Noise Impact Assessment for Variation to Environmental Permit

Blackhill Quarry, Leeds

Reference: 51-009-R1-2

Date: January 2024

NOISE IMPACT ASSESSMENT FOR VARIATION TO ENVIRONMENTAL PERMIT

Blackhill Quarry
Leeds

Prepared for:

Mone Brothers Limited

Report Ref: 51-009-R1-2
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E3P

Manchester Office
Taylor Road
Urmston
M41 7JQ

+ 44 (0) 161 707 9612
https://e3p.co.uk

Registered in England
CRN: 807255262

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PREPARED BY	L Faulkner	L Faulkner	
QUALIFICATIONS	BSc (Hons) MIOA MIEnvSci	BSc (Hons) MIOA MIEnvSci	
POSITION	Associate Director	Associate Director	
CHECKED BY	S Boughton	S Boughton	
QUALIFICATIONS	BEng (Hons) MIOA	BEng (Hons) MIOA	
POSITION	Associate Director	Associate Director	
AUTHORISED BY	L Faulkner	L Faulkner	
QUALIFICATIONS	BSc (Hons) MIOA MIEnvSci	BSc (Hons) MIOA MIEnvSci	
POSITION	Associate Director	Associate Director	

EXECUTIVE SUMMARY

BACKGROUND

BACKGROUND

Site Address	Blackhill Quarry, Kings Road, Bramhope, Leeds LS16 9JN
National Grid Reference	E 427090 N 442171
Proposed Development	Application for the variation of a Bespoke Permit (ref: EPR/NB3135RJ) to the Environment Agency (EA) for the treatment of non-hazardous wastes to include aggregate washing, an increase in the total permitted tonnages, and additional waste codes.
Report Objectives	The objectives of this report are to: • Identify, measure, and assess the potential impact of any proposed sound sources associated with the development upon existing receptors in the immediate vicinity of the Site. The report follows current and relevant British Standards to provide a robust assessment.

ASSESSMENT

Surveys Completed	E3P have undertaken attended baseline noise measurements, in a position representative of the existing receptors during worst-case operational periods.
Assessments	Detailed hand calculations have been undertaken for noise from the proposed washplant. The calculations have been used to predict the Rating Level at the receptors which has been compared with the typical background sound level, accounting for any acoustic characteristics associated with the sound in accordance with BS 4142:2014+A1:2019. The assessment found that the rating level from the wash plant would fall below the background sound level at all receptors. Furthermore, consideration of context supports the findings of the BS 4142 assessment.
Mitigation Requirements	Considering the outcome of the assessment, no mitigation measures are required.

CONCLUSIONS

This assessment has shown that no adverse impact is predicted at the receptors due to the proposed development.

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1. INTRODUCTION

1.1. BACKGROUND

E3P has been commissioned by Mone Brothers Ltd to provide a Noise Impact Assessment to support an application for the variation of a Bespoke Permit (ref: EPR/NB3135RJ) to the Environment Agency (EA) for the treatment of non-hazardous wastes to include aggregate washing, an increase in the total permitted tonnages, and additional waste codes at Blackhill Quarry in Leeds.

The proposed new site layout is shown on Drawing ref: 383/1 – Master Plan-1 Revision 5.0. It includes the provision of new Wash plant area and inert material storage area. The wash plant would replace an older crusher and saw shed building, and is electrically powered, generating low noise levels, compared to existing.

It is assumed that the existing opening hours of 07:00-18:00 will remain with screening and crushing starting after 07:30.

1.2. LIMITATIONS

Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative, and reliable to inform an accurate assessment at the time.

E3P will endeavour to capture all existing and proposed sources of sound and vibration at the time of the surveys and/or assessments. However, should new sources of sound be introduced, existing sources modified/changed, or characteristics of the sound be altered following completion of such, E3P cannot be held accountable for this.

Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance, for either absolute levels or frequency content.

