuation between the proposed areas of activity and the potentially most affected dwellings.

The existing bund which runs along part of the eastern boundary of the quarry would be retained at its existing height. In addition, the bund would be extended as far north as possible at a height of 3 metres. However, it would not be possible to extend the bund along the whole of the eastern boundary, as there are bat caves in the quarry face close to Ael-y-bryn, which prevents infilling to the top of the quarry in this area.

The calculation details are given in Appendix D.

7.3 Assessment of Noise from Site Operations

Location 1 – Dwellings on Glyndwr Road Adjacent to the Quarry

There are a number of dwellings alongside Glyndwr Road, which are to the east of the main quarry void. The dwellings are sited between 90 and 135 metres from the closest quarry face.

At present, the base of the quarry void is approximately 20 metres below the ground level at the dwellings and the eastern quarry face is approximately 35 metres above the base of the quarry void.

To provide some additional protection to the surrounding residents, the existing bund which runs along part of the eastern boundary would be extended to the north. This operation would be carried out at a point in time when sufficient fill has been placed in this area of the quarry void to permit the plant to access the bund. It is expected that this operation would be carried out during Phase 3. Noise levels associated with these works, which would be temporary in nature would generate noise levels of up to 54 dB $L_{Aeq, 1 \text{ hour}}$ at the properties, thus remaining below the temporary working limit of 67 dB $L_{Aeq, 1 \text{ hour}}$. The enhancements to the bund would provide an additional benefit to the residents during Phases 3 – 5.

In addition, the recycling plant would be taken off site at the end of Phase 4, once the levels in the quarry have been raised in this area above 282 metres. It is proposed that the main recycling plant would initially be sited within the southern area of the quarry void, with the height of the plant maintained at a level of 282 metres a.o.d. or lower, to provide a good degree of screening from the operations. Noise levels associated with the operation of the recycling plant and deliveries of materials are anticipated to be between 38 – 40 dB $L_{Aeq, 1 \text{ hour}}$ at the commencement of operations on site, rising to between 38 – 43 dB $L_{Aeq, 1 \text{ hour}}$ as the plant is relocated into the northern half of the quarry during Phase 2. It is not anticipated that the operation of the recycling plant would generate noise levels above the proposed normal working limit at the dwellings.

Infilling of the quarry would be carried out progressively as sufficient materials are brought onto site, with the mobile restoration plant used periodically during the week. As indicated previously, the number of personnel on site would limit the amount of plant which could operate at any one time and it is understood that generally either the recycling or mobile restoration plant would be in use and generally not both.

The calculations of the noise levels associated with the infilling and restoration operations indicate noise levels of between 34 – 38 dB $L_{Aeq, 1 \text{ hour}}$ during Phases 1 and 2, whilst the plant is operating close to the level of the existing quarry floor.

Noise levels associated with the operation of the plant would gradually increase during Phases 3 - 5, as the infill and restoration rises to the final levels, although the plant is anticipated to remain screened from the surrounding properties. The calculations indicate that the noise levels associated with the plant could generate noise levels of up to 44 dB $L_{Aeq, 1 \text{ hour}}$ at the dwellings as the plant nears the surface.

With the bund enhanced and the proposed working methods adopted, noise levels associated with the use of the restoration plant would not normally exceed the 45 dB $L_{Aeq, 1 \text{ hour}}$ normal working limit at the dwellings.

Given the low noise limit at the dwellings along Glyndwr Road, it will be necessary to ensure that noise levels are controlled and monitored periodically to ensure that noise levels are minimised and the of principles of BATNEEC are being adopted.

Location 2 – The Old Chapel and Sharma

The Old Chapel and Sharma are located adjacent to the proposed new access into the quarry. Noise levels associated with the restoration of the quarry at these dwellings would be associated with the vehicle movements along the access.

As indicated in the previous section, all loads into the quarry would be made using tipper trucks and there would be between 3- 4 loads per hour brought to the site, which would double during periods of high activity from ASH contracts.

Beyond the initial stretch of access road, the access road into the quarry would be one way, with the width allowing for a single vehicle. The access would be signal controlled at either end. To ensure potential disturbance to the occupants associated with waiting vehicles was minimised, the signals would be prioritised to ensure that vehicles entering the quarry would not normally need to wait at the signal.

Noise levels at The Old Chapel associated with the vehicle movements would generally be 49 dB $L_{Aeq, 1 \text{ hour}}$, increasing to 52 dB $L_{Aeq, 1 \text{ hour}}$ during periods of high activity, with noise levels at Sharma 5 dB(A) lower.

The noise levels at the dwellings would be below the proposed normal working limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ and below the existing ambient noise levels at the dwellings.

However, to minimise any potential disturbance, principally associated with waiting vehicles, it is proposed to construct a close boarded fence or similar on top of the mound located between Glyndwr Road and the new internal access road, to achieve an overall height of up to 4 metres above the height of the access along the boundary with The Old Chapel where possible. This mitigation would ensure that the vehicles were screened and would provide a reduction of up to 10 dB(A) in the vehicle noise levels as they travel along the access road.

8. NOISE CONTROL DURING SITE OPERATIONS

The calculations and assessment indicate that noise levels associated with the restoration of the quarry would be close to the normal working limits, particularly as the height of infilling rises within the quarry void.

Additional mitigation measures would be implemented as discussed in the previous section to reduce noise levels associated with both the operations within the quarry void and associated with vehicles using the access road, which aim to ensure noise levels are maintained at a satisfactory standard to minimise potential disturbance.

As required within the guidance, the principles of BATNEEC would be adopted during the restoration operations. Measures to be adopted to minimise noise and disturbance would include:

- Periodic monitoring of noise levels at the surrounding dwellings;
- Ensuring that all plant and machinery, including HGVs, are kept well maintained at all times;
- Where possible, selecting plant which generates lower levels of noise;
- Switching off plant when not in use;
- A prohibition on the use of tonal reversing signals on mobile plant operating within the quarry void. Laser detection (camera) or background noise tracking devices will be used as alternatives;
- Route HGVs within the quarry to minimise reversing;
- Surfacing of the new internal access road with asphalt for the first 200 metres which includes the full length of road close to The Old Chapel and Sharma;
- Ensuring that the access road is inspected and maintained regularly and any discontinuities, which could cause body slap, filled in;
- Consideration of providing additional mitigation around the recycling plant, in the form of stock piles, which would seek to reduce any potential reflection effects off the far quarry wall;
- Minimising the amount of plant in use at any one time;
- Provide regular updates to local residents regarding the operations being carried out on site, potentially through a residents' forum.

With regards the monitoring of noise levels, it is recommended that a noise monitoring exercise is carried out within 3 months of the start of recycling and restoration operations within the quarry void. Further monitoring should be carried out periodically, potentially every 12 months or upon receipt of a valid complaint in relation to noise.

For each exercise, it is recommended that measurements are made using a sound level meter conforming to at least Class 2 standard and field calibrated using an acoustic calibrator.

Measurements should be made at freefield positions representative of the dwellings potentially most affected by the site operations, with the microphone at a height of between 1.2 – 1.5 metres above ground level. Measurements should be taken over a period of at least 15 minutes at each location or a longer duration to provide a representative sample of the noise environment. Extraneous noise, such as passing vehicles on the road would be paused out of any measurement.

The results of the measurement would be compared to the limits contained in Section 6. Where the results indicate noise levels above the limits, the current operations would be reviewed and additional mitigation or control measures implemented, as appropriate, to ensure that BATNEEC was achieved.

The results of any monitoring exercise would be made available for inspection by local authority officers within 1 week of the exercise being carried out. Where additional mitigation was deemed to be required, details would be provided to the local authority for agreement, with the aim of implementing the measures within 28 days.

With appropriate control and mitigation measures implemented on site, noise levels should be maintained at a level which would seek to minimise any potential disturbance.

9. SUMMARY

An assessment of the noise generated from activities associated with the proposed restoration of Cambrian Quarry has been carried out.

MTAN 1 provides the relevant guidance when assessing noise from the proposed operations. General noise limits at potentially affected noise-sensitive locations have been determined from background noise levels measured during 2012.

The recycling and restoration operations at the quarry would only take place during normal daytime periods and the following relevant limits have been proposed.

Location	Average Daytime Free-field L_{A90} Noise Levels [dB]	Daytime Criterion dB $L_{Aeq, 1 \text{ hour}}$ Facade
Dwellings on Glyndwr Road east of the Quarry	35	45
The Old Chapel and Sharma	45	55

Table 9.1: Proposed Normal Working Noise Limits

Calculations have been made based on the proposed recycling and restoration operations within the quarry void at the potentially most affected noise-sensitive locations. The assessment of the calculated levels indicates that the proposed criteria with appropriate control and mitigation measures implemented would not be exceeded and would be within the recommended limits.

In summary, this assessment demonstrates that noise from activities associated with the restoration of Cambrian Quarry would be within acceptable limits, which would seek to minimise potential disturbance to the occupants of surrounding properties.

References

1. Department of the Environment. Minerals Planning Guidance: The Control of Noise at Surface Mineral Workings. MPG 11. 1993.
2. Welsh Assembly Government. Minerals Planning Policy (Wales). Minerals Technical Advice Note (Wales) – 1:Aggregates. March 2004.
3. World Health Organisation. Guidelines for Community Noise. Geneva. 2000.
4. British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. 2009.

