


Stainton Quarry Ltd

Report on Noise Assessment At Proposed Mineral Extraction Site

Historical Sandstone Quarry, Gayles, North Yorkshire

NEMS

83 Victoria Road
Darlington
County Durham DL1 5JQ
Tel/Fax: (01325) 255187

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Issued by:	Checked by:
 MS Tunstall B.Tech (Hons), M.Phil.	 AH Young Dip2.OSH, B.Sc. (Hons), M.Sc., CMIOSH, CertOH, LFOH
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1.0 EXECUTIVE SUMMARY

Northern Environmental and Monitoring Services (NEMS) were requested by Stainton Quarry Ltd to carry out a noise impact assessment in support of their planning application to start quarry activities at an historic sandstone quarry on the outskirts of Gayles, North Yorkshire.

Two scenarios have been considered for activities at the site of the quarry in outside Gayles, the first being extraction of sandstone block to be removed from site; the second is crushing and screening of surplus material, it should be noted that the use of the crusher will be limited to either one day a week or approximately one week in any given month.

Baseline noise monitoring was carried out at the nearest sensitive receptor (NSR), namely Quarry House north east of the proposed quarrying activity; background noise monitoring was first carried out on 6th of December 2018 and subsequently on the 14th of April 2021. In addition to background noise monitoring at the site noise levels were taken of the plant to be used, these were carried out over a number of visits to Stainton Quarry; furthermore noise levels were taken at Stainton mimicking the screen effect of the bund and distance.

Quarry house is approximately 90m from the peak height (250m AOD) of the screening bund; crushing and screening will be carried out, at its closest, 130m on the quarry floor (240m AOD). Quarry House itself is sited at 232m AOD

The noise assessment indicates that noise from proposed quarrying and intermittent crushing and screening operations should not exceed 10 dB(A) above the L₉₀ at Quarry House. Short term operations such as the construction of the baffle screen bund would not exceed 70 dB(A).

2.0 INTRODUCTION

Northern Environmental and Monitoring Services (NEMS) were requested by Stainton Quarry Ltd to carry out a noise impact assessment in support of their planning application to start quarry activities at an historic sandstone quarry on the outskirts of Gayles, North Yorkshire.

Two scenarios have been considered for activities at the site of the quarry outside Gayles, the first being extraction of sandstone block to be removed from site and main activity; the second is crushing and screening of surplus material, it should be noted that the use of the crusher will be limited to either one day a week or approximately one week in any given month.

Baseline noise monitoring was carried out at the NSR, namely Quarry House in order to establish the background noise level (L_{A90}) In addition to background noise monitoring at Quarry House, noise levels were taken of the plant to be used, these were carried out over a number of visits to Stainton Quarry; furthermore noise levels were taken at Stainton Quarry mimicking the screen effect of the bund and distance whilst the crusher and all other activities were in operation.

Noise levels would be predicted at the NSR. The predictions would be carried out for both short term operations, such as baffle mound formation, to determine the worst case noise levels and general quarrying activities.

The NPPG Minerals for short term activities which cannot be adequately screened sets a noise criterion of 70 dB LAeq, 1hr which is limited to a period of no more than 8 weeks in a year.

The aim for noise limits for the main operations, including crushing, is to achieve a noise limit of no more than 10 dB(A) above the average background noise level at NSR's, subject to a maximum noise level of 55 dB LAeq, 1hr.

Calculations were also carried out to predict site noise; the calculation method for any plant which is relatively fixed in location is that set out in BS 5228- 1: 2009 + A1: 2014, Annex F, and is the "Method for activity LAeq" described in section F.2.2 or the "Method for plant sound power level" described in section F.2.3.

The calculation method for site mobile plant such as lorries and dump trucks is that set out in BS 5228-1: 2009 + A1: 2014, Annex F, and is the "Method for mobile plant in a defined area" described in section F.2.4 or "Method for mobile plant using a regular well defined route (e. g. haul roads)" described in section F. 2. 5.

Ground Absorption has been calculated using the technique set out in BS 5228-1: 2009 + A1: 2014, Annex F, assuming between 50% and 75% soft ground between the site operations and the receiver locations.

The method of assessing screening is that attributed to Maekawa as used in BS 5228-1: 2009 + A1: 2014, Annex F and various other Government published documents. This method uses the calculated path difference and octave band noise data for each noise source over the frequency range stated in BS 5228-1: 2009 + A1: 2014, Annex F.

3. NOISE ASSESSMENT

3.1 Observations & Subjective Impressions

The general noise environment at the nearest sensitive receptor monitoring location, namely, Quarry House approximately 120m north east of the proposed quarrying, is typical for a rural environment. There is infrequent traffic movement past Quarry House.

Clearly audible is the small stream that runs past the house. To south there is a military firing range, it should be noted that no background monitoring was carried out during firing.

Some discernible noise could be heard from the A66 approximately 3Km to the north, although this was not continuously audible.

3.2 Description of Plant under Investigation

- Volvo tracked excavator. This this will be in use most days. It will be used for the mechanical extraction of the block from the faces and for loading stone onto the wagons.
- Hyundai loading shovel. General loading activities and movement of material around the site and construction of the screening bund in Phase A
- Manitou telehandler. This will be used for moving large blocks of stone.
- Finely 883 Reclaimer screen and Metso 105 mobile crusher. This will be used intermittently to crush and screen the waste stone.
- Various HGVs

3.3 Measurement Location

The background and ambient noise survey was carried out at a single off-site location, namely the entrance to Quarry House. Quarry house is approximately 90m from the peak height (250m AOD) of the screening bund; crushing and screening will be carried out, at its closest, 130m on the quarry floor (240m AOD). Quarry House itself is sited at 232m AOD

3.4 Sound Level Measurements

Continuous noise measurements were made using a Castle Instruments Mirus GA117 Statistical Integrating Sound Level Meter, (serial number 34269); this logs the results in an internal memory, in the form of L_{A10} , L_{A90} , L_{Aeq} , L_{max} , L_{min} and duration for each measurement sample. The meter meets the relevant provisions of IEC61672:2002 Class 1.