2. GUIDANCE

2.1. ENVIRONMENT AGENCY (2022) NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS

Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration. E3P note that the following are required competencies and standards required in relation to Noise Assessments submitted as part of an Environmental Permit Application:

> *Noise impact assessments should be carried out to an appropriate standard and by competent personnel, for example, holders of either an Institute of Acoustics:*
>
> - *Diploma in Acoustics and Noise Control*
> - *Certificate of Competence in Environmental Noise Measurement, with relevant experience*
>
> *Monitoring noise in the environment is a specialist field. Monitoring should be carried out by a qualified acoustician who can demonstrate competency in environmental work rather than, for example, occupational health and safety work.*
>
> *You must use 'BS 4142: Methods for rating and assessing industrial and commercial sound' to quantify the level of environmental noise impact from industrial processes. In rare circumstances, other methods may also be appropriate, for example, NANR45 for assessing existing low frequency sound inside a residential property.*
>
> *If you want to assess impact using another method, you should discuss and agree this with your regulator before you start the assessment.*
>
> *Where vibration is an issue, you should contact your regulator for specific advice.*

E3P note from the above and the guidance that the EA require a BS 4142 assessment to be conducted. Additionally, E3P have used the Method Implementation Document (MID), published by the Environment Agency.

2.2. BS 4142: 2014+A1:2019 'METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes.
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.

There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

- +2 dB: where the tonality is just perceptible.
- +4 dB: where the tonality is clearly perceptible; and
- +6 dB: where the tonality is highly perceptible.

Impulsivity

- +3 dB: where the impulsivity is just perceptible.
- +6 dB: where the impulsivity is clearly perceptible; and
- +9 dB: where the impulsivity is highly perceptible.

Intermittency

- +3 dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background sound level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

It is common that a Local Planning Authority (LPA) will specify their own criterion and, where this is the case, this criterion will usually take precedence over a simple comparison of the rating level against the background sound level.

3. DESCRIPTION OF WORKS AND SOURCES OF NOISE

The proposals are to allow variation of a Bespoke Permit (ref: EPR/NB3135RJ) for the treatment of non-hazardous wastes to include aggregate washing, an increase in the total permitted tonnages, and additional waste codes. It includes the provision of new Wash plant area and inert material storage area. The wash plant would replace an older crusher and saw shed building, and is electrically powered, generating low noise levels, compared to existing.

New on-site sources of noise are proposed with the wash plant and additional tonnage. However, the wash plant proposed is likely to be the main source of noise associated with the variation in the permit and, as such only the wash plant is assessed.

The client has provided a Noise Survey Report for the proposed wash plant, conducted by CDE Global in April 2013 for the M2500 – AGGMAX Wash plant. The report is appended to the rear of this report.

The resultant noise level from the wash plant was summarised as follows:

- 73 dB(A) at 10 m.
- 69 dB(A) at 50 m.
- 63 dB(A) at 100 m.

The report concluded:

> *Close to the aggregate washing facility, measured noise levels are complex due to the contribution of many sources and localised screening. However at distances greater than 50m, the noise generated will begin to behave more like a point source. This is demonstrated in the measurements at 50m and 100m, where the doubling of distance has caused a 6dB drop in noise emissions levels, which is in line with acoustic theory of noise propagation.*
>
> *It can therefore be predicted that, at 200m (a further doubling of distance) noise levels would be expected to be in the region of 57 dB(A)*

As such, the resultant calculated sound power level for the wash plant, considered a point source, is 111 dB L_{WA}. Indeed, this is calculated from the 200 m, 50 m and 100 m distances with only the 10 m distance measurement being the outlier with a calculated sound power of 101 dB L_{WA}. This assumes the source behaving as a point source with sound radiating in a hemisphere.

4. NOISE SURVEY RESULTS

Figure 1 details the Noise Measurement Positions with the layout plan overlaid on Google Maps.

4.1. ATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

E3P has conducted an attended background and ambient sound survey in order to quantify the existing levels of background and ambient sound at a position considered representative of the closest residential receptors to the west. A position to leave a monitor for longer periods was not available.

The survey was carried out over the following period:

- 06:43-13:43 Friday 17th November 2023.