Figures

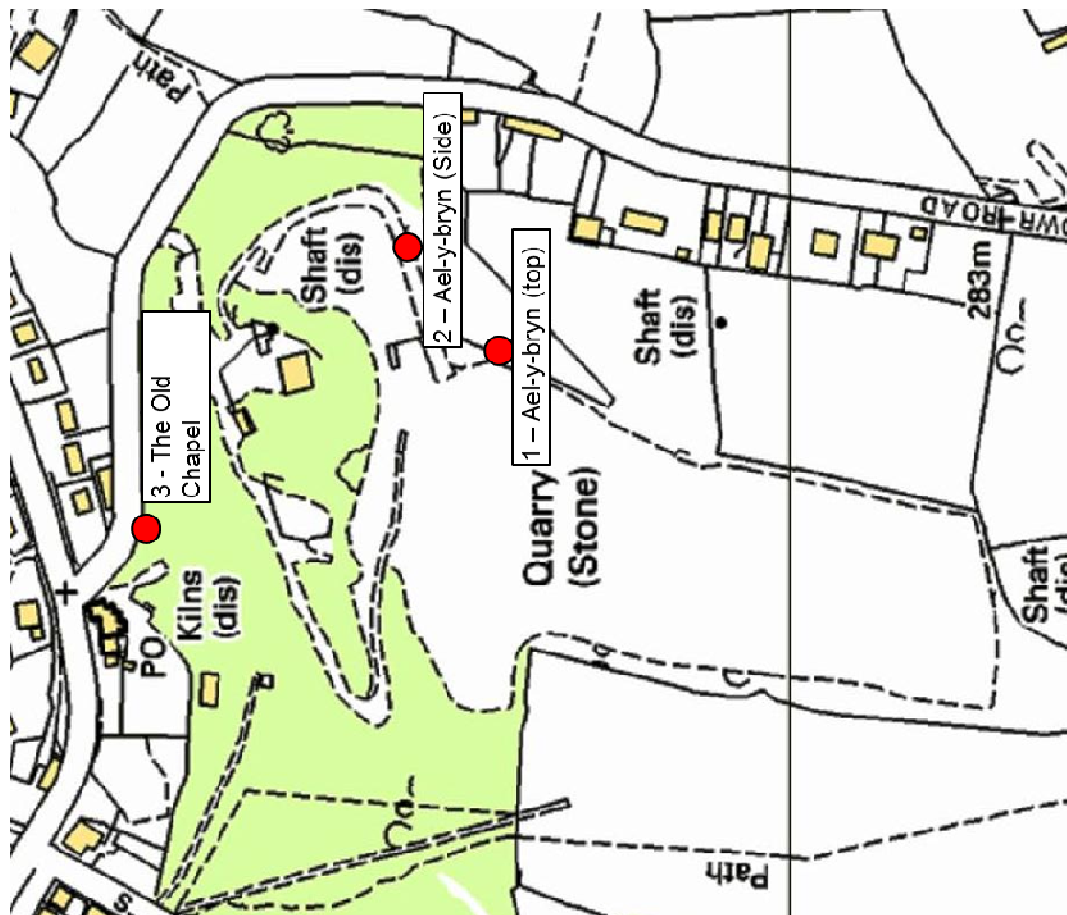


Figure 1 : Noise Monitoring Locations

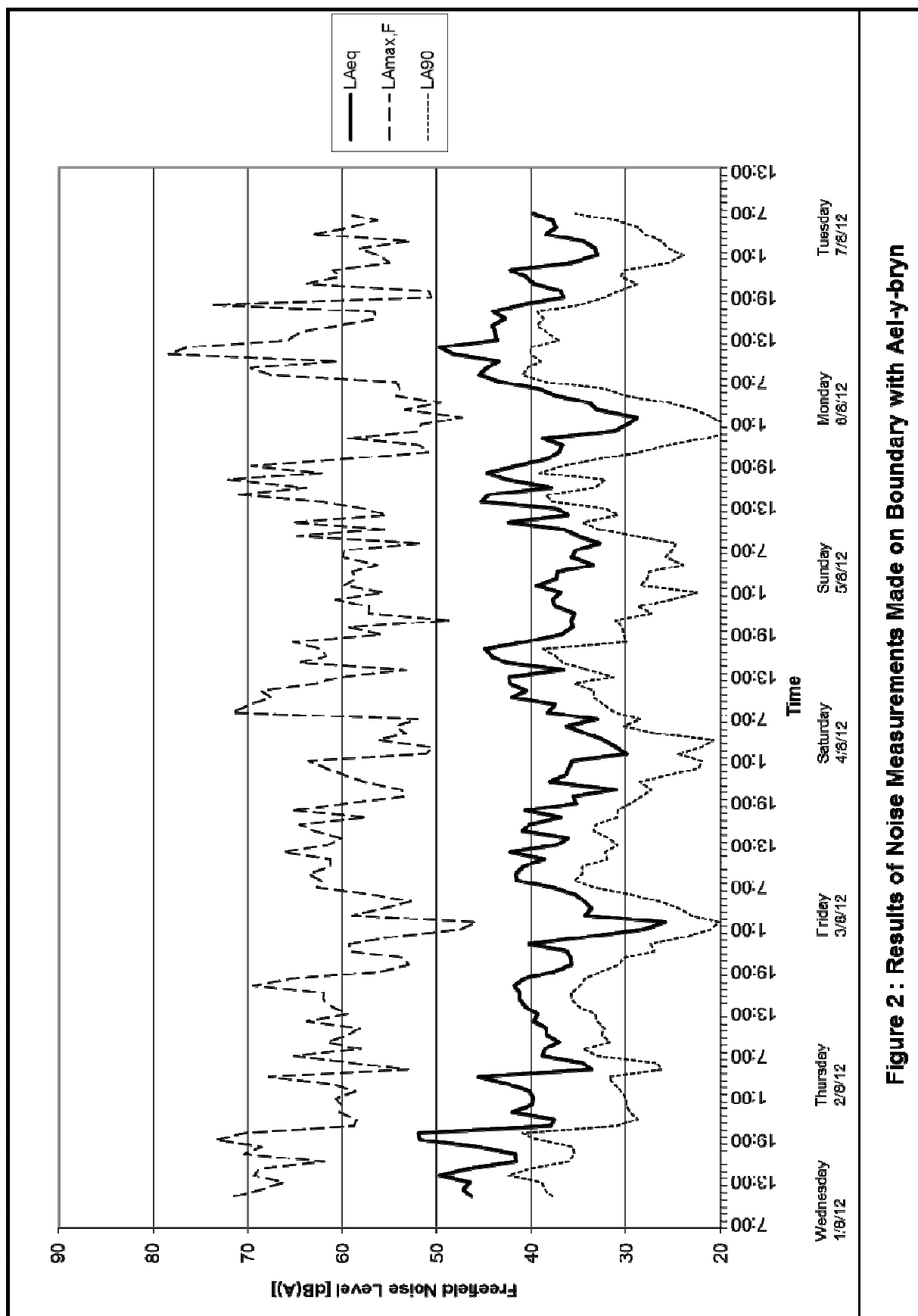


Figure 2 : Results of Noise Measurements Made on Boundary with Ael-y-bryn

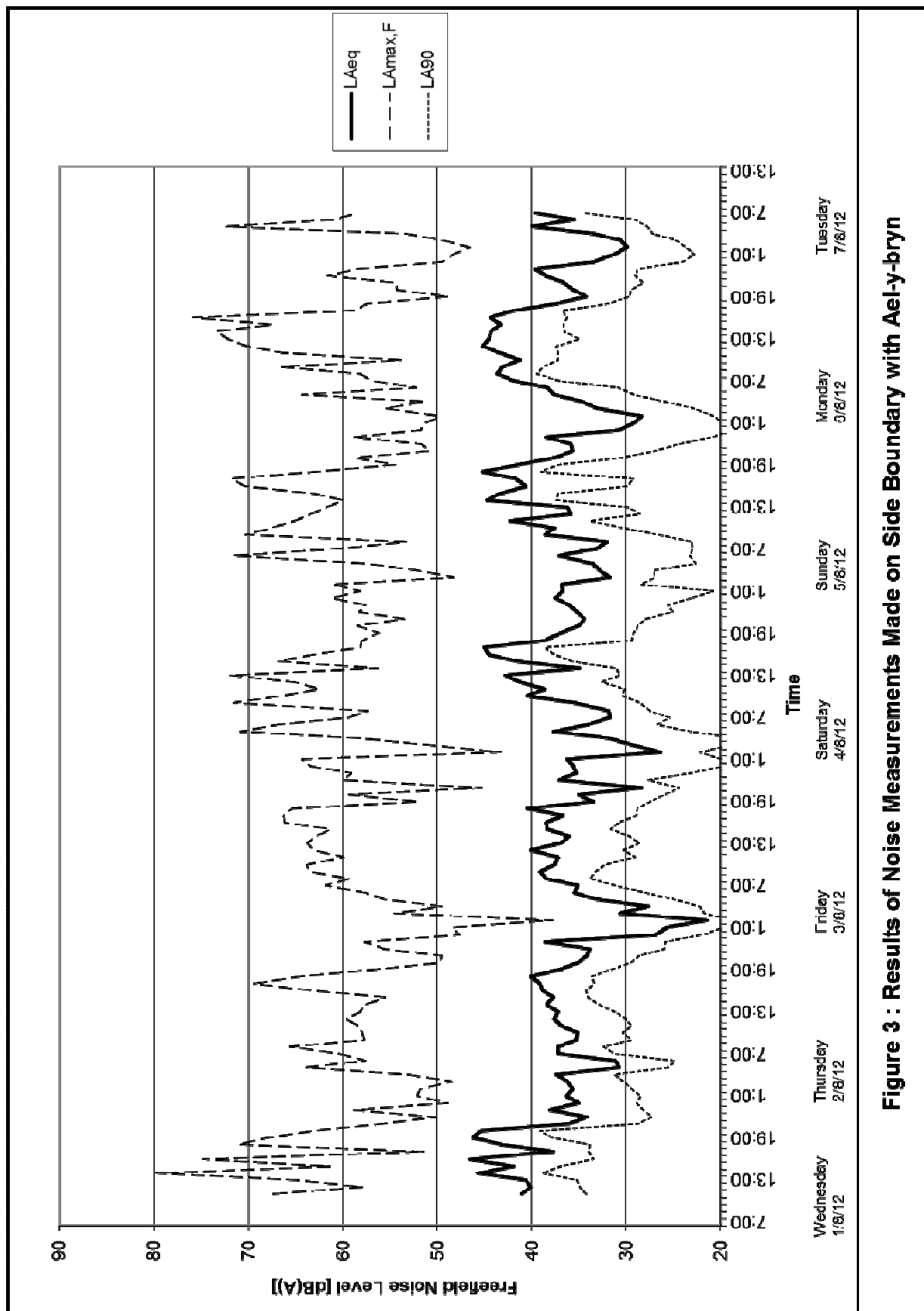
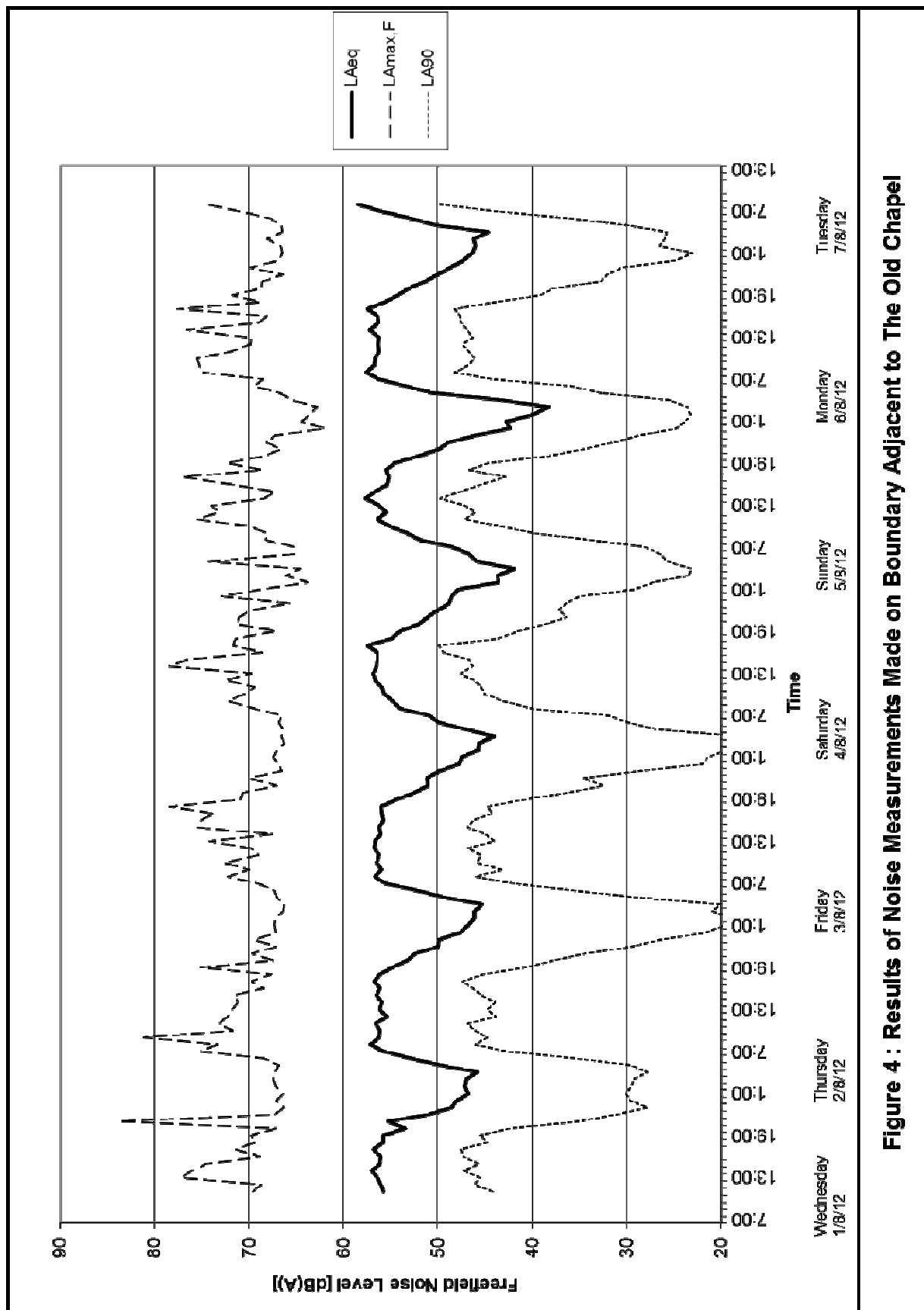


Figure 3 : Results of Noise Measurements Made on Side Boundary with Ael-y-bryn



Appendix A
Results of Unattended Noise Survey on Boundary Adjacent to Ael-y-bryn

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Wednesday 01/08/2012	11:00	46.4	71.4	48.5	37.8
	12:00	47.2	68.6	48.9	38.6
	13:00	46.6	66.2	48.2	39.0
	14:00	49.8	69.3	51.9	42.5
	15:00	46.7	68.8	48.5	40.3
	16:00	41.6	61.9	43.2	36.0
	17:00	41.7	70.4	42.6	35.5
	18:00	45.7	68.5	46.7	35.7
	19:00	51.7	73.5	52.2	39.2
	20:00	52.0	70.4	53.7	41.0
	21:00	38.0	58.8	38.6	31.1
	22:00	37.6	58.5	39.1	28.8
	23:00	42.0	60.3	43.4	29.6
Thursday 02/08/2012	0:00	40.0	60.2	41.7	30.0
	1:00	39.8	60.7	41.6	30.0
	2:00	40.2	58.6	42.6	30.5
	3:00	42.6	61.4	45.0	31.4
	4:00	45.6	67.9	45.5	31.8
	5:00	33.7	53.1	36.5	26.2
	6:00	34.6	58.9	35.7	26.7
	7:00	38.9	65.1	41.0	33.1
	8:00	38.6	58.1	40.7	34.5
	9:00	37.1	61.6	38.8	31.7
	10:00	38.4	59.3	39.7	32.6
	11:00	38.4	58.2	39.6	32.3
	12:00	39.8	63.8	41.4	33.1
	13:00	39.3	59.4	41.3	33.3
	14:00	40.7	61.1	43.5	35.0
	15:00	41.3	62.1	43.4	35.8
	16:00	41.3	62.0	43.5	35.8
	17:00	41.8	69.4	43.6	34.9
	18:00	40.8	65.3	42.6	34.3
	19:00	37.7	56.0	40.2	32.7
	20:00	35.8	53.0	37.7	30.8
	21:00	35.9	53.6	38.5	30.2
	22:00	36.2	59.2	38.0	27.1
	23:00	40.3	59.2	41.9	27.4
Friday 03/08/2012	0:00	34.3	54.8	35.7	23.8
	1:00	28.1	47.5	30.0	21.0
	2:00	25.9	45.9	28.2	20.2
	3:00	34.3	59.0	33.3	23.1
	4:00	33.7	55.7	36.1	24.4
	5:00	34.4	52.7	36.4	26.5
	6:00	35.4	56.8	37.0	29.4
	7:00	37.8	62.7	39.5	33.4
	8:00	41.5	62.3	43.3	35.5

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Friday 03/08/2012	9:00	41.6	63.6	43.9	34.7
	10:00	40.9	61.3	42.2	34.7
	11:00	38.7	61.3	38.9	32.0
	12:00	42.3	66.3	40.4	32.2
	13:00	37.4	61.5	37.4	30.9
	14:00	36.1	60.2	37.7	31.8
	15:00	41.0	63.0	42.3	33.5
	16:00	40.2	64.6	40.5	33.2
	17:00	37.0	57.5	38.1	31.0
	18:00	40.7	65.3	41.5	30.9
	19:00	35.3	59.7	36.8	29.6
	20:00	35.6	53.4	37.0	28.3
	21:00	31.1	53.7	32.4	27.3
	22:00	38.1	57.8	36.5	28.5
	23:00	36.3	60.0	34.4	25.3
Saturday 04/08/2012	0:00	36.0	61.7	30.9	22.3
	1:00	35.7	63.6	32.1	22.0
	2:00	29.9	51.2	31.5	24.6
	3:00	31.1	50.5	31.8	22.1
	4:00	32.4	56.2	28.7	20.7
	5:00	34.3	53.3	35.6	26.9
	6:00	36.3	54.4	39.1	30.3
	7:00	33.1	52.0	35.2	28.5
	8:00	38.2	71.6	36.4	31.2
	9:00	37.5	69.8	38.9	32.4
	10:00	42.1	67.5	41.7	33.5
	11:00	40.6	68.6	40.1	33.4
	12:00	42.3	62.8	40.6	35.5
	13:00	42.4	60.2	40.9	31.4
	14:00	36.7	53.3	38.1	34.0
	15:00	42.7	64.6	45.4	36.8
	16:00	44.2	61.7	44.8	37.4
	17:00	44.9	62.3	43.9	38.8
	18:00	40.7	65.2	39.1	30.0
	19:00	36.9	55.9	38.4	30.3
	20:00	35.7	59.3	38.0	30.4
	21:00	35.8	48.7	38.3	31.2
	22:00	35.5	57.2	36.5	27.3
	23:00	37.5	57.1	37.1	28.7
Sunday 05/08/2012	0:00	37.8	60.7	35.7	25.2
	1:00	37.0	55.7	35.5	22.5
	2:00	39.5	59.9	42.2	28.5
	3:00	37.4	58.6	40.2	27.8
	4:00	37.2	59.0	39.7	27.6
	5:00	33.5	56.4	33.8	23.9

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Sunday 05/08/2012	6:00	35.8	60.0	35.3	25.9
	7:00	35.3	59.8	33.4	25.1
	8:00	32.8	51.6	34.7	24.7
	9:00	35.1	64.8	35.2	29.1
	10:00	36.6	55.5	38.3	32.9
	11:00	42.5	65.3	40.5	34.6
	12:00	36.1	55.3	37.0	30.9
	13:00	37.3	57.7	37.8	32.1
	14:00	45.3	62.4	44.0	37.9
	15:00	44.6	71.3	46.8	38.4
	16:00	37.9	63.8	39.5	33.4
	17:00	42.6	72.2	39.1	32.2
	18:00	44.8	62.3	45.6	39.2
	19:00	41.6	69.7	41.9	36.8
	20:00	38.3	59.6	39.3	32.9
	21:00	37.1	50.9	40.5	28.6
	22:00	36.8	51.8	40.1	25.6
	23:00	38.9	59.4	38.9	21.6
Monday 06/08/2012	0:00	31.4	52.0	32.2	18.6
	1:00	29.8	51.6	31.7	19.5
	2:00	28.9	47.3	30.8	20.8
	3:00	33.1	53.4	33.3	22.7
	4:00	33.9	49.6	36.5	25.6
	5:00	37.4	54.4	40.4	30.1
	6:00	39.3	53.9	42.1	32.3
	7:00	43.3	54.4	45.8	38.5
	8:00	45.5	67.6	48.1	41.0
	9:00	44.8	69.8	47.2	40.4
	10:00	43.5	60.5	46.0	39.1
	11:00	48.3	78.4	48.4	40.1
	12:00	49.7	76.3	48.9	40.1
	13:00	43.7	65.8	44.2	37.1
	14:00	43.8	64.5	46.0	38.4
	15:00	44.1	60.5	46.6	39.4
	16:00	42.8	56.4	45.1	38.8
	17:00	44.0	56.7	46.6	39.4
	18:00	41.1	73.8	42.3	34.9
	19:00	36.7	50.6	39.1	32.3
	20:00	37.0	50.9	39.9	30.7
	21:00	39.7	63.8	41.5	28.9
	22:00	40.6	60.3	42.9	30.5
	23:00	42.3	61.0	45.1	30.2
Tuesday 07/08/2012	0:00	35.8	55.0	38.8	25.6
	1:00	33.1	56.1	35.5	23.8
	2:00	33.3	58.2	35.1	25.6

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Tuesday 07/08/2012	3:00	34.5	52.8	37.6	26.2
	4:00	38.5	63.2	41.3	28.0
	5:00	37.4	59.2	39.8	28.7
	6:00	37.8	56.4	40.3	31.0
	7:00	39.8	59.6	41.7	35.4

Appendix B
Results of Unattended Noise Survey on Side Boundary Adjacent to Ael-y-bryn

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U2 - Eastern Boundary Close to Glyndwr Road

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Wednesday 01/08/2012	11:00	41.1	67.3	40.4	34.2
	12:00	40.1	58.0	40.7	34.9
	13:00	40.6	64.8	41.5	35.2
	14:00	45.7	79.8	46.0	38.9
	15:00	41.9	61.4	43.4	37.0
	16:00	46.6	74.8	41.7	33.5
	17:00	37.7	51.4	39.5	33.9
	18:00	43.2	71.1	41.6	33.8
	19:00	46.2	68.0	47.6	37.8
	20:00	45.4	63.2	47.7	39.2
	21:00	36.0	55.8	36.9	28.7
	22:00	34.1	50.2	35.5	27.3
	23:00	38.1	58.9	38.8	28.2
Thursday 02/08/2012	0:00	35.0	48.9	36.8	28.9
	1:00	36.3	52.1	39.1	28.4
	2:00	35.7	51.8	38.7	29.4
	3:00	36.2	48.4	38.6	30.3
	4:00	37.4	53.1	38.0	31.3
	5:00	30.7	63.9	31.8	25.6
	6:00	31.2	57.6	32.2	24.9
	7:00	37.2	60.4	38.2	31.3
	8:00	37.2	65.6	38.5	32.4
	9:00	35.3	57.7	37.4	29.4
	10:00	35.1	58.0	36.7	30.4
	11:00	36.9	58.3	37.4	29.4
	12:00	37.6	59.6	38.2	30.0
	13:00	37.2	58.2	38.9	31.2
	14:00	38.4	57.6	40.9	32.9
	15:00	37.7	55.5	39.6	34.0
	16:00	38.9	63.5	41.0	34.2
	17:00	39.2	69.4	40.8	33.4
	18:00	40.1	64.6	41.5	33.7
	19:00	37.1	56.9	39.8	31.6
	20:00	35.1	49.7	37.4	29.5
	21:00	34.1	49.5	36.7	28.6
	22:00	33.8	55.6	34.9	26.0
	23:00	38.6	57.7	37.4	25.9
Friday 03/08/2012	0:00	26.9	47.6	28.9	22.0
	1:00	25.7	48.4	26.5	19.6
	2:00	21.5	37.8	23.6	18.6
	3:00	30.7	54.6	29.5	21.7
	4:00	27.7	49.5	29.3	22.2
	5:00	33.1	55.6	35.6	24.9
	6:00	35.5	57.6	37.4	28.0
	7:00	35.1	61.9	37.1	31.2
	8:00	38.4	59.2	40.1	33.8