Other measurements were made using a Casella CEL-621C (serial number 3491705) real-time precision integrating 1/3 octave band sound level meter - conforming to IEC 61672:2002 Class 1.

Both instruments were calibrated in accordance with the manufacturer's recommendations. In addition, the meters were calibrated before and after each period of monitoring, using a Castle GA602 Precision Calibrator (serial number 031705) that provides 94dB and 104dB at 1000Hz.

The measurements were taken at a height of 1.2-1.5m above ground level, the microphones were appropriately orientated, and a foam windshield was fitted to minimise the influence of wind on measured noise levels.

3.5 Meteorological Condition

Meteorological conditions during the surveys are presented below:

Table 3.5.1 – Meteorological Conditions for Background Measurements

Date	Temp °C	Windspeed (m/s) Direction	Pressure (mb)	RH %	Cloud Cover	Precipitation
6/12/2018	2-3	0-1 WNW	1021	52	0/8	None
14/04/2021	11-13	2-3.SE	1014	61	2/8	None

3.6 Summary of Sound Level Measurements

A summary of the noise monitoring results taken at Stainton Quarry are presented in Tables 3.6.1 & 2 below:

Table 3.6.1- Summary of Noise Monitoring from Various Activities

Log Ref.	Duration (min:sec)	L _{Aeq}	L _{Amax}	Comments
10m from Crusher/screens and 360° excavator				
30	63:14	86.2	92.6	Crusher being loaded by excavator, loading shovel operating
10m from 360° excavator				
31	35:38	73.7	81.8	Removing material including block from mound
32	15:11	71.0	79.5	As above
Loading shovel ~10m				
33	61:10	79.3	93.4	Stockpiling and loading wagons, wagons moving around the area

Table 3.6.2- Summary Background Sound Levels at Entrance to Quarry House

Date	Duration (min:sec)	L_{A90}	Time	Comments
6/12/2018	110:10	37	14:30-16:20	One car movement uphill
14/4/2021	124:05	36	11:15-13:19	Two car movements, distant tractor noise

3.7 Noise Impact Assessment

Noise impact assessments have been calculated at the NSR for the cumulative noise sources, and summarised in Tables 3.7.1, 2 & 3 below and compared against set out in the NPPG Minerals Guidance.

Ambient sound is defined in as "*totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far*". It comprises the residual sound and the specific sound when present.

Residual sound is defined as "*ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound*". The background sound level is the L_{A90,T} of the residual sound level, and is the underlying level of sound. Measurements of background sound level should be undertaken at the assessment location where possible or at a comparable location. The measurement time interval should be sufficient to obtain a representative value (normally not less than 15 minutes) and the monitoring duration should reflect the range of background sound levels across the assessment period. The background sound level used for the assessment should be representative of the period being assessed.

The specific sound level is the L_{Aeq,T_r} of the sound source being assessed over the reference time interval, T_r. The daytime T_r should be 1 hour during the day (07:00 – 23:00)

Sound Power Levels of Plant SWL	dB(A)
Single loading shovel	106
HGV movements	104
360° Excavator	99
Crusher and Screens	111
Assumptions	
Overall effective barrier height	14m
Path Length Difference from working area to NSR	2 m
Noise attenuation from barrier height	22 dB(A)
Average distance from working area to NSR Phase B	130m
Distance attenuation for on-site activity including crushing and HGV movement	42 d(BA)
Average distance to NSR Phase A bund construction	90 m
Distance attenuation	39 d(A)
Phase A screening bund loading shovel use	50% "on-time"
Activity continuous for crushing and screening with other operations on-going	100% "on" time
No account has been allowed for soft ground	-

Table 3.7.1 - Summary of Noise Assessment –Crusher/screens and Excavator

Calculated sound level (L_{Aeq}) at NSR	Background Level (L_{A90})	Background + 10 d(B)	Excess over background in dB(A) +10
42	36	46	-4

Table 3.7.2 - Summary of Noise Assessment –Sandstone Extraction with wagon loading

Calculated sound level (L_{Aeq}) at NSR	Background Level (L_{A90})	Background + 10 d(B)	Excess over background in dB(A) +10
36	36	46	-10

Table 3.7.3 - Summary of Noise Assessment –Phase A Bund Construction

Specific sound level (L_{Aeq}) at NSR	Maximum (L_{Aeq})	Background Level (L_{A90})	Excess over 70 dB(A)
61 ¹	70	36	-9

¹Assuming that the excavator is used to profile the bund and loading shovel imports material

4.0 CONCLUSIONS

The Noise assessments indicate that noise from proposed quarrying should not adversely impact the amenity of residents during the daytime at Quarry House. There is a degree of uncertainty in the actual noise levels that will be emitted once the screening bund is constructed. It should be noted that no attenuation has been applied for soft ground attenuation.

The worst case situation once the bund is constructed will be the use of the crusher and screens, albeit only once a week or for one week in the month; the excess over the background at the Quarry House has been calculated as being 6 dB(A) which falls below the 10 dB(A) that is permitted.

Normal quarrying operations will be well below the 10 dB(A) and barely audible. Monitoring at Stainton Quarry using screening mounds to create a similar effective barrier height and distance with all other activities, including crushing confirmed this.