The following noise measurement position was chosen for the Background Sound Survey:

- Noise Measurement Position 1 (NMP1): Located on Kings Drive to the west of the site in a position representative of plots along Kings Road and equidistant from Kings Road as the closest receptors to the Site. The measurement position was under free-field conditions. The microphone of the sound level meter was attached to a tripod at a height of 1.5 m above ground level. Sound sources here were dominated by road traffic sound from Kings Road and Leeds Road. No operational sound from site was audible at any time.

Figure 1 below shows the location of NMP1. The star stipulates the NMP location.

FIGURE 1 NOISE MEASUREMENT POSITION NMP1

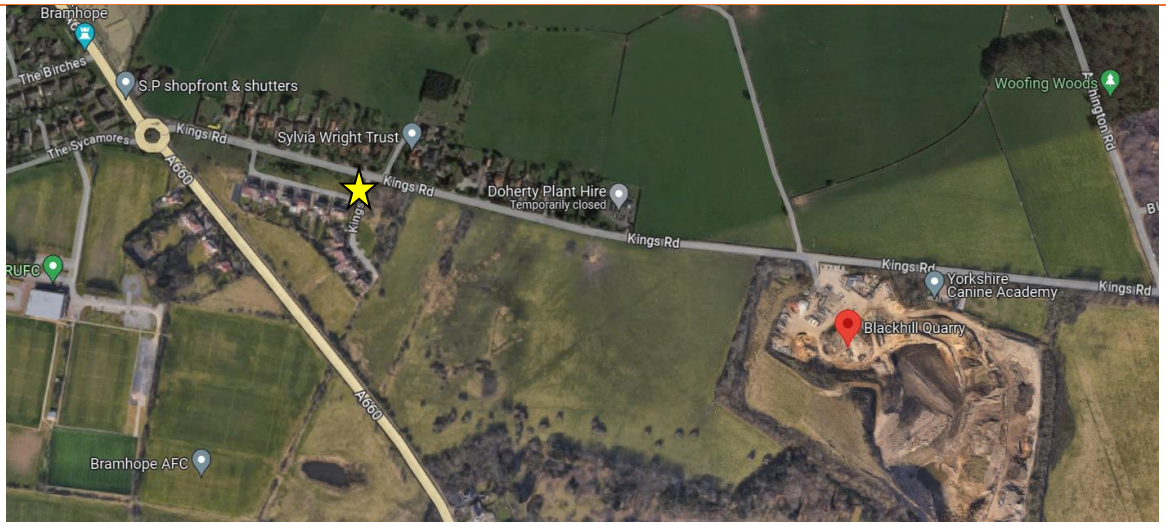


Table 4.1 details the measured background and ambient sound levels. The levels correspond to the $L_{A90,1hr}$. The operation of the site will only take place during daytime periods. As such, the lowest measured background sound levels for the daytime have been used.

TABLE 4.1 MEASURED BACKGROUND AND AMBIENT SOUND PRESSURE LEVELS

TIME	COMMENTARY	MEASURED AMBIENT SOUND LEVEL, $L_{Aeq,T}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)
06:43-07:43	Road traffic dominant	63.6	53.3
07:43-08:43		64.5	55.2
08:43-09:43		62.7	51.9
09:43-10:43	Road traffic dominant but traffic levels easing	61.9	49.7
10:43-11:43		61.4	49.3
11:43-12:43		61.0	**49.1**
12:43-13:43		61.0	50.6

The lowest measured is highlighted for use in the assessment. During the survey, temperatures were approximately 5°C and wind speeds were between 4 and 11 km/h with a WSW direction.

TABLE 4.2 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	LAST CALIBRATION DATE
NMP1	Sound Level Meter	01dB Fusion	14226	7th December 2023
	Pre-amplifier	01dB Pre22	2135072	
	Microphone	GRAS 40CD	470570	
	Calibrator	Cirrus CR 515	99204	8th August 2023

The sound level meter was field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. The calibrated value at the start was 93.9 dB and the value at the end was 93.8 dB with a -0.1 dB drift. The calibrator is set at a value of 94 dB. Calibration certificates are available upon request.