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U2 - Eastern Boundary Close to Glyndwr Road

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Friday 03/08/2012	9:00	39.2	63.5	39.6	33.3
	10:00	37.6	63.8	38.8	32.2
	11:00	37.2	59.9	36.9	29.1
	12:00	40.1	63.1	38.5	30.3
	13:00	37.0	63.7	36.1	28.6
	14:00	36.0	62.9	35.5	29.6
	15:00	38.3	61.3	39.8	31.6
	16:00	38.5	66.2	37.8	30.8
	17:00	36.7	66.3	35.7	29.0
	18:00	40.5	65.3	40.0	28.8
	19:00	33.5	52.0	34.5	27.5
	20:00	35.0	59.3	33.8	26.0
	21:00	28.3	45.3	29.6	24.3
	22:00	37.1	60.0	35.2	27.7
	23:00	35.3	59.1	32.3	23.1
Saturday 04/08/2012	0:00	35.6	63.4	27.7	19.8
	1:00	36.2	64.4	29.4	19.9
	2:00	26.3	43.3	27.8	22.2
	3:00	29.2	50.4	28.2	19.2
	4:00	31.7	58.0	25.4	18.2
	5:00	37.7	70.9	31.5	23.1
	6:00	34.0	66.9	35.0	26.7
	7:00	31.7	59.4	32.6	25.4
	8:00	31.8	57.3	33.0	27.5
	9:00	35.5	71.6	35.2	28.5
	10:00	40.5	66.6	38.6	30.4
	11:00	38.6	62.5	37.2	30.2
	12:00	41.3	65.1	37.8	32.6
	13:00	42.8	72.0	40.7	30.7
	14:00	34.9	56.3	36.4	31.1
	15:00	41.6	66.9	44.2	35.8
	16:00	44.6	63.1	44.8	37.6
	17:00	45.0	58.2	43.6	38.6
	18:00	38.7	58.0	37.9	29.4
	19:00	36.9	56.2	38.3	29.3
	20:00	35.0	58.5	37.3	28.7
	21:00	34.4	53.5	37.2	28.0
	22:00	35.2	58.3	36.5	25.1
	23:00	36.0	57.6	34.1	25.6
Sunday 05/08/2012	0:00	37.5	61.2	35.0	23.1
	1:00	36.8	58.2	34.5	20.7
	2:00	36.9	61.2	37.3	28.4
	3:00	31.7	48.2	34.2	27.0
	4:00	32.8	52.2	34.9	27.1
	5:00	33.6	57.5	33.5	22.6
	6:00	37.1	71.6	33.8	23.3

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U2 - Eastern Boundary Close to Glyndwr Road
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Sunday 05/08/2012	7:00	33.2	60.6	32.0	22.9
	8:00	32.0	53.3	33.9	23.0
	9:00	38.6	70.3	34.4	26.6
	10:00	37.6	67.7	36.8	30.3
	11:00	42.3	65.1	40.0	33.8
	12:00	35.9	63.4	35.3	28.5
	13:00	36.2	61.7	36.3	29.8
	14:00	44.8	60.0	42.8	37.4
	15:00	43.3	63.2	45.5	37.2
	16:00	40.6	70.3	36.6	29.9
	17:00	41.7	71.8	37.1	29.3
	18:00	45.2	62.9	45.2	39.1
	19:00	41.4	54.5	41.3	37.1
	20:00	37.6	58.8	39.1	30.5
	21:00	35.7	50.8	39.3	27.0
	22:00	35.9	51.7	39.3	24.3
	23:00	38.5	59.0	38.7	20.9
Monday 06/08/2012	0:00	30.7	51.7	31.3	18.4
	1:00	29.3	51.4	31.9	19.6
	2:00	28.3	49.7	30.9	20.6
	3:00	33.1	55.5	32.8	22.8
	4:00	34.7	51.3	37.8	26.0
	5:00	37.6	64.4	40.3	29.2
	6:00	38.3	52.2	41.3	30.8
	7:00	41.9	56.9	44.4	37.1
	8:00	43.7	58.2	46.3	39.5
	9:00	43.1	66.6	45.3	38.8
	10:00	41.3	53.8	43.9	37.2
	11:00	43.4	66.4	45.9	37.2
	12:00	45.2	70.2	47.3	37.4
	13:00	44.6	72.2	42.9	34.9
	14:00	44.3	73.4	46.1	36.6
	15:00	43.3	67.4	44.5	36.7
	16:00	44.4	75.9	43.3	36.2
	17:00	41.9	58.9	44.5	36.8
	18:00	37.4	57.4	39.1	31.9
	19:00	34.2	48.8	36.8	29.6
	20:00	35.6	54.3	38.7	29.5
	21:00	36.6	54.4	39.8	28.2
	22:00	38.5	61.6	40.6	29.1
	23:00	39.6	58.7	41.8	28.8
Tuesday 07/08/2012	0:00	33.5	49.5	36.5	24.0
	1:00	31.3	48.3	35.0	22.7
	2:00	29.9	46.6	32.5	23.7
	3:00	30.5	49.4	33.3	24.7

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U2 - Eastern Boundary Close to Glyndwr Road
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Tuesday 07/08/2012	4:00	33.5	53.4	35.6	27.2
	5:00	39.9	72.4	37.1	27.8
	6:00	35.5	61.0	37.7	29.1
	7:00	39.6	58.4	41.3	34.4

Appendix C
Results of Unattended Noise Survey on Boundary Opposite The Old Chapel

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Wednesday 01/08/2012	11:00	55.8	69.6	59.5	44.2
	12:00	56.0	68.7	59.5	46.1
	13:00	56.4	77.2	59.6	45.6
	14:00	57.0	76.0	60.2	47.2
	15:00	56.1	74.6	59.5	45.7
	16:00	56.0	68.8	59.4	47.3
	17:00	56.9	71.4	60.3	47.6
	18:00	55.8	69.3	59.6	44.8
	19:00	55.8	69.9	59.2	45.6
	20:00	53.5	67.1	57.3	42.4
	21:00	55.3	83.7	56.6	35.0
	22:00	51.0	67.3	54.8	31.2
	23:00	48.5	66.3	51.4	27.8
Thursday 02/08/2012	0:00	48.1	67.1	49.7	29.6
	1:00	46.8	66.4	44.1	30.1
	2:00	47.1	67.1	46.0	29.5
	3:00	47.0	67.4	43.7	29.3
	4:00	45.9	67.2	44.1	27.8
	5:00	49.7	66.9	51.7	29.5
	6:00	52.9	68.4	57.0	35.4
	7:00	55.8	75.2	59.7	42.6
	8:00	57.1	73.4	60.6	46.0
	9:00	56.2	81.2	59.5	44.8
	10:00	56.1	71.7	59.7	46.0
	11:00	56.6	73.2	59.9	46.9
	12:00	55.4	72.3	59.1	43.8
	13:00	56.1	71.8	59.6	44.8
	14:00	55.9	71.2	59.6	43.9
	15:00	56.5	71.5	60.2	45.4
	16:00	56.1	68.4	59.5	46.3
	17:00	56.8	69.8	59.9	47.4
	18:00	56.1	67.7	59.8	45.2
	19:00	54.8	75.2	58.6	40.7
	20:00	53.3	67.4	57.5	37.8
	21:00	52.4	69.8	56.4	34.4
	22:00	50.0	67.1	54.4	29.5
	23:00	49.9	69.4	52.7	26.4
Friday 03/08/2012	0:00	47.7	67.1	49.3	21.7
	1:00	46.8	67.3	43.0	19.5
	2:00	46.1	67.2	41.4	18.8
	3:00	46.1	66.4	43.7	20.9
	4:00	45.3	66.3	40.3	20.1
	5:00	49.3	67.0	51.4	29.0
	6:00	52.2	67.3	56.3	35.6
	7:00	55.6	69.1	59.5	42.0
	8:00	56.7	72.3	60.1	46.0

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Friday 03/08/2012	9:00	55.9	70.0	59.5	43.1
	10:00	56.5	72.6	59.8	45.9
	11:00	56.2	69.0	59.5	45.5
	12:00	56.8	69.9	60.0	46.9
	13:00	56.7	74.2	60.1	44.0
	14:00	56.0	67.5	59.4	44.9
	15:00	56.2	75.5	59.4	46.9
	16:00	55.8	75.1	59.2	46.2
	17:00	55.9	73.6	59.3	44.2
	18:00	56.0	78.4	58.9	44.8
	19:00	54.4	70.9	57.9	40.8
	20:00	52.5	70.6	56.8	36.2
	21:00	51.1	67.0	55.5	32.5
	22:00	51.2	70.0	55.1	34.6
Saturday 04/08/2012	23:00	49.8	66.6	53.1	28.6
	0:00	47.8	66.9	48.7	22.0
	1:00	47.5	67.4	45.9	21.4
	2:00	45.8	67.0	41.3	19.5
	3:00	45.7	66.3	41.5	18.1
	4:00	44.0	66.6	35.9	17.8
	5:00	47.0	66.4	49.2	26.7
	6:00	49.9	66.9	53.7	29.8
	7:00	50.9	66.5	55.0	31.9
	8:00	53.9	69.3	58.1	39.9
	9:00	54.8	72.2	58.6	43.1
	10:00	55.7	70.5	59.1	45.0
	11:00	55.9	69.4	59.4	45.4
	12:00	56.7	72.5	59.5	46.2
Sunday 05/08/2012	13:00	56.9	69.8	60.1	47.6
	14:00	56.5	78.5	59.6	46.3
	15:00	56.4	76.5	59.5	46.7
	16:00	56.4	68.6	59.6	49.4
	17:00	57.5	71.7	60.7	49.9
	18:00	54.9	71.4	58.9	43.7
	19:00	53.9	67.1	57.9	41.4
	20:00	52.0	71.3	56.1	38.6
	21:00	51.1	71.0	55.5	36.3
	22:00	50.0	69.8	53.7	37.2
	23:00	48.8	65.7	52.6	36.4
	0:00	48.5	72.9	52.0	34.9
	1:00	47.9	68.8	49.5	29.2
	2:00	43.6	63.7	40.9	27.2
	3:00	43.7	66.1	43.0	23.4
	4:00	41.9	64.6	38.0	23.1
	5:00	45.9	74.3	46.5	25.7
	6:00	46.7	65.2	48.5	26.4

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Sunday 05/08/2012	7:00	48.5	65.2	52.1	28.1
	8:00	51.8	68.2	55.6	33.7
	9:00	53.3	68.1	57.4	39.9
	10:00	55.1	69.9	58.7	43.3
	11:00	56.4	75.5	59.7	47.1
	12:00	55.5	73.2	59.1	46.0
	13:00	56.2	74.0	59.5	47.1
	14:00	57.7	68.4	60.6	49.8
	15:00	56.7	67.3	60.2	47.6
	16:00	55.4	71.6	59.1	45.5
	17:00	55.2	77.0	58.5	42.8
	18:00	55.5	68.6	59.1	46.7
	19:00	54.6	72.4	58.3	44.7
	20:00	52.1	68.5	56.2	38.4
	21:00	49.9	66.6	54.1	34.6
	22:00	48.9	68.2	52.8	31.4
	23:00	46.0	67.2	46.7	28.7
Monday 06/08/2012	0:00	42.4	62.0	41.8	24.7
	1:00	42.7	64.5	39.8	23.8
	2:00	39.9	63.6	34.4	23.2
	3:00	38.2	62.7	35.4	23.6
	4:00	43.4	65.5	41.0	25.5
	5:00	50.6	66.8	53.5	32.8
	6:00	53.4	69.4	57.3	35.9
	7:00	56.3	68.5	60.2	44.3
	8:00	57.6	75.1	60.7	48.2
	9:00	56.8	75.3	60.1	46.8
	10:00	56.7	75.6	59.9	46.1
	11:00	56.2	72.0	59.7	46.7
	12:00	56.3	69.9	59.7	47.4
	13:00	56.2	69.8	59.5	46.3
	14:00	57.2	76.7	60.3	46.9
	15:00	56.3	69.0	59.6	47.6
	16:00	56.4	68.1	59.9	47.7
	17:00	57.5	77.7	60.4	48.2
	18:00	55.7	68.8	59.4	44.0
	19:00	54.2	71.8	58.1	39.2
	20:00	53.1	68.7	57.2	37.8
	21:00	51.4	68.6	55.4	32.7
	22:00	50.0	66.4	54.0	32.0
	23:00	48.7	70.0	50.8	30.5
Tuesday 07/08/2012	0:00	47.3	66.9	47.6	24.8
	1:00	46.3	66.5	43.0	23.0
	2:00	46.0	66.7	42.2	26.5
	3:00	46.2	68.1	42.0	26.0

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Tuesday 07/08/2012	4:00	44.7	66.5	42.4	25.8
	5:00	50.3	66.6	53.3	30.0
	6:00	52.9	67.8	57.0	36.0
	7:00	56.0	71.0	59.9	43.8
	8:00	58.5	74.6	61.9	49.8

Appendix D Calculation Details

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor: Ael-y-bryn m Uses BS5228:2009
Height 286

Predicted Freefield Noise Levels

Activity	Ref @ 10m	% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation Hard	Distance Attenuation Soft	CRTN Barrier Attenuation	Max Atten.	LAeq [dB]	Total LAeq [dB]
Phase 1												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	282	230	305	60	-27.2	-32.0	-20.0	-47.2	36.9	
Loading Shovel	70.0	LAeq 100	282	230	305	60	-27.2	-32.0	-20.0	-47.2	22.8	
Screen	76.5	LAeq 100	282	230	305	60	-27.2	-32.0	-20.0	-47.2	29.2	
HGV Movement (Laden)	83.4	SEL 4	282	120	298	60	-21.6	-25.0	-20.0	-41.6	12.3	
HGV Movement (Unladen)	77.4	SEL 4	282	120	298	60	-21.6	-25.0	-20.0	-41.6	6.3	
HGV Tipping	92.9	SEL 4	282	230	305	60	-27.2	-32.0	-20.0	-47.2	16.1	37.7
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	282	120	298	40	-21.6	-25.0	-20.0	-41.6	29.8	
Dozer / Compactor	79.2	LAeq 75	282	120	298	40	-21.6	-25.0	-20.0	-41.6	36.4	
HGV Movement (Laden)	83.4	SEL 4	282	120	298	40	-21.6	-25.0	-20.0	-41.6	12.3	
HGV Movement (Unladen)	77.4	SEL 4	282	120	298	40	-21.6	-25.0	-20.0	-41.6	6.3	
HGV Tipping	92.9	SEL 4	282	120	298	40	-21.6	-25.0	-20.0	-41.6	21.8	37.4
Phase 2												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	285	150	298	60	-23.5	-27.4	-18.6	-42.1	42.0	
Loading Shovel	70.0	LAeq 100	285	150	298	60	-23.5	-27.4	-18.6	-42.1	27.9	
Screen	76.5	LAeq 100	285	150	298	60	-23.5	-27.4	-18.6	-42.1	34.4	
HGV Movement (Laden)	83.4	SEL 4	285	150	298	60	-23.5	-27.4	-18.6	-42.1	11.8	
HGV Movement (Unladen)	77.4	SEL 4	285	150	298	60	-23.5	-27.4	-18.6	-42.1	5.8	
HGV Tipping	92.9	SEL 4	285	150	298	60	-23.5	-27.4	-18.6	-42.1	21.3	42.9
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	288	150	298	60	-23.5	-27.4	-17.2	-40.8	30.6	
Dozer / Compactor	79.2	LAeq 75	288	150	298	60	-23.5	-27.4	-17.2	-40.8	37.2	
HGV Movement (Laden)	83.4	SEL 4	288	150	298	60	-23.5	-27.4	-17.2	-40.8	13.1	
HGV Movement (Unladen)	77.4	SEL 4	288	150	298	60	-23.5	-27.4	-17.2	-40.8	7.1	
HGV Tipping	92.9	SEL 4	288	150	298	60	-23.5	-27.4	-17.2	-40.8	22.6	38.2
Phase 3												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	284	150	298	60	-23.5	-27.4	-19.0	-42.5	41.6	
Loading Shovel	70.0	LAeq 100	284	150	298	60	-23.5	-27.4	-19.0	-42.5	27.5	
Screen	76.5	LAeq 100	284	150	298	60	-23.5	-27.4	-19.0	-42.5	34.0	
HGV Movement (Laden)	83.4	SEL 4	284	150	298	60	-23.5	-27.4	-19.0	-42.5	11.4	
HGV Movement (Unladen)	77.4	SEL 4	284	150	298	60	-23.5	-27.4	-19.0	-42.5	5.4	
HGV Tipping	92.9	SEL 4	284	150	298	60	-23.5	-27.4	-19.0	-42.5	20.9	42.5
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	294	110	298	15	-20.9	-24.1	-15.4	-36.2	35.2	
Dozer / Compactor	79.2	LAeq 75	294	110	298	15	-20.9	-24.1	-15.4	-36.2	41.7	
HGV Movement (Laden)	83.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	15.0	
HGV Movement (Unladen)	77.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	9.0	
HGV Tipping	92.9	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	24.5	42.7
Phase 4												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	300	200	298	115	-26.0	-30.6	-12.3	-38.3	33.1	
Dozer / Compactor	79.2	LAeq 75	300	200	298	115	-26.0	-30.6	-12.3	-38.3	39.6	
HGV Movement (Laden)	83.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	15.0	
HGV Movement (Unladen)	77.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	9.0	
HGV Tipping	92.9	SEL 4	300	200	298	115	-26.0	-30.6	-12.3	-38.3	25.0	40.6
Phase 5												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	295	110	298	30	-20.9	-24.1	-14.1	-34.9	36.5	
Dozer / Compactor	79.2	LAeq 75	295	110	298	30	-20.9	-24.1	-14.1	-34.9	43.0	
HGV Movement (Laden)	83.4	SEL 4	292	110	298	30	-20.8	-24.1	-16.5	-37.3	16.6	
HGV Movement (Unladen)	77.4	SEL 4	292	110	298	30	-20.8	-24.1	-16.5	-37.3	10.6	
HGV Tipping	92.9	SEL 4	295	110	298	30	-20.9	-24.1	-14.1	-34.9	28.4	44.0
Construction / Removal of Bund												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	300	150			-23.6	-27.4	0.0	-27.4	44.0	
Dozer / Compactor	79.2	LAeq 75	300	120			-21.6	-25.1	0.0	-25.1	52.9	
HGV Movement (Laden)	83.4	SEL 4	300	120			-21.6	-25.1	0.0	-25.1	28.8	
HGV Movement (Unladen)	77.4	SEL 4	300	120			-21.6	-25.1	0.0	-25.1	22.8	
HGV Tipping	92.9	SEL 4	300	120			-21.6	-25.1	0.0	-25.1	38.3	53.6

