LONG-TERM REAL-TIME NOISE MONITORING AND PHASE 1 MODELLING

Forest Lodge Home Farm

Prepared for: TJ Transport Limited

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1.0 Introduction

SLR Consulting Limited (SLR) has been appointed by TJ Transport Limited (TJT) to undertake a programme of real-time noise monitoring and noise modelling at their quarry facility at Forest Lodge Home Farm, Fawley Road, Hythe, Hampshire, SO45 3NJ (the Site).

The noise monitoring is required in response to a deferment made by Hampshire Country Council's (HCC) planning department for the variation of Condition 28 of the planning permission to allow the use of additional mobile screening kit to improve operational efficiency of the Site.

This report outlines the monitoring methodology, noise limits and results for the period between Wednesday 25th of November and Tuesday the December 15th2020.[1]

Following a review of the monitoring report and a liaison committee meeting on the 12th of January 2021, it was agreed that this addendum report would be produced showing the results of a noise modelling exercise of the cumulative impact of existing quarry operations and the additional plant associated with proposed infilling operations within Phase 1 of the Site.

Whilst reasonable effort has been made to ensure that this noise report is easy to understand, it is necessarily technical in nature. To assist the reader, a glossary of terminology is provided as Appendix 01.

[1] First version of the report (Ref: 416.00492.00026.002) issued on the 21/12/2020

2.0 Site Description

2.1 Site Location

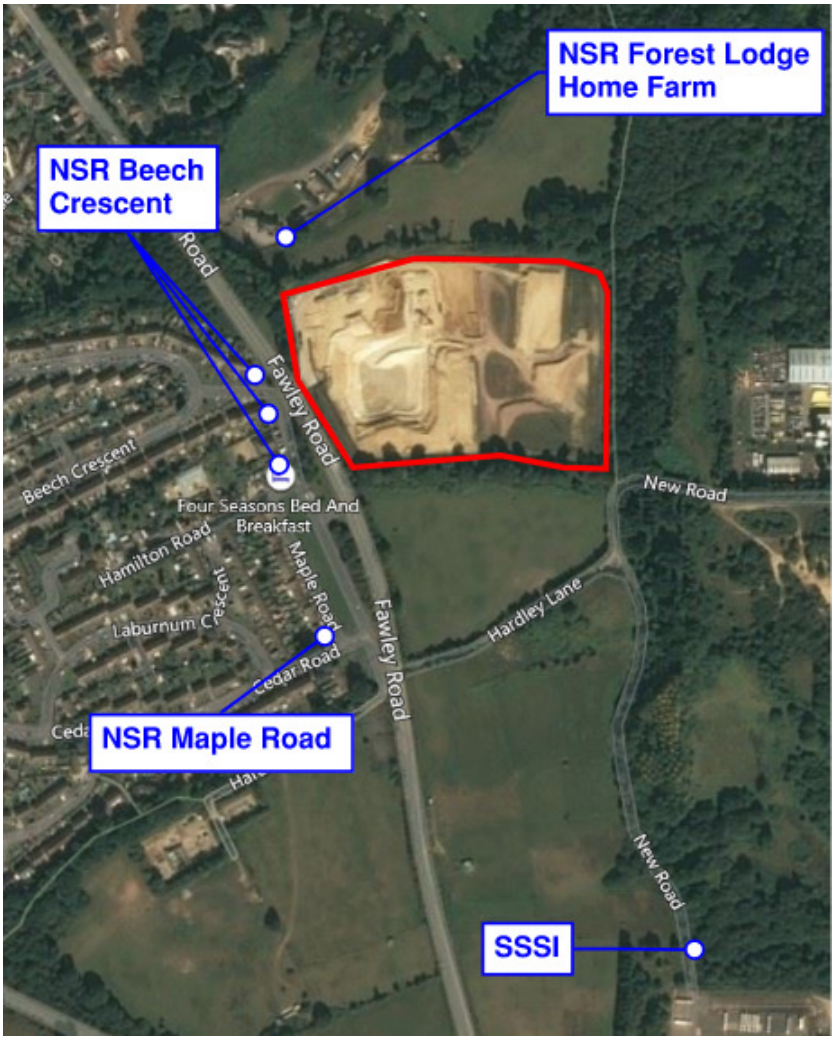
The site is situated on Fawley Road in Hythe, Hampshire, SO45 3NJ. It is bounded by fields to the north and south, forest to the east and Fawley Road to the west.