5. BS 4142 ASSESSMENT

This section considers the likely rating levels from the operations in accordance with BS 4142 and advice given in the Noise and Vibration Management guidance from the EA.

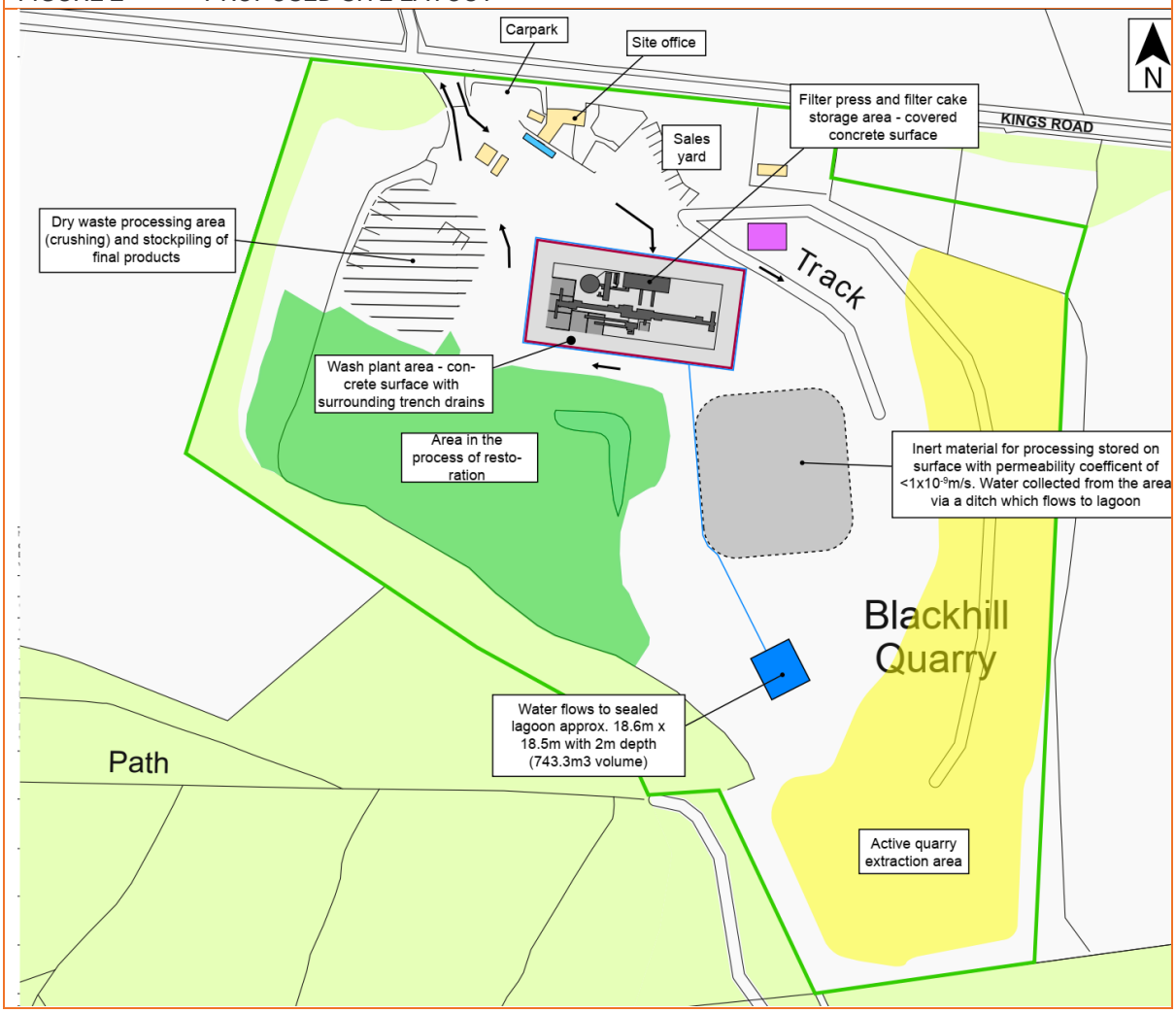
For the purposes of the assessments, E3P has undertaken detailed hand calculations for noise from the wash plant only given its significant noise level, especially compared to other proposed plant items on site, that would have a time corrected sound power level of more than 10 dB below.