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor: Hillside
Height: 287 m
Uses BS5228:2009

Predicted Freefield Noise Levels

							Distance		CRTN	Max		Total	
Activity	Ref		% On Time	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Attenuation	Soft	Barrier	Atten.	LAeq	LAeq
	@10m		/ no./hr					Hard		Attenuation		[dB]	[dB]
Phase 1													
Recycling Area													
Crusher Being Loaded by Excavator	84.1	LAeq	100	282	170	317	30	-24.6	-28.8	-20.0	-44.6	39.5	
Loading Shovel	70.0	LAeq	100	282	170	317	30	-24.6	-28.8	-20.0	-44.6	25.4	
Screen	76.5	LAeq	100	282	170	317	30	-24.6	-28.8	-20.0	-44.6	31.9	
HGV Movement (Laden)	83.4	SEL	4	282	170	317	30	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL	4	282	170	317	30	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL	4	282	170	317	30	-24.6	-28.8	-20.0	-44.6	18.7	40.4
Placement of Restoration Materials													
Excavator	71.4	LAeq	100	282	170	315	40	-24.6	-28.8	-20.0	-44.6	26.8	
Dozer / Compactor	79.2	LAeq	75	282	170	315	40	-24.6	-28.8	-20.0	-44.6	33.3	
HGV Movement (Laden)	83.4	SEL	4	282	170	315	40	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL	4	282	170	315	40	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL	4	282	170	315	40	-24.6	-28.8	-20.0	-44.6	18.7	34.3
Phase 2													
Recycling Area													
Crusher Being Loaded by Excavator	84.1	LAeq	100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	37.7	
Loading Shovel	70.0	LAeq	100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	23.6	
Screen	76.5	LAeq	100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	30.0	
HGV Movement (Laden)	83.4	SEL	4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	7.4	
HGV Movement (Unladen)	77.4	SEL	4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	1.4	
HGV Tipping	92.9	SEL	4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	16.9	38.5
Placement of Restoration Materials													
Excavator	71.4	LAeq	100	292	170	315	40	-24.6	-28.8	-20.0	-44.6	26.8	
Dozer / Compactor	79.2	LAeq	75	292	170	315	40	-24.6	-28.8	-20.0	-44.6	33.3	
HGV Movement (Laden)	83.4	SEL	4	292	170	315	40	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL	4	292	170	315	40	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL	4	292	170	315	40	-24.6	-28.8	-20.0	-44.6	18.7	34.3
Phase 3													
Recycling Area													
Crusher Being Loaded by Excavator	84.1	LAeq	100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	37.7	
Loading Shovel	70.0	LAeq	100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	23.6	
Screen	76.5	LAeq	100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	30.0	
HGV Movement (Laden)	83.4	SEL	4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	7.4	
HGV Movement (Unladen)	77.4	SEL	4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	1.4	
HGV Tipping	92.9	SEL	4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	16.9	38.5
Placement of Restoration Materials													
Excavator	71.4	LAeq	100	302	170	315	40	-24.6	-28.8	-20.0	-44.6	26.8	
Dozer / Compactor	79.2	LAeq	75	302	170	315	40	-24.6	-28.8	-20.0	-44.6	33.3	
HGV Movement (Laden)	83.4	SEL	4	302	170	315	40	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL	4	302	170	315	40	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL	4	302	170	315	40	-24.6	-28.8	-20.0	-44.6	18.7	34.3
Phase 4													
Placement of Restoration Materials													
Excavator	71.4	LAeq	100	300	210	313	80	-26.5	-31.1	-20.0	-46.5	24.9	
Dozer / Compactor	79.2	LAeq	75	300	210	313	80	-26.5	-31.1	-20.0	-46.5	31.5	
HGV Movement (Laden)	83.4	SEL	4	300	210	313	80	-26.5	-31.1	-20.0	-46.5	7.4	
HGV Movement (Unladen)	77.4	SEL	4	300	210	313	80	-26.5	-31.1	-20.0	-46.5	1.4	
HGV Tipping	92.9	SEL	4	300	210	313	80	-26.5	-31.1	-20.0	-46.5	16.9	32.5
Phase 5													
Placement of Restoration Materials													
Excavator	71.4	LAeq	100	305	170	313	40	-24.7	-28.8	-19.0	-43.7	27.7	
Dozer / Compactor	79.2	LAeq	75	305	170	313	40	-24.7	-28.8	-19.0	-43.7	34.3	
HGV Movement (Laden)	83.4	SEL	4	305	170	313	40	-24.7	-28.8	-19.0	-43.7	10.2	
HGV Movement (Unladen)	77.4	SEL	4	305	170	313	40	-24.7	-28.8	-19.0	-43.7	4.2	
HGV Tipping	92.9	SEL	4	305	170	313	40	-24.7	-28.8	-19.0	-43.7	19.7	35.3
Construction / Removal of Bund													
Placement of Restoration Materials													
Excavator	71.4	LAeq	100	310	130			-22.4	-26.0	0.0	-26.0	45.4	
Dozer / Compactor	79.2	LAeq	75	310	130			-22.4	-26.0	0.0	-26.0	51.9	
HGV Movement (Laden)	83.4	SEL	4	310	130			-22.4	-26.0	0.0	-26.0	27.8	
HGV Movement (Unladen)	77.4	SEL	4	310	130			-22.4	-26.0	0.0	-26.0	21.8	
HGV Tipping	92.9	SEL	4	310	130			-22.4	-26.0	0.0	-26.0	37.3	52.9

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor:
Height

The Old Chapel
239 m

Uses BS5228:2009

Predicted Freefield Noise Levels

Reduced Predicted Noise Levels														Total LAeq [dB]
Activity	Ref @10m		% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation Hard Soft		CRTN Barrier Attenuation	Max Atten.	LAeq [dB]		
Vehicles on Access (Worst Case)														
HGV Entering Quarry (Laden)	83.4	SEL	4	241	14			-3.0	-3.0	0.0	-3.0	50.8	51.8	
HGV Leaving Quarry (Unladen)	77.4	SEL	4	241	14			-3.0	-3.0	0.0	-3.0	44.8		
Vehicles on Access (Typical Case)														
HGV Entering Quarry (Laden)	83.4	SEL	2	241	14			-3.0	-3.0	0.0	-3.0	47.8	48.8	
HGV Leaving Quarry (Unladen)	77.4	SEL	2	241	14			-3.0	-3.0	0.0	-3.0	41.8		
Vehicles on Access (Worst Case - Mitigated)														
HGV Entering Quarry (Laden)	83.4	SEL	4	241	14	242	2	-3.0	-3.0	-12.9	-15.9	37.9	38.9	
HGV Leaving Quarry (Unladen)	77.4	SEL	4	241	14	242	2	-3.0	-3.0	-12.9	-15.9	31.9		

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor:
Height

Sharma
235 m

Uses BS5228:2009

Predicted Freefield Noise Levels

Predicted Fitted Noise Levels													
Activity	Ref @10m		% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		CRTN Barrier Attenuation	Max Atten.	LAeq [dB]	Total LAeq [dB]
								Hard	Soft				
Vehicles on Access (Worst Case)													
HGV Entering Quarry (Laden)	83.4	SEL	4	236	26			-8.3	-8.4	0.0	-8.4	45.5	
HGV Leaving Quarry (Unladen)	77.4	SEL	4	236	26			-8.3	-8.4	0.0	-8.4	39.5	46.5
Vehicles on Access General Case)													
HGV Entering Quarry (Laden)	83.4	SEL	2	236	26			-8.3	-8.4	0.0	-8.4	42.5	
HGV Leaving Quarry (Unladen)	77.4	SEL	2	236	26			-8.3	-8.4	0.0	-8.4	36.5	43.4

ANV

**Acoustics Noise
and Vibration**

Acoustic Consultants

Beaufort Court
17 Roebuck Way
Milton Keynes
MK5 8HL
Tel 01908 642811
Fax 01908 642800

NOISE ASSESSMENT

PLANNING APPLICATION FOR THE RESTORATION OF CAMBRIAN QUARRY BY THE IMPORTATION AND RECYCLING OF INERT MATERIALS

**ASH RESOURCE MANAGEMENT
(CAMBRIAN QUARRY) LTD**

FINAL REPORT

FEBRUARY 2013

NOISE ASSESSMENT

**PLANNING APPLICATION FOR THE
RESTORATION OF CAMBRIAN QUARRY BY
THE IMPORTATION AND RECYCLING OF
INERT MATERIALS**

**ASH RESOURCE MANAGEMENT
(CAMBRIAN QUARRY) LTD**

FINAL REPORT

FEBRUARY 2013

This report has been prepared using all reasonable skill, care and diligence within the resources and brief agreed with the client.
Acoustics Noise and Vibration (ANV) accept no responsibility for matters outside the terms of the brief or for use of this report, wholly or in part, by third parties.

CONTENTS

1.	Introduction	1
2.	Scope of the Assessment	2
3.	Noise Units and Standards	3
3.1	Noise Units	3
4.	Applicable Standards	4
4.1	Minerals Planning Guidance MPG 11	4
4.2	Minerals Technical Advice Note 1	4
5.	Existing Noise Environment	5
5.1	General Format for Environmental Noise Assessment	5
5.2	Identification of Potentially Affected Noise-Sensitive Locations	5
5.3	Noise Measurements	5
5.4	Discussion of Existing Noise Environment	7
6.	Assessment Criteria	9
7.	Assessment	10
7.1	Potential Sources of Impact	10
7.2	Calculated Noise Levels	11
7.3	Assessment of Noise from Site Operations	12
8.	Noise Control During Site Operations	14
9.	Summary	16
	References	
	Figures	
	Appendices	

1. INTRODUCTION

Acoustics Noise and Vibration ('ANV') has been appointed by ASH Resource Management (Cambrian Quarry) Ltd ('ASH'), to carry out a noise assessment in relation to the proposed operations associated with the restoration of Cambrian Quarry.

The assessment is required as part of a formal Environmental Statement, which is being prepared to accompany a Planning Application for inert materials recycling and infilling to restore the former quarry.

ASH are proposing to utilise an existing recycling plant, currently operating at another site within the quarry, with materials brought onto site using four axle HGV tipper lorries.

2. SCOPE OF THE ASSESSMENT

This assessment includes:

- a description of the noise units referred to;
- establishment of the existing baseline situation;
- an assessment of the existing noise environment at potentially affected noise sensitive locations;
- standards for the assessment of noise from site operations;
- predicted noise levels from the proposed operations; and
- an assessment of the predicted levels against the proposed noise criteria; and
- recommendations for the control and mitigation of noise from site operations.

3. NOISE UNITS AND STANDARDS

3.1 Noise Units

Decibels (dB)

Noise can be considered as ‘unwanted sound’. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

A-Weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit that has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

Units Used to Describe Time-Varying Noise Sources (L_{Aeq} , L_{Amax} , L_{A10} , and L_{A90})

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax S}$, or Slow, is averaged over 1 second. All L_{Amax} values referred to in this report are Fast.

The L_{A10} is the noise level exceeded for 10% of the measurement period. It has been used in the UK for the assessment of road traffic noise.

The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise that is present even during the quieter parts of measurement period.

4. APPLICABLE STANDARDS

4.1 Minerals Planning Guidance MPG 11

The guidance used to assess noise from quarry operations is provided in Minerals Planning Guidance (MPG) 11 [1]. Sections 31 to 42 of this guidance, which contain advice on noise limits, were superseded in 2004 with guidance contained in Minerals Technical Advice Note (MTAN) 1 [2], although the remainder of MPG 11 remains current.

The remaining sections of MPG11 contain advice on the requirements for noise monitoring, calculation of noise levels and on noise abatement controls and consideration of this has been made within this report.

4.2 Minerals Technical Advice Note 1

MTAN 1, published in 2004, replaced Sections 31 to 42 of MPG 11 and seeks that:

“the aggregates industry should aim to keep noise emissions to a level that reflects the highest possible environmental standards, taking all reasonable steps to achieve quieter working while having regard to the principles of BATNEEC – the best available techniques not entailing excessive cost.”

MTAN 1 advises that noise limits should relate to background noise levels, subject to a maximum daytime noise limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ where background noise levels exceed 45 dB (A). 55 dB L_{Aeq} is the lower limit of the daytime noise levels where serious annoyance is caused. Where background noise levels are less than 45 dB(A), noise limits should be defined as background noise levels plus 10 dB(A).

Night-time working limits should not exceed 42 dB $L_{Aeq, 1 \text{ hour}}$ at noise sensitive properties.

Daytime working is defined as 07:00 – 19:00 hours and night-time as 19:00 – 07:00 hours.

During temporary or short-term operations, higher levels may be reasonable, but should not exceed 67 dB $L_{Aeq, 1 \text{ hour}}$ for periods of up to 8 weeks in a year specified at noise sensitive properties.

5. EXISTING NOISE ENVIRONMENT

5.1 General Format for Environmental Noise Assessment

An environmental noise assessment of a potentially noisy proposal consists of the following steps:

- i) identification of potentially affected noise-sensitive locations (in particular dwellings);
- ii) assessment of the existing noise environment at potentially affected noise-sensitive locations;
- iii) establishment of suitable assessment criteria;
- iv) prediction of noise levels from the proposed activities; and
- v) assessment of predicted levels against criteria, taking into account the existing noise environment where appropriate, and proposing mitigation where necessary.

5.2 Identification of Potentially Affected Noise-Sensitive Locations

During site visits carried out in 2012, the following dwellings were identified as being the potentially most likely to be affected by noise from the proposed restoration of Cambrian Quarry:

- i) Sharma and The Old Chapel at the northern end of Glyndwr Road, which would be potentially affected by the vehicles accessing the quarry along the new access; and
- ii) The dwellings to the east of the quarry along Glyndwr Road, which include Hillside and Ael-y-bryn and would be potentially most affected by the operations within the quarry.

The potentially affected locations are shown on Figure 1.

5.3 Noise Measurements

Unattended Noise Survey

In order to evaluate the existing noise environment at the dwellings which would be potentially affected by the reopening of the quarry, unattended noise surveys were carried out between 1 – 7 August 2012.

Rion NL-32 Class 1 Sound Level Meters were used for the survey, which were calibrated before and after the exercise using a Rion NC-74 Class 1 Sound Level Calibrator. The instruments were also fitted with sound recording cards, which allowed sample recordings of the noise environment to be obtained during the survey period.

Measurements were taken at three locations along the quarry boundary, representative of the closest dwellings to the proposed activity. The monitoring locations are indicated on Figure 1.

At each position, the microphone was positioned at a height of 1.3 metres above local ground level at a free-field position (i.e. at least 3.5 metres from a reflecting surface such as a building facade).

Measurements were made over contiguous 15 minute periods during the survey period, with the results subsequently analysed into hourly periods for reporting purposes using the Rion AS-60 Data Analysis software package.

Weather conditions during the survey period were mixed, with dry conditions followed by periods of rain. Wind speeds remained generally light throughout the survey.

The results of the monitoring at each location are discussed below.

Position 1- Adjacent to Ael-y-bryn

This monitoring location was at the top of the existing quarry face on the boundary with Ael-y-bryn. This location was considered to be representative of the noise environment at the dwellings adjacent to the quarry along Glyndwr Road.

The results obtained at this location are presented in Appendix A, with a graphical representation on Figure 2. A summary of the daytime noise levels, when the proposed quarry would operate, are provided in Table 5.1 below.