The nearest noise-sensitive residential receptors (NSRs) as described in Chapter 8 of the Environmental Statement approved under Planning Permission 16/10450, are:

- Beech Crescent to the west;
- Maple Road to the west;
- Forest Lodge Home Farm to the north; and
- SSSI to the south.

The approximate site boundary is shown in red and the NSRs are given in blue in Figure 2-1.

Figure 2-1
Site location and NSRs



2.2 Site Operations

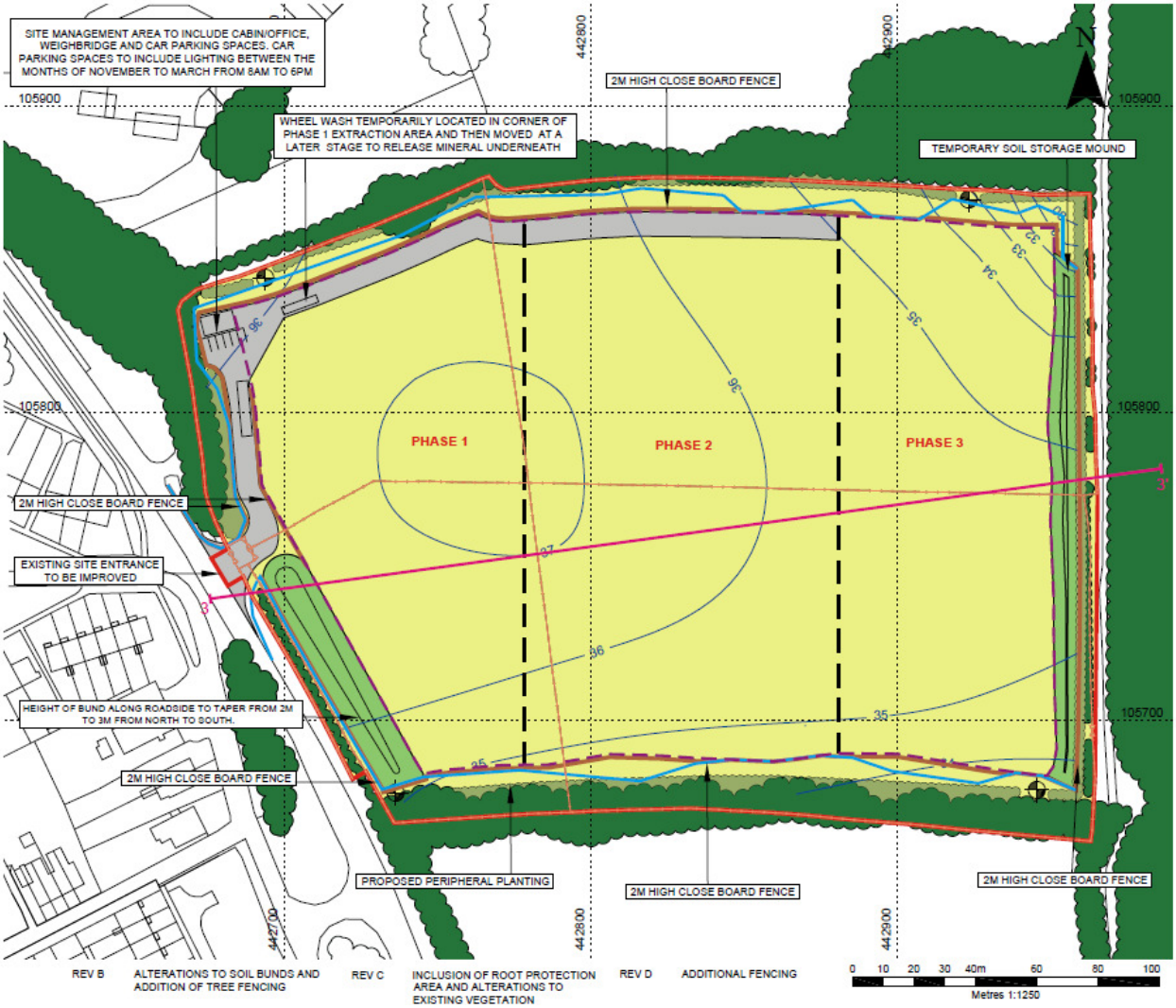
Figure 2-2 shows a plan of the site. It is understood that the current normal operations at the Site are situated in the middle of Phase 2.