The following assumptions have been made:

- Ground elevations around the site have been taken as existing with the assumption of no ground variation between source and receiver.
- The operation of the wash plant is assumed to take place for a full continuous hour in any given operational hour period.
- It is assumed that intervening ground is partially soft, the proportion of which depends on the receptor.
- The source height of the wash plant source is assumed to be 3 m above ground level and receptors are at 1.8 m above ground level for rear garden areas.

The proposed site layout is shown below.

FIGURE 2 PROPOSED SITE LAYOUT



For the BS 4142:2014+A1:2019 assessment, penalties are applied to the specific sound level to provide the rating level. These penalties relate to the acoustic features of the sound source.

As noted in the survey report, the noise is subjectively analysed to include intermittent bangs when loading by a digger. As such, a correction of 3 dB is applied for intermittency but no penalty is applied for impulsivity, considering the distance from the source. Therefore, the total acoustic character feature correction is +3 dB.

Table 5.1 details the BS 4142 assessment for each respective receptors. As receptors are at differing distances and angles from the wash plant, multiple receptor locations are used to ensure that where any barriers are required are bespoke for that boundary.

As noted in Table 4.1, the lowest measured background sound level is noted to be 49 dB. As such, this is used as a worst-case period.

TABLE 5.1 BS 4142 ASSESSMENT

CALCULATION STEP	23 KINGS ROAD	KINGS DRIVE	LEEDS ROAD (SW)
PLANT, L_{WA}	111	111	111
DISTANCE TO RECEPTOR (m)	325	600	482
ADJUST FOR DISTANCE (dB)	-58.2	-63.6	-61.7
ADJUST FOR AIR ABSORPTION (dB)	-7.8	-9.1	-8.7
ADJUST FOR BARRIER ATT (dB)	0	0	0
ESTIMATED $L_{Aeq,T}$ FREE-FIELD (dB)	45	38	41
ACOUSTIC FEATURE CORRECTION (dB)	+3	+3	+3
RATING LEVEL, $L_{A,r}$ (dB)	48	41	44
BACKGROUND SOUND LEVEL, $L_{A90,T}$ (dB)	49	49	49
DIFFERENCE, +/- (dB)	-1	-8	-5

It is found that rating levels are expected to fall below the background sound level at the closest receptors by between 1 and 8 dB. As such, BS 4142 provides the following advice:

> *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.*

Given the above, consideration of context is warranted given the new operations close to receptors.

Furthermore, it is worth highlighting that the above is based on the lowest measured background sound level. The average background sound level during the 06:43-13:43 period is noted to be 51 dB. This would further support the low impact conclusion.

6. CONTEXT AND UNCERTAINTY

In order to determine the final outcome of the assessment, the context must be considered, in accordance with BS 4142:2014+A1:2019, Section 11. Specifically, this relates to receptors to the south east subject to an exceedance of up to +2 dB. The factors to be considered are discussed below:

THE ABSOLUTE LEVEL OF THE SOUND

Since the assessment relates to a future noise source, it is not possible at present to compare the Specific Noise Level with the residual sound, as discussed within the standard. However, the absolute noise level at the most affected receptor is 45 dB $L_{Aeq,1hr}$. This is 5 dB below the 50 dB criterion for relaxation in gardens.

As such, this is not considered to cause adverse impact.

THE CHARACTER AND LEVEL OF THE RESIDUAL SOUND COMPARED TO THE CHARACTER AND LEVEL OF THE SPECIFIC SOUND

As discussed above, this is not directly possible since the assessment relates to a proposed noise source rather than an existing noise source, albeit the some of the noise character remains the same as existing operations. However, quarry sources are already audible at the site and so form part of the sound climate for those closest. Notwithstanding this, corrections for intermittency are applied and are considered worst-case.