Date	Free-field Noise Levels [dB]	
	Period L_{Aeq}	Average L_{A90}
Wednesday 1/8/12	46.4	38.2
Thursday 2/8/12	39.9	33.9
Friday 3/8/12	40.0	32.8
Saturday (4/8/12) (a.m.)	39.9	32.4
Monday 6/8/12	45.2	38.9
Average	42	35

Table 5.1 Summary Results of Measurements Made Adjacent to Ael-y-bryn

Position 2- Access Road Adjacent to Ael-y-bryn

This monitoring location was along the existing access road adjacent to the dwelling, set down approximately 6 metres below the ground level at the dwelling.

The results obtained at this location are presented in Appendix B, with a graphical representation on Figure 3. A summary of the daytime noise levels, when the proposed quarry would operate, are provided in Table 5.2 below.

Date	Free-field Noise Levels [dB]	
	Period L_{Aeq}	Average L_{A90}
Wednesday 1/8/12	43.0	35.2
Thursday 2/8/12	37.8	31.9
Friday 3/8/12	38.2	30.7
Saturday (4/8/12) (a.m.)	38.1	29.1
Monday 6/8/12	43.2	36.7
Average	40	33

Table 5.2 Summary Results of Measurements Made on Access Road

Position 3- The Old Chapel, Glyndwr Road

This monitoring location at this position was located within the site opposite The Old Chapel, with the instrument set at the same distance back from the road as the facade of the dwelling.

The results obtained at this location are presented in Appendix C, with a graphical representation on Figure 4. A summary of the daytime noise levels, when the proposed quarry would operate, are provided in Table 5.3 below.

Date	Free-field Noise Levels [dB]	
	Period L_{Aeq}	Average L_{A90}
Wednesday 1/8/12	56.3	46.1
Thursday 2/8/12	56.2	45.3
Friday 3/8/12	56.2	45.0
Saturday (4/8/12) (a.m.)	55.0	41.9
Monday 6/8/12	56.2	46.7
Average	56	45

Table 5.3 Summary Results of Measurements Made Adjacent to The Old Chapel

5.4 Discussion of Existing Noise Environment

Existing noise levels at the dwellings along Glyndwr Road adjacent to the main quarry are low, as the properties are remote from any major noise sources. The principal influences on the noise environment at these dwellings were associated with the occasional vehicles travelling along the road and more distant road traffic on the main road network. Given the distances to the main roads, the noise levels varied from day to day, principally based upon the direction of the wind.

Noise levels were higher at the northern end of the quarry, adjacent to The Old Chapel. Noise levels at this location are principally influenced by the road traffic travelling along the A494 Ruthin Road to the north, with vehicles also passing along Glyndwr Road during the day. Given the proximity to the A494, noise levels were generally more constant throughout the survey period.

6. ASSESSMENT CRITERIA

Noise limits have been proposed in accordance with the guidance contained in MTAN1, based upon a limit 10 dB(A) above the typical background noise levels. Given the rural surroundings the limits would be achieved where possible, however, it is likely that there would be periods during the restoration where this may not be achievable. During these periods, the principles of BATNEEC would be adopted to ensure that noise levels would be minimised and remain within acceptable daytime noise standards as recommended by the World Health Organisation [3].

The proposed normal working criteria, presented in terms of a freefield noise limit as required by the MTAN 1 guidelines, are presented in Table 6.1.

Location	Average Daytime Free-field L_{A90} Noise Levels [dB]	Daytime Criterion dB $L_{Aeq, 1 \text{ hour}}$ Freefield
Dwellings on Glyndwr Road east of the Quarry	35	45
The Old Chapel and Sharma	45	55

Table 6.1: Assessment Criteria for Potentially Most Affected Dwellings

For all temporary operations, an assessment criterion of 67 dB $L_{Aeq, 1 \text{ hour}}$ freefield, has been adopted for the assessment as per the requirements of the MTAN 1 guidance.

7. ASSESSMENT

7.1 Potential Sources of Impact

It is proposed to construct a new access into the quarry, which will turn off Glyndwr Road close to The Old Chapel. The initial stretch of the access road would be two way and beyond there it would generally be single width and be signal controlled, with the northern control point close to the property.

Based upon the anticipated tonnage to be imported on an annual basis, it is anticipated that on average there would be 3 to 4 in/outbound trips per hour (30 – 40 two way trips per weekday), with a maximum of 7 to 8 trips per hour during a busy contract period. All the vehicles accessing the quarry would be four axle HGV tipper lorries.

It is proposed to restore the quarry in 5 main phases, as indicated on plans ASH/CQ/08a-f, which are provided within the main ES.

The processes carried out within the main quarry would be split into two main areas.

During phases 1 – 4, there would be a recycling area, containing a crusher and screens, which would operate throughout the week and would be used to screen some of the imported materials. It is proposed that the recycling plant would initially be located within the southern part of the quarry, prior to relocating into the northern area, ensuring that the height of the plant was maintained at a maximum ground level of 282 metres a.o.d. throughout the operational period, ensuring that the plant was at least 10 metres below the top of the quarry face and thus maximising the attenuation afforded by the top of the face. The recycling plant would not operate within the quarry during Phase 5 when the overall level of the quarry floor is raised.

The second operation would be associated with the mobile restoration plant, which would include an excavator, dozer and compaction roller. This plant would be used periodically throughout the week, when sufficient material was available to progress an area for restoration.

The recycling and mobile plant within the quarry would not be operated concurrently. It is proposed that there would only be three personnel on site operating the plant, and generally it is likely that either the recycling or mobile restoration plant would be working at one time.

It is proposed that the recycling plant currently in use at the existing ASH recycling facility at Deeside would be brought into the quarry and source term noise levels have been measured adjacent to this plant. Where items of mobile plant were not operational within the existing facility, source terms have been assumed from measurements obtained previously by ANV.

Table 7.1 lists the plant assumed for the calculations along with the source term information.

Item of Plant	Noise Level [dB(A)]	Distance [m]	Index
Crusher and Excavator	84.1	10	L _{Aeq}
Loading Shovel	70.0	10	L _{Aeq}
Power Screen	76.5	10	L _{Aeq}
HGV Movement (Laden)	83.4	10	SEL
HGV Movement (Unladen)	77.4	10	SEL
HGV Tipping	92.9	10	SEL
Dozer / Compactor	79.2	10	L _{Aeq}

Table 7.1: Noise Source Terms for Equipment Likely to be used on Site

The proposed operational hours at the quarry would be 07:00 – 17:00 hours Monday to Friday and 07:00 – 13:00 hours on Saturdays, with no working on Sundays or Bank Holidays.

7.2 Calculated Noise Levels

Noise levels have been predicted for the principal items of plant likely to be used during normal operations.

Noise levels have been calculated using the methodology described in BS 5228:Part 1 [4]. Where barrier performances have been calculated, the methodology described in a ‘Calculation of Road Traffic Noise’ (CRTN) [4] has been adopted and assuming a maximum attenuation of 20 dB(A) from the quarry face.

Estimated worst-case noise levels, based on a realistic operating scenario, have been compared to the criteria described in Section 6 in order to determine whether mitigation is likely to be necessary to achieve the standards of noise required by the MTAN1 guidelines.

The predicted levels are worst case because:

- i) It has been assumed that the main items of plant will operate 100% of the time;
- ii) Calculations have been made upon the restoration levels at the end of each phase; and
- iii) the need for mitigation has been determined on the basis of the shortest distance/minimum attenuation between the proposed areas of activity and the potentially most affected dwellings.

The existing bund which runs along part of the eastern boundary of the quarry would be retained at its existing height. In addition, the bund would be extended as far north as possible at a height of 3 metres. However, it would not be possible to extend the bund along the whole of the eastern boundary, as there are bat caves in the quarry face close to Ael-y-bryn, which prevents infilling to the top of the quarry in this area.

The calculation details are given in Appendix D.

7.3 Assessment of Noise from Site Operations

Location 1 – Dwellings on Glyndwr Road Adjacent to the Quarry

There are a number of dwellings alongside Glyndwr Road, which are to the east of the main quarry void. The dwellings are sited between 90 and 135 metres from the closest quarry face.

At present, the base of the quarry void is approximately 20 metres below the ground level at the dwellings and the eastern quarry face is approximately 35 metres above the base of the quarry void.

To provide some additional protection to the surrounding residents, the existing bund which runs along part of the eastern boundary would be extended to the north. This operation would be carried out at a point in time when sufficient fill has been placed in this area of the quarry void to permit the plant to access the bund. It is expected that this operation would be carried out during Phase 3. Noise levels associated with these works, which would be temporary in nature would generate noise levels of up to 54 dB $L_{Aeq, 1 \text{ hour}}$ at the properties, thus remaining below the temporary working limit of 67 dB $L_{Aeq, 1 \text{ hour}}$. The enhancements to the bund would provide an additional benefit to the residents during Phases 3 – 5.

In addition, the recycling plant would be taken off site at the end of Phase 4, once the levels in the quarry have been raised in this area above 282 metres. It is proposed that the main recycling plant would initially be sited within the southern area of the quarry void, with the height of the plant maintained at a level of 282 metres a.o.d. or lower, to provide a good degree of screening from the operations. Noise levels associated with the operation of the recycling plant and deliveries of materials are anticipated to be between 38 – 40 dB $L_{Aeq, 1 \text{ hour}}$ at the commencement of operations on site, rising to between 38 – 43 dB $L_{Aeq, 1 \text{ hour}}$ as the plant is relocated into the northern half of the quarry during Phase 2. It is not anticipated that the operation of the recycling plant would generate noise levels above the proposed normal working limit at the dwellings.

Infilling of the quarry would be carried out progressively as sufficient materials are brought onto site, with the mobile restoration plant used periodically during the week. As indicated previously, the number of personnel on site would limit the amount of plant which could operate at any one time and it is understood that generally either the recycling or mobile restoration plant would be in use and generally not both.

The calculations of the noise levels associated with the infilling and restoration operations indicate noise levels of between 34 – 38 dB $L_{Aeq, 1 \text{ hour}}$ during Phases 1 and 2, whilst the plant is operating close to the level of the existing quarry floor.

Noise levels associated with the operation of the plant would gradually increase during Phases 3 - 5, as the infill and restoration rises to the final levels, although the plant is anticipated to remain screened from the surrounding properties. The calculations indicate that the noise levels associated with the plant could generate noise levels of up to 44 dB $L_{Aeq, 1 \text{ hour}}$ at the dwellings as the plant nears the surface.

With the bund enhanced and the proposed working methods adopted, noise levels associated with the use of the restoration plant would not normally exceed the 45 dB $L_{Aeq, 1 \text{ hour}}$ normal working limit at the dwellings.

Given the low noise limit at the dwellings along Glyndwr Road, it will be necessary to ensure that noise levels are controlled and monitored periodically to ensure that noise levels are minimised and the of principles of BATNEEC are being adopted.

Location 2 – The Old Chapel and Sharma

The Old Chapel and Sharma are located adjacent to the proposed new access into the quarry. Noise levels associated with the restoration of the quarry at these dwellings would be associated with the vehicle movements along the access.

As indicated in the previous section, all loads into the quarry would be made using tipper trucks and there would be between 3- 4 loads per hour brought to the site, which would double during periods of high activity from ASH contracts.

Beyond the initial stretch of access road, the access road into the quarry would be one way, with the width allowing for a single vehicle. The access would be signal controlled at either end. To ensure potential disturbance to the occupants associated with waiting vehicles was minimised, the signals would be prioritised to ensure that vehicles entering the quarry would not normally need to wait at the signal.

Noise levels at The Old Chapel associated with the vehicle movements would generally be 49 dB $L_{Aeq, 1 \text{ hour}}$, increasing to 52 dB $L_{Aeq, 1 \text{ hour}}$ during periods of high activity, with noise levels at Sharma 5 dB(A) lower.

The noise levels at the dwellings would be below the proposed normal working limit of 55 dB $L_{Aeq, 1 \text{ hour}}$ and below the existing ambient noise levels at the dwellings.

However, to minimise any potential disturbance, principally associated with waiting vehicles, it is proposed to construct a close boarded fence or similar on top of the mound located between Glyndwr Road and the new internal access road, to achieve an overall height of up to 4 metres above the height of the access along the boundary with The Old Chapel where possible. This mitigation would ensure that the vehicles were screened and would provide a reduction of up to 10 dB(A) in the vehicle noise levels as they travel along the access road.

8. NOISE CONTROL DURING SITE OPERATIONS

The calculations and assessment indicate that noise levels associated with the restoration of the quarry would be close to the normal working limits, particularly as the height of infilling rises within the quarry void.

Additional mitigation measures would be implemented as discussed in the previous section to reduce noise levels associated with both the operations within the quarry void and associated with vehicles using the access road, which aim to ensure noise levels are maintained at a satisfactory standard to minimise potential disturbance.

As required within the guidance, the principles of BATNEEC would be adopted during the restoration operations. Measures to be adopted to minimise noise and disturbance would include:

- Periodic monitoring of noise levels at the surrounding dwellings;
- Ensuring that all plant and machinery, including HGVs, are kept well maintained at all times;
- Where possible, selecting plant which generates lower levels of noise;
- Switching off plant when not in use;
- A prohibition on the use of tonal reversing signals on mobile plant operating within the quarry void. Laser detection (camera) or background noise tracking devices will be used as alternatives;
- Route HGVs within the quarry to minimise reversing;
- Surfacing of the new internal access road with asphalt for the first 200 metres which includes the full length of road close to The Old Chapel and Sharma;
- Ensuring that the access road is inspected and maintained regularly and any discontinuities, which could cause body slap, filled in;
- Consideration of providing additional mitigation around the recycling plant, in the form of stock piles, which would seek to reduce any potential reflection effects off the far quarry wall;
- Minimising the amount of plant in use at any one time;
- Provide regular updates to local residents regarding the operations being carried out on site, potentially through a residents' forum.

With regards the monitoring of noise levels, it is recommended that a noise monitoring exercise is carried out within 3 months of the start of recycling and restoration operations within the quarry void. Further monitoring should be carried out periodically, potentially every 12 months or upon receipt of a valid complaint in relation to noise.

For each exercise, it is recommended that measurements are made using a sound level meter conforming to at least Class 2 standard and field calibrated using an acoustic calibrator.

Measurements should be made at freefield positions representative of the dwellings potentially most affected by the site operations, with the microphone at a height of between 1.2 – 1.5 metres above ground level. Measurements should be taken over a period of at least 15 minutes at each location or a longer duration to provide a representative sample of the noise environment. Extraneous noise, such as passing vehicles on the road would be paused out of any measurement.

The results of the measurement would be compared to the limits contained in Section 6. Where the results indicate noise levels above the limits, the current operations would be reviewed and additional mitigation or control measures implemented, as appropriate, to ensure that BATNEEC was achieved.

The results of any monitoring exercise would be made available for inspection by local authority officers within 1 week of the exercise being carried out. Where additional mitigation was deemed to be required, details would be provided to the local authority for agreement, with the aim of implementing the measures within 28 days.

With appropriate control and mitigation measures implemented on site, noise levels should be maintained at a level which would seek to minimise any potential disturbance.

9. SUMMARY

An assessment of the noise generated from activities associated with the proposed restoration of Cambrian Quarry has been carried out.

MTAN 1 provides the relevant guidance when assessing noise from the proposed operations. General noise limits at potentially affected noise-sensitive locations have been determined from background noise levels measured during 2012.

The recycling and restoration operations at the quarry would only take place during normal daytime periods and the following relevant limits have been proposed.

Location	Average Daytime Free-field L_{A90} Noise Levels [dB]	Daytime Criterion dB $L_{Aeq, 1 \text{ hour}}$ Facade
Dwellings on Glyndwr Road east of the Quarry	35	45
The Old Chapel and Sharma	45	55

Table 9.1: Proposed Normal Working Noise Limits

Calculations have been made based on the proposed recycling and restoration operations within the quarry void at the potentially most affected noise-sensitive locations. The assessment of the calculated levels indicates that the proposed criteria with appropriate control and mitigation measures implemented would not be exceeded and would be within the recommended limits.

In summary, this assessment demonstrates that noise from activities associated with the restoration of Cambrian Quarry would be within acceptable limits, which would seek to minimise potential disturbance to the occupants of surrounding properties.

References

1. Department of the Environment. Minerals Planning Guidance: The Control of Noise at Surface Mineral Workings. MPG 11. 1993.
2. Welsh Assembly Government. Minerals Planning Policy (Wales). Minerals Technical Advice Note (Wales) – 1:Aggregates. March 2004.
3. World Health Organisation. Guidelines for Community Noise. Geneva. 2000.
4. British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. 2009.