Current operations at the Site include:

- Continuation of extraction and screening of materials from Phase 2.

It should be noted that the normal operations currently being undertaken at the Site are only utilising the permitted plant, as the use of the additional plant ceased following a number of noise complaints at the Site and the recommendations of the HCC liaison committee (see Section 2.4 for further details).

Figure 2-2
Plan of Site Showing Phases of Operation



2.3 Planning Conditions Relating to Noise

Condition 28 contained within planning permission 18/11586 related to noise and states:

'The total noise from operations at the hereby approved site shall not exceed 55dB $L_{Aeq\ 1\ hour}$ (free field) at the boundary of the nearest noise sensitive properties (as identified within chapter 8 of the Environmental Statement approved under planning permission 16/10450).'

2.4 Deferment and Noise Complaints

The planning application for additional mobile screening kit to improve operation efficiency of the Site was deferred by the planning committee of HCC.

HCC stated:

"The committee were concerned at the number of complaints being received from local residents concerning noise this year and the risk of this being exacerbated through additional plant being added via this application."

HCC also stated:

"We need TJs to have a think about what can be done here as we will need to report back to Committee with solutions. The original permission's ES contains noise monitoring locations to the west of the site. Could these be more routinely monitored? Could additional locations be added? Looking at real time monitoring, which is employed at a site in Pennington in the New Forest, have TJs ever considered this?"

In view of the above, SLR consulted with the Environmental Health department of HCC to agree a programme of real-time monitoring, further details of this consultation are provided in Section 3.4.

3.0 Monitoring Methodology

A sound level meter with real-time monitoring capabilities was installed at the Site on Tuesday the 3rd of November 2020, the monitoring methodology is described below.

3.1 Monitoring Location

The sound level meter was installed at a location on the northern boundary of the Site, at a location representative of the western extents of phase 2, as shown on Figure 3-1 below.

The approximate location of the screener, which is considered to be the main noise source at the Site, and the location of the weighbridge is also shown on the image below.

Figure 3-1
Monitoring Location

3.1.1 Reasons for Choosing the Monitoring Location

It is understood that the most sensitive receptors are residential properties located to the west of the Site on Beach Crescent and Maple Road, however the noise climate at these receptors during the daytime is dominated by road traffic noise from Fawley Road, which was determined by observations made by the qualified acoustician[2] on the 3rd of November 2020.

It also should be noted that SLR undertook a baseline survey at these properties in January 2016 as part of a planning application for the Site, the results of the baseline survey showed that the measured ambient ($L_{Aeq,T}$) noise levels in absence of any quarry operations were above 55dB, which is above the noise limit outlined in Condition 28.

In view of the above it was considered that if the meter was positioned on the western boundary of the Site which is closest to the residential properties, road traffic noise, and not noise being generated by operations at the Site, would significantly influence the measured levels and have the potential to cause exceedances in the noise limits.

Therefore, a monitoring position needed to be selected where the noise being generated by everyday operations at the Site was prominent, but the meter would not interfere with Site operations and be safe from accidental damage.