THE SENSITIVITY OF THE RECEPTOR AND WHETHER DWELLINGS OR OTHER PREMISES USED FOR RESIDENTIAL PURPOSES WILL ALREADY INCORPORATE DESIGN MEASURES THAT SECURE GOOD INTERNAL AND/OR OUTDOOR ACOUSTIC CONDITIONS.

The receptors are residential, assumed to be permanent and are therefore considered to be sensitive. Given that details of the existing receptors are not known, it is assumed that no design measures are incorporated. Based on the absolute noise levels within garden areas, the external noise levels would be below BS 8233:2014 criteria and would be considered acceptable.

Given the contextual factors discussed above in accordance with BS 4142:2014+A1:2019, it is concluded that the sound sources proposed are likely to have a low adverse impact during the daytime periods at the receptors when accounting for context. Indeed, internal noise levels with windows open would be less than 35 dB at the closest receptors.

7. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned to undertake a Noise Impact Assessment for the proposed variation to an Environmental Permit at the Mone Brothers Ltd site, Blackhill Quarry.

E3P have undertaken attended background and ambient sound measurements at a position considered representative of the closest existing receptors.

Detailed calculations have informed a BS 4142 assessment for the proposed operations on site. The calculations have been used to predict the rating level at the receptors which has been compared with the typical background sound level, accounting for any acoustic characteristics associated with the sound in accordance with BS 4142:2014+A1:2019.

The BS 4142 assessment determined that the predicted rating levels would fall below the existing lowest measured background sound level at all receptors. As such, no mitigation measures are required.

Considering this, it is concluded that there should be no adverse impact due to the operations of the proposed operations upon existing receptors.

END OF REPORT

APPENDIX I
GLOSSARY OF ACOUSTIC TERMINOLOGY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE A1 TYPICAL SOUND PRESSURE LEVELS

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20–30	Quiet bedroom at night
30–40	Living room during the day
40–50	Typical office
50–60	Inside a car
60–70	Typical high street
70–90	Inside a factory
100–110	Burglar alarm at 1 m away
110–130	Jet aircraft on take off
140	Threshold of pain

ACOUSTIC TERMINOLOGY

TABLE A2 TERMINOLOGY

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L_{90} is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.

APPENDIX II
NOISE SOURCE SURVEY – CDE GLOBAL

CDE GLOBAL

TYPICAL NOISE EMISSIONS

M2500 – AGGMAX

Prepared on 15 April 2013

CDE Global Ltd, Ballyreagh Industrial Estate, Sandholes Road, Cookstown, Co. Tyrone, N. Ireland, BT80 9DG
Office Phone: +44 28 8676 7900 | Office Fax: +44 28 8676 1414
Email: info@cdeglobal.com
cdeglobal.com

NOISE ASSESSMENT REPORT

Introduction

The following report represents the noise level measurement emitted by a CDE aggregate washing plan i.e. M2500 and AggMax 83 installed in the UK operating in its normal conditions which are similar to the SP-631 project. Further measurements were taken at specified distances to investigate the propagation of noise emissions.

In relation to the water treatment machinery noise emission, it hasn't been included in the report and should be expected to be less than the generated by an M2500 or an AggMax i.e. <75 dB (A).

2.0 Manual noise measurements

2.1 Procedure

The noise level measurements were undertaken at the positions shown on the indicative M2500 AggMax site layout plan noise emissions. Measurements at each location lasted for at least 1-2 minutes and it was ensured that durations were long enough to encapsulate the noise from the aggregate washing processes under normal operation.

Measurements were undertaken at various locations around the plant in order to best depict the noise levels associated with various parts of the washing process.

Operational modes were typical and all processes were operated at a setting deemed typical for normal conditions.

During this noise survey, there was some influence from other sources associated with the aggregate washing plant. These included an auxiliary hopper, a tracked excavator/loader vehicle, a pump and a diesel generator all within the vicinity. Although these are deemed necessary accessories to the washing plant, their influence has been indicated on the relevant measurements.