Figures

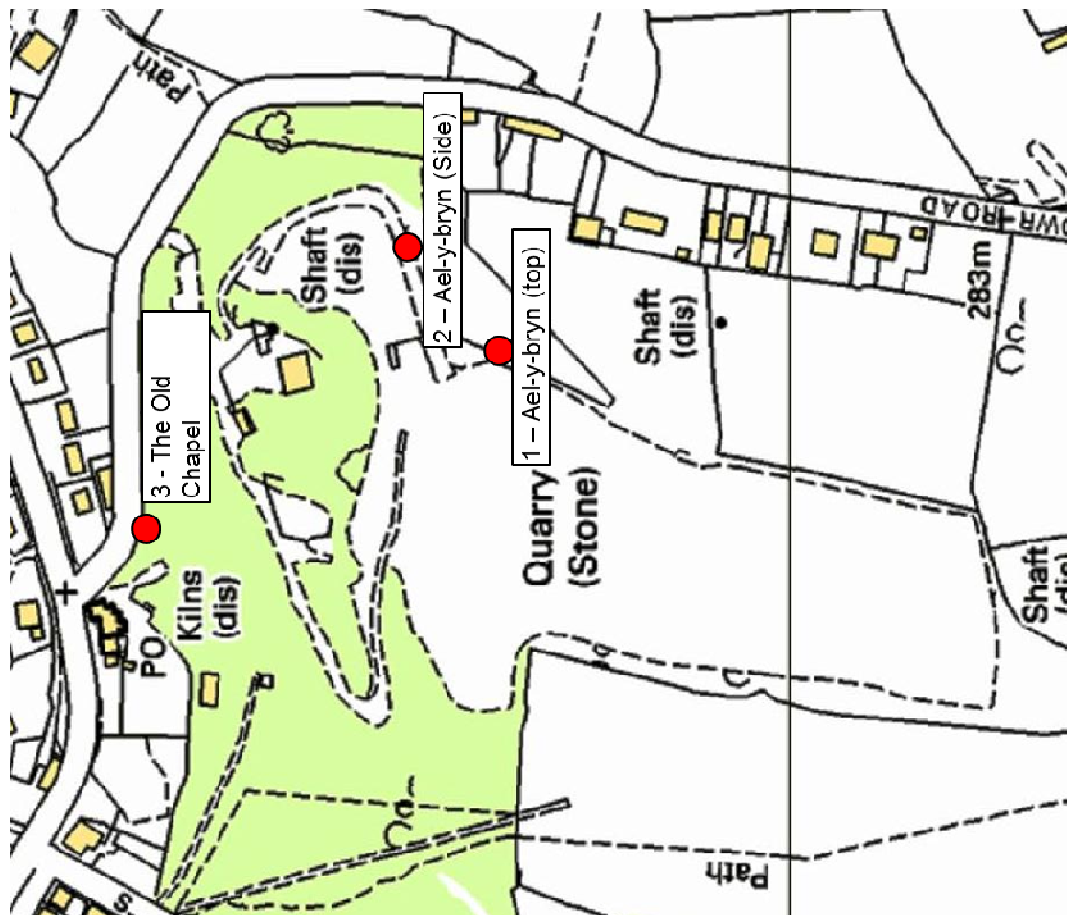


Figure 1 : Noise Monitoring Locations

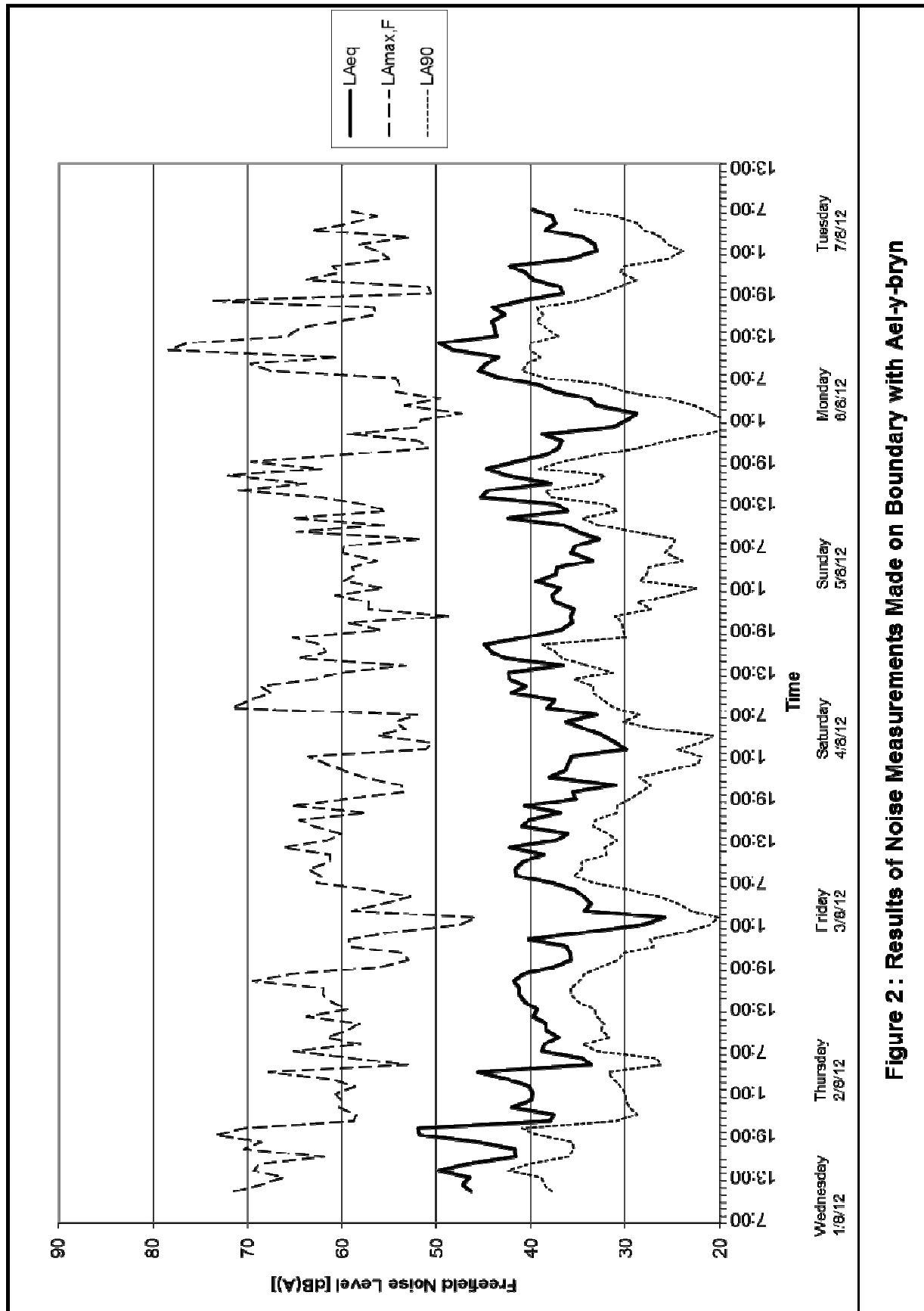


Figure 2 : Results of Noise Measurements Made on Boundary with Ael-y-bryn

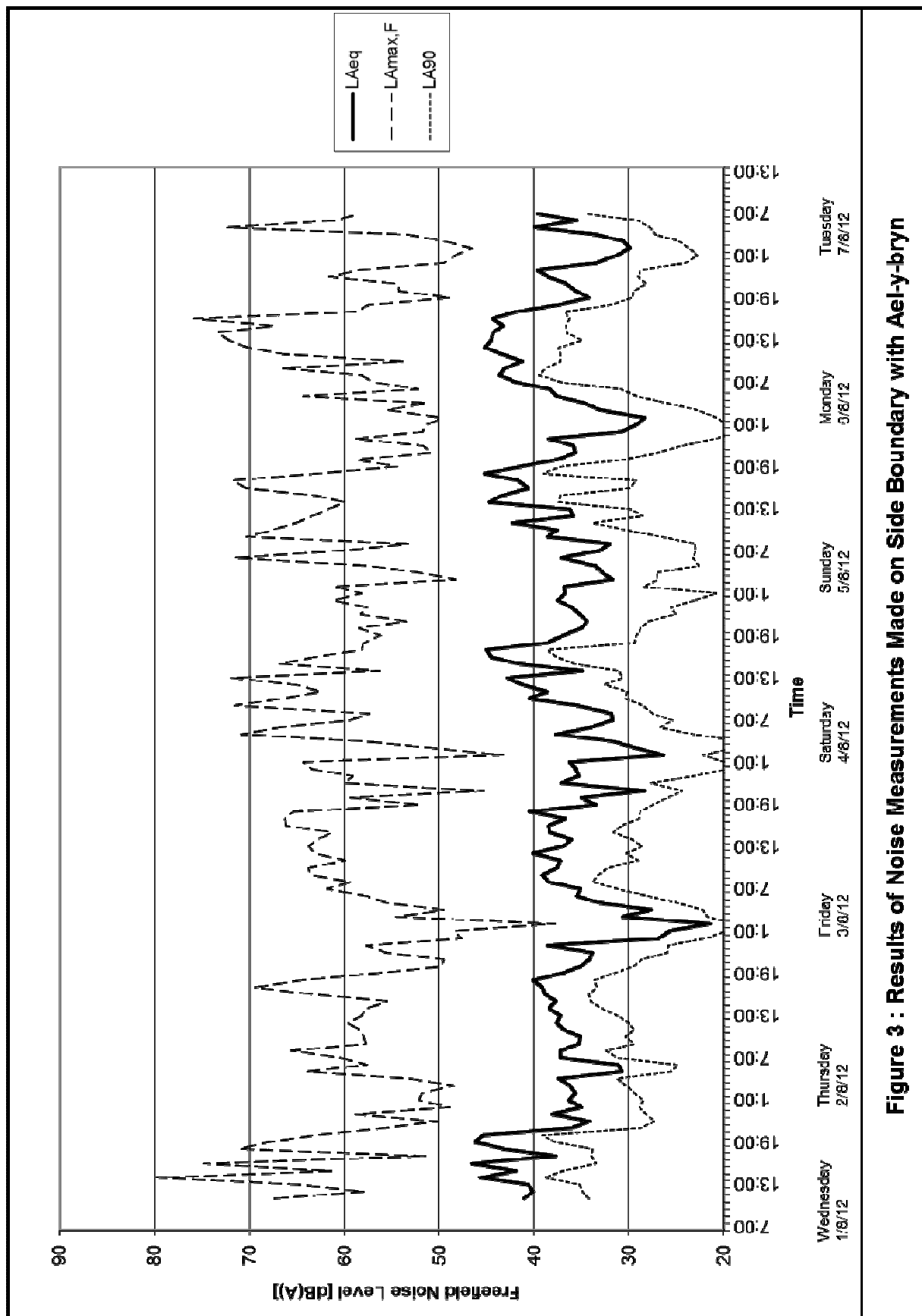


Figure 3 : Results of Noise Measurements Made on Side Boundary with Ael-y-bryn

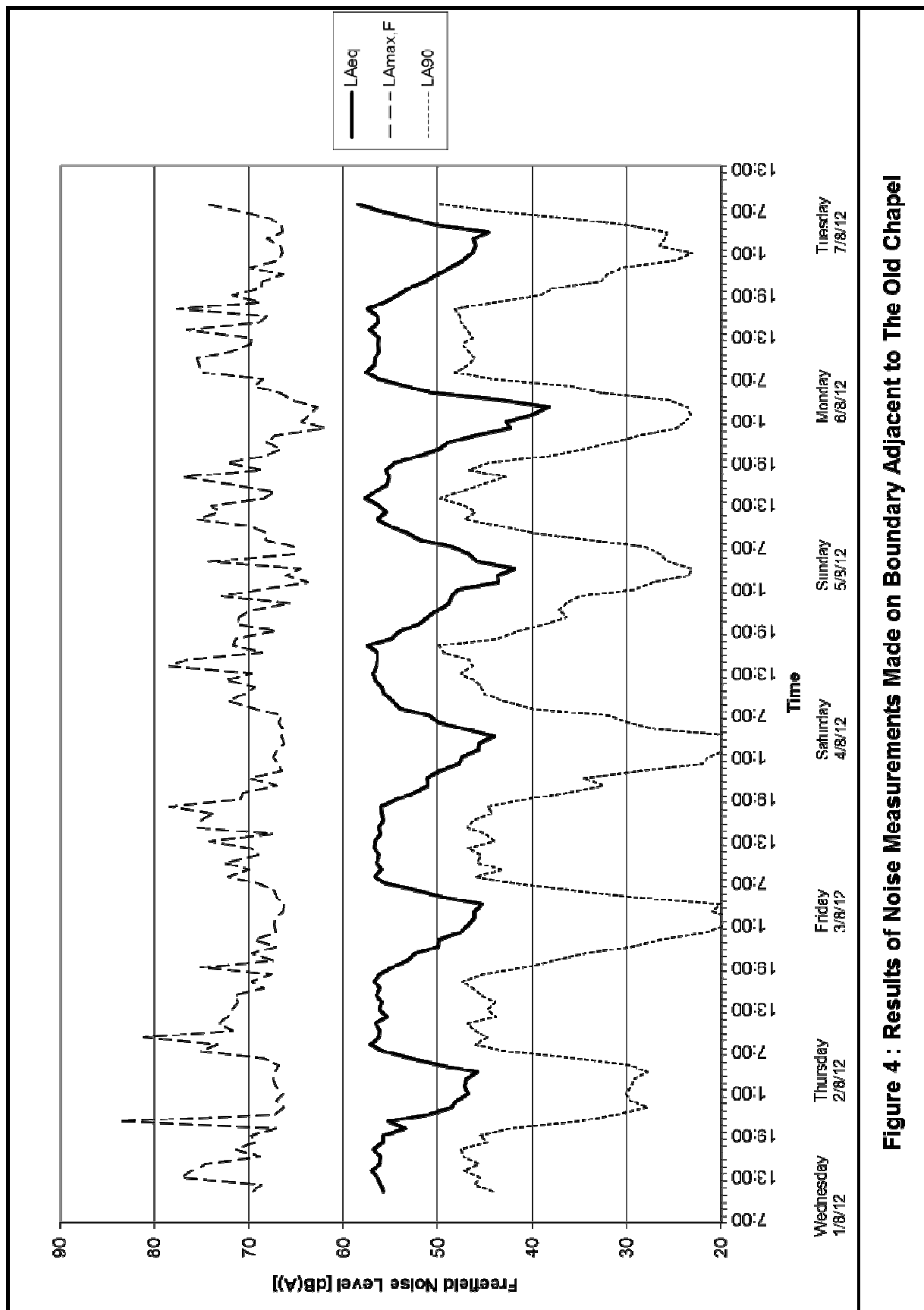


Figure 4 : Results of Noise Measurements Made on Boundary Adjacent to The Old Chapel

Appendix A
Results of Unattended Noise Survey on Boundary Adjacent to Ael-y-bryn

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Wednesday 01/08/2012	11:00	46.4	71.4	48.5	37.8
	12:00	47.2	68.6	48.9	38.6
	13:00	46.6	66.2	48.2	39.0
	14:00	49.8	69.3	51.9	42.5
	15:00	46.7	68.8	48.5	40.3
	16:00	41.6	61.9	43.2	36.0
	17:00	41.7	70.4	42.6	35.5
	18:00	45.7	68.5	46.7	35.7
	19:00	51.7	73.5	52.2	39.2
	20:00	52.0	70.4	53.7	41.0
	21:00	38.0	58.8	38.6	31.1
	22:00	37.6	58.5	39.1	28.8
	23:00	42.0	60.3	43.4	29.6
Thursday 02/08/2012	0:00	40.0	60.2	41.7	30.0
	1:00	39.8	60.7	41.6	30.0
	2:00	40.2	58.6	42.6	30.5
	3:00	42.6	61.4	45.0	31.4
	4:00	45.6	67.9	45.5	31.8
	5:00	33.7	53.1	36.5	26.2
	6:00	34.6	58.9	35.7	26.7
	7:00	38.9	65.1	41.0	33.1
	8:00	38.6	58.1	40.7	34.5
	9:00	37.1	61.6	38.8	31.7
	10:00	38.4	59.3	39.7	32.6
	11:00	38.4	58.2	39.6	32.3
	12:00	39.8	63.8	41.4	33.1
	13:00	39.3	59.4	41.3	33.3
	14:00	40.7	61.1	43.5	35.0
	15:00	41.3	62.1	43.4	35.8
	16:00	41.3	62.0	43.5	35.8
	17:00	41.8	69.4	43.6	34.9
	18:00	40.8	65.3	42.6	34.3
	19:00	37.7	56.0	40.2	32.7
	20:00	35.8	53.0	37.7	30.8
	21:00	35.9	53.6	38.5	30.2
	22:00	36.2	59.2	38.0	27.1
	23:00	40.3	59.2	41.9	27.4
Friday 03/08/2012	0:00	34.3	54.8	35.7	23.8
	1:00	28.1	47.5	30.0	21.0
	2:00	25.9	45.9	28.2	20.2
	3:00	34.3	59.0	33.3	23.1
	4:00	33.7	55.7	36.1	24.4
	5:00	34.4	52.7	36.4	26.5
	6:00	35.4	56.8	37.0	29.4
	7:00	37.8	62.7	39.5	33.4
	8:00	41.5	62.3	43.3	35.5

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Friday 03/08/2012	9:00	41.6	63.6	43.9	34.7
	10:00	40.9	61.3	42.2	34.7
	11:00	38.7	61.3	38.9	32.0
	12:00	42.3	66.3	40.4	32.2
	13:00	37.4	61.5	37.4	30.9
	14:00	36.1	60.2	37.7	31.8
	15:00	41.0	63.0	42.3	33.5
	16:00	40.2	64.6	40.5	33.2
	17:00	37.0	57.5	38.1	31.0
	18:00	40.7	65.3	41.5	30.9
	19:00	35.3	59.7	36.8	29.6
	20:00	35.6	53.4	37.0	28.3
	21:00	31.1	53.7	32.4	27.3
	22:00	38.1	57.8	36.5	28.5
	23:00	36.3	60.0	34.4	25.3
Saturday 04/08/2012	0:00	36.0	61.7	30.9	22.3
	1:00	35.7	63.6	32.1	22.0
	2:00	29.9	51.2	31.5	24.6
	3:00	31.1	50.5	31.8	22.1
	4:00	32.4	56.2	28.7	20.7
	5:00	34.3	53.3	35.6	26.9
	6:00	36.3	54.4	39.1	30.3
	7:00	33.1	52.0	35.2	28.5
	8:00	38.2	71.6	36.4	31.2
	9:00	37.5	69.8	38.9	32.4
	10:00	42.1	67.5	41.7	33.5
	11:00	40.6	68.6	40.1	33.4
	12:00	42.3	62.8	40.6	35.5
	13:00	42.4	60.2	40.9	31.4
	14:00	36.7	53.3	38.1	34.0
	15:00	42.7	64.6	45.4	36.8
	16:00	44.2	61.7	44.8	37.4
	17:00	44.9	62.3	43.9	38.8
	18:00	40.7	65.2	39.1	30.0
	19:00	36.9	55.9	38.4	30.3
	20:00	35.7	59.3	38.0	30.4
	21:00	35.8	48.7	38.3	31.2
	22:00	35.5	57.2	36.5	27.3
	23:00	37.5	57.1	37.1	28.7
Sunday 05/08/2012	0:00	37.8	60.7	35.7	25.2
	1:00	37.0	55.7	35.5	22.5
	2:00	39.5	59.9	42.2	28.5
	3:00	37.4	58.6	40.2	27.8
	4:00	37.2	59.0	39.7	27.6
	5:00	33.5	56.4	33.8	23.9

Cambrian Quarry Results of Noise Measurements Carried Out Between 1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Sunday 05/08/2012	6:00	35.8	60.0	35.3	25.9
	7:00	35.3	59.8	33.4	25.1
	8:00	32.8	51.6	34.7	24.7
	9:00	35.1	64.8	35.2	29.1
	10:00	36.6	55.5	38.3	32.9
	11:00	42.5	65.3	40.5	34.6
	12:00	36.1	55.3	37.0	30.9
	13:00	37.3	57.7	37.8	32.1
	14:00	45.3	62.4	44.0	37.9
	15:00	44.6	71.3	46.8	38.4
	16:00	37.9	63.8	39.5	33.4
	17:00	42.6	72.2	39.1	32.2
	18:00	44.8	62.3	45.6	39.2
	19:00	41.6	69.7	41.9	36.8
	20:00	38.3	59.6	39.3	32.9
	21:00	37.1	50.9	40.5	28.6
	22:00	36.8	51.8	40.1	25.6
	23:00	38.9	59.4	38.9	21.6
Monday 06/08/2012	0:00	31.4	52.0	32.2	18.6
	1:00	29.8	51.6	31.7	19.5
	2:00	28.9	47.3	30.8	20.8
	3:00	33.1	53.4	33.3	22.7
	4:00	33.9	49.6	36.5	25.6
	5:00	37.4	54.4	40.4	30.1
	6:00	39.3	53.9	42.1	32.3
	7:00	43.3	54.4	45.8	38.5
	8:00	45.5	67.6	48.1	41.0
	9:00	44.8	69.8	47.2	40.4
	10:00	43.5	60.5	46.0	39.1
	11:00	48.3	78.4	48.4	40.1
	12:00	49.7	76.3	48.9	40.1
	13:00	43.7	65.8	44.2	37.1
	14:00	43.8	64.5	46.0	38.4
	15:00	44.1	60.5	46.6	39.4
	16:00	42.8	56.4	45.1	38.8
	17:00	44.0	56.7	46.6	39.4
	18:00	41.1	73.8	42.3	34.9
	19:00	36.7	50.6	39.1	32.3
	20:00	37.0	50.9	39.9	30.7
	21:00	39.7	63.8	41.5	28.9
	22:00	40.6	60.3	42.9	30.5
	23:00	42.3	61.0	45.1	30.2
Tuesday 07/08/2012	0:00	35.8	55.0	38.8	25.6
	1:00	33.1	56.1	35.5	23.8
	2:00	33.3	58.2	35.1	25.6

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U1 - On top of Quarry Close to Glyndwr Road (Ael-y-bryn)
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Tuesday 07/08/2012	3:00	34.5	52.8	37.6	26.2
	4:00	38.5	63.2	41.3	28.0
	5:00	37.4	59.2	39.8	28.7
	6:00	37.8	56.4	40.3	31.0
	7:00	39.8	59.6	41.7	35.4

Appendix B
Results of Unattended Noise Survey on Side Boundary Adjacent to Ael-y-bryn

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U2 - Eastern Boundary Close to Glyndwr Road

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Wednesday 01/08/2012	11:00	41.1	67.3	40.4	34.2
	12:00	40.1	58.0	40.7	34.9
	13:00	40.6	64.8	41.5	35.2
	14:00	45.7	79.8	46.0	38.9
	15:00	41.9	61.4	43.4	37.0
	16:00	46.6	74.8	41.7	33.5
	17:00	37.7	51.4	39.5	33.9
	18:00	43.2	71.1	41.6	33.8
	19:00	46.2	68.0	47.6	37.8
	20:00	45.4	63.2	47.7	39.2
	21:00	36.0	55.8	36.9	28.7
	22:00	34.1	50.2	35.5	27.3
	23:00	38.1	58.9	38.8	28.2
Thursday 02/08/2012	0:00	35.0	48.9	36.8	28.9
	1:00	36.3	52.1	39.1	28.4
	2:00	35.7	51.8	38.7	29.4
	3:00	36.2	48.4	38.6	30.3
	4:00	37.4	53.1	38.0	31.3
	5:00	30.7	63.9	31.8	25.6
	6:00	31.2	57.6	32.2	24.9
	7:00	37.2	60.4	38.2	31.3
	8:00	37.2	65.6	38.5	32.4
	9:00	35.3	57.7	37.4	29.4
	10:00	35.1	58.0	36.7	30.4
	11:00	36.9	58.3	37.4	29.4
	12:00	37.6	59.6	38.2	30.0
	13:00	37.2	58.2	38.9	31.2
	14:00	38.4	57.6	40.9	32.9
	15:00	37.7	55.5	39.6	34.0
	16:00	38.9	63.5	41.0	34.2
	17:00	39.2	69.4	40.8	33.4
	18:00	40.1	64.6	41.5	33.7
	19:00	37.1	56.9	39.8	31.6
	20:00	35.1	49.7	37.4	29.5
	21:00	34.1	49.5	36.7	28.6
	22:00	33.8	55.6	34.9	26.0
	23:00	38.6	57.7	37.4	25.9
Friday 03/08/2012	0:00	26.9	47.6	28.9	22.0
	1:00	25.7	48.4	26.5	19.6
	2:00	21.5	37.8	23.6	18.6
	3:00	30.7	54.6	29.5	21.7
	4:00	27.7	49.5	29.3	22.2
	5:00	33.1	55.6	35.6	24.9
	6:00	35.5	57.6	37.4	28.0
	7:00	35.1	61.9	37.1	31.2
	8:00	38.4	59.2	40.1	33.8

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U2 - Eastern Boundary Close to Glyndwr Road

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Friday 03/08/2012	9:00	39.2	63.5	39.6	33.3
	10:00	37.6	63.8	38.8	32.2
	11:00	37.2	59.9	36.9	29.1
	12:00	40.1	63.1	38.5	30.3
	13:00	37.0	63.7	36.1	28.6
	14:00	36.0	62.9	35.5	29.6
	15:00	38.3	61.3	39.8	31.6
	16:00	38.5	66.2	37.8	30.8
	17:00	36.7	66.3	35.7	29.0
	18:00	40.5	65.3	40.0	28.8
	19:00	33.5	52.0	34.5	27.5
	20:00	35.0	59.3	33.8	26.0
	21:00	28.3	45.3	29.6	24.3
	22:00	37.1	60.0	35.2	27.7
	23:00	35.3	59.1	32.3	23.1
Saturday 04/08/2012	0:00	35.6	63.4	27.7	19.8
	1:00	36.2	64.4	29.4	19.9
	2:00	26.3	43.3	27.8	22.2
	3:00	29.2	50.4	28.2	19.2
	4:00	31.7	58.0	25.4	18.2
	5:00	37.7	70.9	31.5	23.1
	6:00	34.0	66.9	35.0	26.7
	7:00	31.7	59.4	32.6	25.4
	8:00	31.8	57.3	33.0	27.5
	9:00	35.5	71.6	35.2	28.5
	10:00	40.5	66.6	38.6	30.4
	11:00	38.6	62.5	37.2	30.2
	12:00	41.3	65.1	37.8	32.6
	13:00	42.8	72.0	40.7	30.7
	14:00	34.9	56.3	36.4	31.1
	15:00	41.6	66.9	44.2	35.8
	16:00	44.6	63.1	44.8	37.6
	17:00	45.0	58.2	43.6	38.6
	18:00	38.7	58.0	37.9	29.4
	19:00	36.9	56.2	38.3	29.3
	20:00	35.0	58.5	37.3	28.7
	21:00	34.4	53.5	37.2	28.0
	22:00	35.2	58.3	36.5	25.1
	23:00	36.0	57.6	34.1	25.6
Sunday 05/08/2012	0:00	37.5	61.2	35.0	23.1
	1:00	36.8	58.2	34.5	20.7
	2:00	36.9	61.2	37.3	28.4
	3:00	31.7	48.2	34.2	27.0
	4:00	32.8	52.2	34.9	27.1
	5:00	33.6	57.5	33.5	22.6
	6:00	37.1	71.6	33.8	23.3

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U2 - Eastern Boundary Close to Glyndwr Road
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Sunday 05/08/2012	7:00	33.2	60.6	32.0	22.9
	8:00	32.0	53.3	33.9	23.0
	9:00	38.6	70.3	34.4	26.6
	10:00	37.6	67.7	36.8	30.3
	11:00	42.3	65.1	40.0	33.8
	12:00	35.9	63.4	35.3	28.5
	13:00	36.2	61.7	36.3	29.8
	14:00	44.8	60.0	42.8	37.4
	15:00	43.3	63.2	45.5	37.2
	16:00	40.6	70.3	36.6	29.9
	17:00	41.7	71.8	37.1	29.3
	18:00	45.2	62.9	45.2	39.1
	19:00	41.4	54.5	41.3	37.1
	20:00	37.6	58.8	39.1	30.5
	21:00	35.7	50.8	39.3	27.0
	22:00	35.9	51.7	39.3	24.3
	23:00	38.5	59.0	38.7	20.9
Monday 06/08/2012	0:00	30.7	51.7	31.3	18.4
	1:00	29.3	51.4	31.9	19.6
	2:00	28.3	49.7	30.9	20.6
	3:00	33.1	55.5	32.8	22.8
	4:00	34.7	51.3	37.8	26.0
	5:00	37.6	64.4	40.3	29.2
	6:00	38.3	52.2	41.3	30.8
	7:00	41.9	56.9	44.4	37.1
	8:00	43.7	58.2	46.3	39.5
	9:00	43.1	66.6	45.3	38.8
	10:00	41.3	53.8	43.9	37.2
	11:00	43.4	66.4	45.9	37.2
	12:00	45.2	70.2	47.3	37.4
	13:00	44.6	72.2	42.9	34.9
	14:00	44.3	73.4	46.1	36.6
	15:00	43.3	67.4	44.5	36.7
	16:00	44.4	75.9	43.3	36.2
	17:00	41.9	58.9	44.5	36.8
	18:00	37.4	57.4	39.1	31.9
	19:00	34.2	48.8	36.8	29.6
	20:00	35.6	54.3	38.7	29.5
	21:00	36.6	54.4	39.8	28.2
	22:00	38.5	61.6	40.6	29.1
	23:00	39.6	58.7	41.8	28.8
Tuesday 07/08/2012	0:00	33.5	49.5	36.5	24.0
	1:00	31.3	48.3	35.0	22.7
	2:00	29.9	46.6	32.5	23.7
	3:00	30.5	49.4	33.3	24.7

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter
Location: U2 - Eastern Boundary Close to Glyndwr Road
All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Tuesday 07/08/2012	4:00	33.5	53.4	35.6	27.2
	5:00	39.9	72.4	37.1	27.8
	6:00	35.5	61.0	37.7	29.1
	7:00	39.6	58.4	41.3	34.4

Appendix C
Results of Unattended Noise Survey on Boundary Opposite The Old Chapel

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Wednesday 01/08/2012	11:00	55.8	69.6	59.5	44.2
	12:00	56.0	68.7	59.5	46.1
	13:00	56.4	77.2	59.6	45.6
	14:00	57.0	76.0	60.2	47.2
	15:00	56.1	74.6	59.5	45.7
	16:00	56.0	68.8	59.4	47.3
	17:00	56.9	71.4	60.3	47.6
	18:00	55.8	69.3	59.6	44.8
	19:00	55.8	69.9	59.2	45.6
	20:00	53.5	67.1	57.3	42.4
	21:00	55.3	83.7	56.6	35.0
	22:00	51.0	67.3	54.8	31.2
	23:00	48.5	66.3	51.4	27.8
Thursday 02/08/2012	0:00	48.1	67.1	49.7	29.6
	1:00	46.8	66.4	44.1	30.1
	2:00	47.1	67.1	46.0	29.5
	3:00	47.0	67.4	43.7	29.3
	4:00	45.9	67.2	44.1	27.8
	5:00	49.7	66.9	51.7	29.5
	6:00	52.9	68.4	57.0	35.4
	7:00	55.8	75.2	59.7	42.6
	8:00	57.1	73.4	60.6	46.0
	9:00	56.2	81.2	59.5	44.8
	10:00	56.1	71.7	59.7	46.0
	11:00	56.6	73.2	59.9	46.9
	12:00	55.4	72.3	59.1	43.8
	13:00	56.1	71.8	59.6	44.8
	14:00	55.9	71.2	59.6	43.9
	15:00	56.5	71.5	60.2	45.4
	16:00	56.1	68.4	59.5	46.3
	17:00	56.8	69.8	59.9	47.4
	18:00	56.1	67.7	59.8	45.2
	19:00	54.8	75.2	58.6	40.7
	20:00	53.3	67.4	57.5	37.8
	21:00	52.4	69.8	56.4	34.4
	22:00	50.0	67.1	54.4	29.5
	23:00	49.9	69.4	52.7	26.4
Friday 03/08/2012	0:00	47.7	67.1	49.3	21.7
	1:00	46.8	67.3	43.0	19.5
	2:00	46.1	67.2	41.4	18.8
	3:00	46.1	66.4	43.7	20.9
	4:00	45.3	66.3	40.3	20.1
	5:00	49.3	67.0	51.4	29.0
	6:00	52.2	67.3	56.3	35.6
	7:00	55.6	69.1	59.5	42.0
	8:00	56.7	72.3	60.1	46.0

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Friday 03/08/2012	9:00	55.9	70.0	59.5	43.1
	10:00	56.5	72.6	59.8	45.9
	11:00	56.2	69.0	59.5	45.5
	12:00	56.8	69.9	60.0	46.9
	13:00	56.7	74.2	60.1	44.0
	14:00	56.0	67.5	59.4	44.9
	15:00	56.2	75.5	59.4	46.9
	16:00	55.8	75.1	59.2	46.2
	17:00	55.9	73.6	59.3	44.2
	18:00	56.0	78.4	58.9	44.8
	19:00	54.4	70.9	57.9	40.8
	20:00	52.5	70.6	56.8	36.2
	21:00	51.1	67.0	55.5	32.5
	22:00	51.2	70.0	55.1	34.6
Saturday 04/08/2012	23:00	49.8	66.6	53.1	28.6
	0:00	47.8	66.9	48.7	22.0
	1:00	47.5	67.4	45.9	21.4
	2:00	45.8	67.0	41.3	19.5
	3:00	45.7	66.3	41.5	18.1
	4:00	44.0	66.6	35.9	17.8
	5:00	47.0	66.4	49.2	26.7
	6:00	49.9	66.9	53.7	29.8
	7:00	50.9	66.5	55.0	31.9
	8:00	53.9	69.3	58.1	39.9
	9:00	54.8	72.2	58.6	43.1
	10:00	55.7	70.5	59.1	45.0
	11:00	55.9	69.4	59.4	45.4
	12:00	56.7	72.5	59.5	46.2
Sunday 05/08/2012	13:00	56.9	69.8	60.1	47.6
	14:00	56.5	78.5	59.6	46.3
	15:00	56.4	76.5	59.5	46.7
	16:00	56.4	68.6	59.6	49.4
	17:00	57.5	71.7	60.7	49.9
	18:00	54.9	71.4	58.9	43.7
	19:00	53.9	67.1	57.9	41.4
	20:00	52.0	71.3	56.1	38.6
	21:00	51.1	71.0	55.5	36.3
	22:00	50.0	69.8	53.7	37.2
	23:00	48.8	65.7	52.6	36.4
	0:00	48.5	72.9	52.0	34.9
	1:00	47.9	68.8	49.5	29.2
	2:00	43.6	63.7	40.9	27.2
	3:00	43.7	66.1	43.0	23.4
	4:00	41.9	64.6	38.0	23.1
	5:00	45.9	74.3	46.5	25.7
	6:00	46.7	65.2	48.5	26.4