2.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 Pulsar Model 14 - Class 2 Sound Level Meter
- 1 Pulsar Model 16 – Class 2 Acoustic Calibrator
- 50 mm wind shield

3.0 Results

The summarised results of measurements in each location are shown in Table 3.1. Measurements are given as overall sound pressure at close range to the sources in order to give the best impression of the noise emissions unaffected by surrounding sources.

Comments shown in red mark measurements where the influence of nearby sources not directly associated with the aggregate washing plant was noted.

ITEM	LOCATION NUMBER	POSITION	DISTANCE FROM SOURCE	MEASURED ONSITE NOISE LEVEL LAEQ,T
M2500 E4X	1	Side of hopper (close to auxiliary hopper)	1m	76.9 dB(A)
M2500 E4X	2	Side unit	1m	80.6 dB(A)
M2500 E4X	3	Side unit	1m	81.2 dB(A)
M2500 E4X	4	Conveyor belt	1m	75.8 dB(A)
M2500 E4X	5	Conveyor belt	1m	76.6 dB(A)
M2500 E4X	6	End unit	1m	75.8 dB(A)
M2500 E4X	7	Conveyor belt	2m	74.6 dB(A)
M2500 E4X	8	Side unit	1m	84.1dB(A)
M2500 E4X	9	Side unit	1m	84.4 dB(A)
M2500 E4X	10	Conveyor belt	1m	82.3 dB(A)
P2-75	11	On unit	0.5m	87.1 dB(A)
P2-75	12	On unit	0.5m	87.7 dB(A)
RX 80	15	Side unit (non CDE pump operating)	1m	81.9 dB(A)
RX 80	16	Side unit (without non CDE pump operating)	1m	78.6 dB(A)
RX 80	17	Side unit	1m	82.4 dB(A)
RX 80	18	Side unit	1m	82 dB(A)
RX 80	19	Side unit (next to non CDE equipment)	1m	81.8 dB(A)
RX 80	20	Side unit (next to non CDE equipment)	1m	85.4 dB(A)
RX 80 - Aggregate screen	21	On unit	1m	90.8 dB(A)
RX 80- Aggregate screen	22	On unit side	1m	88 dB(A)
M1508	23	Conveyor belt	1m	81.4 d(B)A

Table 3.1 Measured source noise levels at close range to the plant

Note is red are related to non-CDE equipment.

In addition to the above measured levels, ambient noise levels were also taken at various distances from the aggregate washing facility where feasible. This was undertaken in one direction from the plant only due to the terrain and surrounding boundaries of the quarry site, the direction of measurements is indicated on the attached site plan.

MEASUREMENT LOCATION	COMMENTS	MEASURED NOISE LEVEL LAEQ,T
10 m	Some intermittent bangs from digger (when loading)	71.9 dB(A) - 73 dB(A)
50 m	Some intermittent bangs from digger (when loading)	66.6 dB(A) - 69 dB(A)
100 m	Some intermittent bangs from digger (when loading)	62.2 dB(A) - 63 dB(A)

Table 3.2 Measured source noise level at various distances from the plant

The above measurements were taken in order to obtain measurements at distance while maintaining a direct line of sight with ongoing operations.

Close to the aggregate washing facility, measured noise levels are complex due to the contribution of many sources and localised screening. However at distances greater than 50m, the noise generated will begin to behave more like a point source. This is demonstrated in the measurements at 50m and 100m, where the doubling of distance has caused a 6dB drop in noise emissions levels, which is in line with acoustic theory of noise propagation.

It can therefore be predicted that, at 200m (a further doubling of distance) noise levels would be expected to be in the region of 57 dB(A).