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Sunday 05/08/2012	7:00	48.5	65.2	52.1	28.1
	8:00	51.8	68.2	55.6	33.7
	9:00	53.3	68.1	57.4	39.9
	10:00	55.1	69.9	58.7	43.3
	11:00	56.4	75.5	59.7	47.1
	12:00	55.5	73.2	59.1	46.0
	13:00	56.2	74.0	59.5	47.1
	14:00	57.7	68.4	60.6	49.8
	15:00	56.7	67.3	60.2	47.6
	16:00	55.4	71.6	59.1	45.5
	17:00	55.2	77.0	58.5	42.8
	18:00	55.5	68.6	59.1	46.7
	19:00	54.6	72.4	58.3	44.7
	20:00	52.1	68.5	56.2	38.4
	21:00	49.9	66.6	54.1	34.6
	22:00	48.9	68.2	52.8	31.4
	23:00	46.0	67.2	46.7	28.7
Monday 06/08/2012	0:00	42.4	62.0	41.8	24.7
	1:00	42.7	64.5	39.8	23.8
	2:00	39.9	63.6	34.4	23.2
	3:00	38.2	62.7	35.4	23.6
	4:00	43.4	65.5	41.0	25.5
	5:00	50.6	66.8	53.5	32.8
	6:00	53.4	69.4	57.3	35.9
	7:00	56.3	68.5	60.2	44.3
	8:00	57.6	75.1	60.7	48.2
	9:00	56.8	75.3	60.1	46.8
	10:00	56.7	75.6	59.9	46.1
	11:00	56.2	72.0	59.7	46.7
	12:00	56.3	69.9	59.7	47.4
	13:00	56.2	69.8	59.5	46.3
	14:00	57.2	76.7	60.3	46.9
	15:00	56.3	69.0	59.6	47.6
	16:00	56.4	68.1	59.9	47.7
	17:00	57.5	77.7	60.4	48.2
	18:00	55.7	68.8	59.4	44.0
	19:00	54.2	71.8	58.1	39.2
	20:00	53.1	68.7	57.2	37.8
	21:00	51.4	68.6	55.4	32.7
	22:00	50.0	66.4	54.0	32.0
	23:00	48.7	70.0	50.8	30.5
Tuesday 07/08/2012	0:00	47.3	66.9	47.6	24.8
	1:00	46.3	66.5	43.0	23.0
	2:00	46.0	66.7	42.2	26.5
	3:00	46.2	68.1	42.0	26.0

Cambrian Quarry
Results of Noise Measurements Carried Out Between
1 - 7 August 2012

Equipment Used: Rion NL-32 Class 1 Sound Level Meter

Location: U3 - Northern Access Adjacent to Glyndwr Road (The Old Chapel)

All Levels; Fast, Freefield, Mic Height 1.3 metres.

Date	Start Period	Measured Noise Levels [dB]			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
Tuesday 07/08/2012	4:00	44.7	66.5	42.4	25.8
	5:00	50.3	66.6	53.3	30.0
	6:00	52.9	67.8	57.0	36.0
	7:00	56.0	71.0	59.9	43.8
	8:00	58.5	74.6	61.9	49.8

Appendix D Calculation Details

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor: Ael-y-bryn m Uses BS5228:2009
Height 286

Predicted Freefield Noise Levels

Activity	Ref @ 10m	% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation Hard	Distance Attenuation Soft	CRTN Barrier Attenuation	Max Atten.	LAeq [dB]	Total LAeq [dB]
Phase 1												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	282	230	305	60	-27.2	-32.0	-20.0	-47.2	36.9	
Loading Shovel	70.0	LAeq 100	282	230	305	60	-27.2	-32.0	-20.0	-47.2	22.8	
Screen	76.5	LAeq 100	282	230	305	60	-27.2	-32.0	-20.0	-47.2	29.2	
HGV Movement (Laden)	83.4	SEL 4	282	120	298	60	-21.6	-25.0	-20.0	-41.6	12.3	
HGV Movement (Unladen)	77.4	SEL 4	282	120	298	60	-21.6	-25.0	-20.0	-41.6	6.3	
HGV Tipping	92.9	SEL 4	282	230	305	60	-27.2	-32.0	-20.0	-47.2	16.1	37.7
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	282	120	298	40	-21.6	-25.0	-20.0	-41.6	29.8	
Dozer / Compactor	79.2	LAeq 75	282	120	298	40	-21.6	-25.0	-20.0	-41.6	36.4	
HGV Movement (Laden)	83.4	SEL 4	282	120	298	40	-21.6	-25.0	-20.0	-41.6	12.3	
HGV Movement (Unladen)	77.4	SEL 4	282	120	298	40	-21.6	-25.0	-20.0	-41.6	6.3	
HGV Tipping	92.9	SEL 4	282	120	298	40	-21.6	-25.0	-20.0	-41.6	21.8	37.4
Phase 2												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	285	150	298	60	-23.5	-27.4	-18.6	-42.1	42.0	
Loading Shovel	70.0	LAeq 100	285	150	298	60	-23.5	-27.4	-18.6	-42.1	27.9	
Screen	76.5	LAeq 100	285	150	298	60	-23.5	-27.4	-18.6	-42.1	34.4	
HGV Movement (Laden)	83.4	SEL 4	285	150	298	60	-23.5	-27.4	-18.6	-42.1	11.8	
HGV Movement (Unladen)	77.4	SEL 4	285	150	298	60	-23.5	-27.4	-18.6	-42.1	5.8	
HGV Tipping	92.9	SEL 4	285	150	298	60	-23.5	-27.4	-18.6	-42.1	21.3	42.9
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	288	150	298	60	-23.5	-27.4	-17.2	-40.8	30.6	
Dozer / Compactor	79.2	LAeq 75	288	150	298	60	-23.5	-27.4	-17.2	-40.8	37.2	
HGV Movement (Laden)	83.4	SEL 4	288	150	298	60	-23.5	-27.4	-17.2	-40.8	13.1	
HGV Movement (Unladen)	77.4	SEL 4	288	150	298	60	-23.5	-27.4	-17.2	-40.8	7.1	
HGV Tipping	92.9	SEL 4	288	150	298	60	-23.5	-27.4	-17.2	-40.8	22.6	38.2
Phase 3												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	284	150	298	60	-23.5	-27.4	-19.0	-42.5	41.6	
Loading Shovel	70.0	LAeq 100	284	150	298	60	-23.5	-27.4	-19.0	-42.5	27.5	
Screen	76.5	LAeq 100	284	150	298	60	-23.5	-27.4	-19.0	-42.5	34.0	
HGV Movement (Laden)	83.4	SEL 4	284	150	298	60	-23.5	-27.4	-19.0	-42.5	11.4	
HGV Movement (Unladen)	77.4	SEL 4	284	150	298	60	-23.5	-27.4	-19.0	-42.5	5.4	
HGV Tipping	92.9	SEL 4	284	150	298	60	-23.5	-27.4	-19.0	-42.5	20.9	42.5
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	294	110	298	15	-20.9	-24.1	-15.4	-36.2	35.2	
Dozer / Compactor	79.2	LAeq 75	294	110	298	15	-20.9	-24.1	-15.4	-36.2	41.7	
HGV Movement (Laden)	83.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	15.0	
HGV Movement (Unladen)	77.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	9.0	
HGV Tipping	92.9	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	24.5	42.7
Phase 4												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	300	200	298	115	-26.0	-30.6	-12.3	-38.3	33.1	
Dozer / Compactor	79.2	LAeq 75	300	200	298	115	-26.0	-30.6	-12.3	-38.3	39.6	
HGV Movement (Laden)	83.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	15.0	
HGV Movement (Unladen)	77.4	SEL 4	292	150	298	60	-23.5	-27.4	-15.3	-38.8	9.0	
HGV Tipping	92.9	SEL 4	300	200	298	115	-26.0	-30.6	-12.3	-38.3	25.0	40.6
Phase 5												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	295	110	298	30	-20.9	-24.1	-14.1	-34.9	36.5	
Dozer / Compactor	79.2	LAeq 75	295	110	298	30	-20.9	-24.1	-14.1	-34.9	43.0	
HGV Movement (Laden)	83.4	SEL 4	292	110	298	30	-20.8	-24.1	-16.5	-37.3	16.6	
HGV Movement (Unladen)	77.4	SEL 4	292	110	298	30	-20.8	-24.1	-16.5	-37.3	10.6	
HGV Tipping	92.9	SEL 4	295	110	298	30	-20.9	-24.1	-14.1	-34.9	28.4	44.0
Construction / Removal of Bund												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	300	150			-23.6	-27.4	0.0	-27.4	44.0	
Dozer / Compactor	79.2	LAeq 75	300	120			-21.6	-25.1	0.0	-25.1	52.9	
HGV Movement (Laden)	83.4	SEL 4	300	120			-21.6	-25.1	0.0	-25.1	28.8	
HGV Movement (Unladen)	77.4	SEL 4	300	120			-21.6	-25.1	0.0	-25.1	22.8	
HGV Tipping	92.9	SEL 4	300	120			-21.6	-25.1	0.0	-25.1	38.3	53.6

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor: Hillside
Height 287 m
Uses BS5228:2009

Predicted Freefield Noise Levels

Activity	Ref @ 10m	% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation Hard	Distance Attenuation Soft	CRTN Barrier Attenuation	Max Atten.	LAeq [dB]	Total LAeq [dB]
Phase 1												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	282	170	317	30	-24.6	-28.8	-20.0	-44.6	39.5	
Loading Shovel	70.0	LAeq 100	282	170	317	30	-24.6	-28.8	-20.0	-44.6	25.4	
Screen	76.5	LAeq 100	282	170	317	30	-24.6	-28.8	-20.0	-44.6	31.9	
HGV Movement (Laden)	83.4	SEL 4	282	170	317	30	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL 4	282	170	317	30	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL 4	282	170	317	30	-24.6	-28.8	-20.0	-44.6	18.7	40.4
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	282	170	315	40	-24.6	-28.8	-20.0	-44.6	26.8	
Dozer / Compactor	79.2	LAeq 75	282	170	315	40	-24.6	-28.8	-20.0	-44.6	33.3	
HGV Movement (Laden)	83.4	SEL 4	282	170	315	40	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL 4	282	170	315	40	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL 4	282	170	315	40	-24.6	-28.8	-20.0	-44.6	18.7	34.3
Phase 2												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	37.7	
Loading Shovel	70.0	LAeq 100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	23.6	
Screen	76.5	LAeq 100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	30.0	
HGV Movement (Laden)	83.4	SEL 4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	7.4	
HGV Movement (Unladen)	77.4	SEL 4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	1.4	
HGV Tipping	92.9	SEL 4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	16.9	38.5
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	292	170	315	40	-24.6	-28.8	-20.0	-44.6	26.8	
Dozer / Compactor	79.2	LAeq 75	292	170	315	40	-24.6	-28.8	-20.0	-44.6	33.3	
HGV Movement (Laden)	83.4	SEL 4	292	170	315	40	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL 4	292	170	315	40	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL 4	292	170	315	40	-24.6	-28.8	-20.0	-44.6	18.7	34.3
Phase 3												
<i>Recycling Area</i>												
Crusher Being Loaded by Excavator	84.1	LAeq 100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	37.7	
Loading Shovel	70.0	LAeq 100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	23.6	
Screen	76.5	LAeq 100	285	210	313	50	-26.4	-31.1	-20.0	-46.4	30.0	
HGV Movement (Laden)	83.4	SEL 4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	7.4	
HGV Movement (Unladen)	77.4	SEL 4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	1.4	
HGV Tipping	92.9	SEL 4	285	210	313	50	-26.4	-31.1	-20.0	-46.4	16.9	38.5
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	302	170	315	40	-24.6	-28.8	-20.0	-44.6	26.8	
Dozer / Compactor	79.2	LAeq 75	302	170	315	40	-24.6	-28.8	-20.0	-44.6	33.3	
HGV Movement (Laden)	83.4	SEL 4	302	170	315	40	-24.6	-28.8	-20.0	-44.6	9.2	
HGV Movement (Unladen)	77.4	SEL 4	302	170	315	40	-24.6	-28.8	-20.0	-44.6	3.2	
HGV Tipping	92.9	SEL 4	302	170	315	40	-24.6	-28.8	-20.0	-44.6	18.7	34.3
Phase 4												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	300	210	313	80	-26.5	-31.1	-20.0	-46.5	24.9	
Dozer / Compactor	79.2	LAeq 75	300	210	313	80	-26.5	-31.1	-20.0	-46.5	31.5	
HGV Movement (Laden)	83.4	SEL 4	300	210	313	80	-26.5	-31.1	-20.0	-46.5	7.4	
HGV Movement (Unladen)	77.4	SEL 4	300	210	313	80	-26.5	-31.1	-20.0	-46.5	1.4	
HGV Tipping	92.9	SEL 4	300	210	313	80	-26.5	-31.1	-20.0	-46.5	16.9	32.5
Phase 5												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	305	170	313	40	-24.7	-28.8	-19.0	-43.7	27.7	
Dozer / Compactor	79.2	LAeq 75	305	170	313	40	-24.7	-28.8	-19.0	-43.7	34.3	
HGV Movement (Laden)	83.4	SEL 4	305	170	313	40	-24.7	-28.8	-19.0	-43.7	10.2	
HGV Movement (Unladen)	77.4	SEL 4	305	170	313	40	-24.7	-28.8	-19.0	-43.7	4.2	
HGV Tipping	92.9	SEL 4	305	170	313	40	-24.7	-28.8	-19.0	-43.7	19.7	35.3
Construction / Removal of Bund												
<i>Placement of Restoration Materials</i>												
Excavator	71.4	LAeq 100	310	130			-22.4	-26.0	0.0	-26.0	45.4	
Dozer / Compactor	79.2	LAeq 75	310	130			-22.4	-26.0	0.0	-26.0	51.9	
HGV Movement (Laden)	83.4	SEL 4	310	130			-22.4	-26.0	0.0	-26.0	27.8	
HGV Movement (Unladen)	77.4	SEL 4	310	130			-22.4	-26.0	0.0	-26.0	21.8	
HGV Tipping	92.9	SEL 4	310	130			-22.4	-26.0	0.0	-26.0	37.3	52.9

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor:
Height

The Old Chapel
239 m

Uses BS5228:2009

Predicted Freefield Noise Levels

Predicted Predicted Noise Levels														Total LAeq [dB]
Activity	Ref @10m		% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation Hard Soft		CRTN Barrier Attenuation	Max Atten.	LAeq [dB]		
Vehicles on Access (Worst Case)														
HGV Entering Quarry (Laden)	83.4	SEL	4	241	14			-3.0	-3.0	0.0	-3.0	50.8	51.8	
HGV Leaving Quarry (Unladen)	77.4	SEL	4	241	14			-3.0	-3.0	0.0	-3.0	44.8		
Vehicles on Access (Typical Case)														
HGV Entering Quarry (Laden)	83.4	SEL	2	241	14			-3.0	-3.0	0.0	-3.0	47.8	48.8	
HGV Leaving Quarry (Unladen)	77.4	SEL	2	241	14			-3.0	-3.0	0.0	-3.0	41.8		
Vehicles on Access (Worst Case - Mitigated)														
HGV Entering Quarry (Laden)	83.4	SEL	4	241	14	242	2	-3.0	-3.0	-12.9	-15.9	37.9	38.9	
HGV Leaving Quarry (Unladen)	77.4	SEL	4	241	14	242	2	-3.0	-3.0	-12.9	-15.9	31.9		

Restoration of Cambrian Quarry Calculation of Noise Levels from Site Operations 15-Jan-2013

Receptor:
Height

Sharma
235 m

Uses BS5228:2009

Predicted Freefield Noise Levels

Predicted Freefield Noise Levels													
Activity	Ref @10m		% On Time / no./hr	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		CRTN Barrier Attenuation	Max Atten.	LAeq [dB]	Total LAeq [dB]
								Hard	Soft				
Vehicles on Access (Worst Case)													
HGV Entering Quarry (Laden)	83.4	SEL	4	236	26			-8.3	-8.4	0.0	-8.4	45.5	
HGV Leaving Quarry (Unladen)	77.4	SEL	4	236	26			-8.3	-8.4	0.0	-8.4	39.5	46.5
Vehicles on Access General Case)													
HGV Entering Quarry (Laden)	83.4	SEL	2	236	26			-8.3	-8.4	0.0	-8.4	42.5	
HGV Leaving Quarry (Unladen)	77.4	SEL	2	236	26			-8.3	-8.4	0.0	-8.4	36.5	43.4