4.0 Conclusion

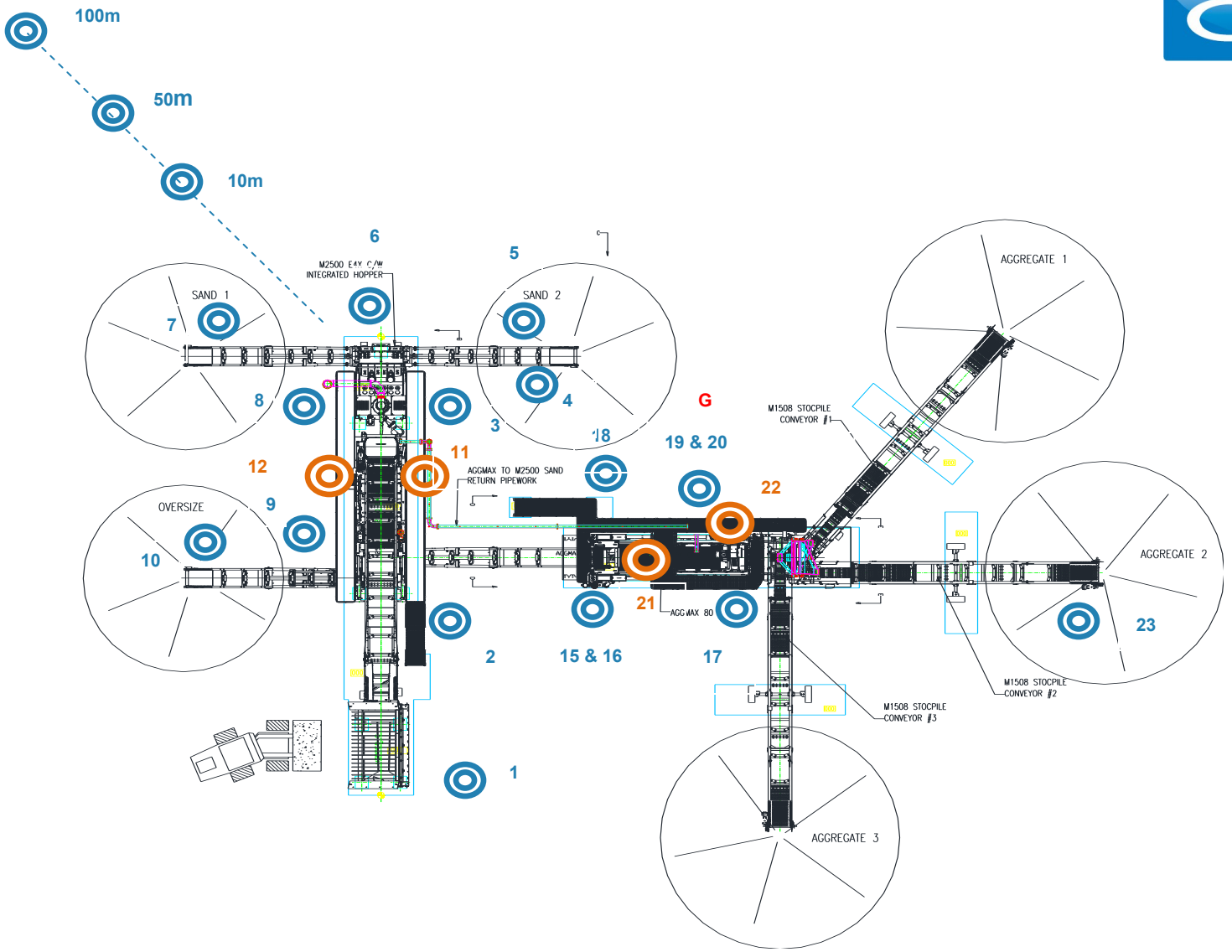
Noise measurements have been taken at and around an existing aggregate washing facility in order to investigate the propagation of noise around the site.

Measurements have assessed noise levels at source due to individual parts of the aggregate washing process. Further measurements have also been undertaken to demonstrate how overall noise levels propagate at set distances from the site.

Reported by: Juan Elias

Approved by: Chris McKeown

CDE Global Ltd, Ballyreagh Industrial Estate, Sandholes Road, Cookstown, Co. Tyrone, N. Ireland, BT80 9DG
Office Phone: +44 28 8676 7900 | Office Fax: +44 28 8676 1414
Email: info@cdeglobal.com
cdeglobal.com



M2500 – AGGMAX layout plan noise emission

Noise Measurement Position (On unit)

Noise Measurement Position (Ground level)

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