As shown on Figures 2-2 and 3-1, extraction operations are currently being undertaken in phase 2 part of the quarry with the screener located towards the centre of the Site.

The surveyor therefore chose the position shown on Figure 3-1, as the noise from Site operations was prominent, and the noise environment was not significantly influenced by road traffic noise from Fawley Road. The main noise sources from the quarry consisted of the screening of material and mobile plant movements.

The selected location is also adjacent to the haul route, which is utilised by mobile plant travelling from the Site compound to the working area within the quarry and by tipper lorries accessing the Site, consequently worst-case noise levels from vehicle movements are also being captured.

3.2 Monitoring Equipment

Details of the equipment installed at the Site are shown in Table 3-1 below.

The sound level meter was calibrated on set-up on the 3rd of November and during a scheduled Site visit on the 25th of November 2020 an acoustic calibrator and no significant drifts were observed. The calibration chain is traceable via the United Kingdom Accreditation Service to national standards held at the National Physical Laboratory.

Table 3-1
Survey Equipment

Survey Location	Equipment	Serial Number
Northern Boundary	Rion NL-52 Type 1 Sound Level Meter	00976174
	Rion NC-74 Acoustic Calibrator	34478298

[2] The acoustician has 8-years relevant experience, holds the I.o.A diploma in Acoustics and Noise Control and is a full member of the I.o.A.

The meter was set-up in free-field conditions at the monitoring location, i.e. at least 3.5m from the nearest vertical reflecting surface.

Nosie levels are being measured on a continuous basis and logged every 1-hour and the following noise level indices are being recorded:

- **$L_{Aeq,T}$** The A-weighted equivalent continuous noise level over the measurement period T.
- **L_{Amax}** The maximum A-weighted noise level during the measurement period.

3.3 Noise Limits

As stated in Section 2.3, the Site is subject to a planning condition which specifies a noise limit of 55dB $L_{Aeq\ 1\ hour}$ (free field) at the boundary of the nearest noise sensitive properties.

The monitoring location shown in Figure 3-1 is closer to the working area than the nearest noise-sensitive receptors shown on Figure 2-1.

Further to the above, the Site has also a number of complexities i.e. plant can operate over a wide area, and the noise meter is adjacent to the haul route, therefore a limit of 65dB(A) $L_{Aeq\ 1\ hour}$ (free field), was set at the monitoring location between the 25th of November and the 15th of December 2020.

A secondary limit of 90dB $L_{Amax\text{-}1min}$ was also set at the monitoring location.

If either of the limits is exceeded an audio file is created, so that the cause of the exceedance can be identified. The purpose of the maximum (L_{Amax}) noise limit is to gather audio data of instantaneous 'one-off' events, in-case a complaint is received from such an event.

It should be noted that these limits would be subject to change if:

- They pose an undue constraint on operations at the Site, and in the absence of complaints, they may be revised upwards; and
- Complaints arise and the source be attributed to Site, they may need to be reduced downwards, especially if plant is operating closer to the Receptor than the monitoring position.

3.3.1 Alerts and Web-access

If the noise levels over a 1-hour period are within 3dB of the specified limit an 'Amber Alert' is sent via email to all the relevant parties, this is a notification to warn the operator that noise levels are approaching the limit, and to investigate if necessary.

If the noise levels over a 1-hour period exceeds the relevant noise limit, then a 'Red Alert' is sent and it may be necessary to investigate the reasons why.

Access has been granted to all the relevant parties involved (SLR, TJ Waste and HCC) so the noise levels being measured can be seen in real-time.

3.4 Consultation with HCC

SLR have consulted with the Environmental Health Department of HCC regarding the monitoring methodology and specified limits.

In an email response from Arran Harmer, the Environmental Protection Officer (EHO) for HCC, on the 17th of November 2020 he stated that he had no particular concerns or queries regarding the monitoring, he also stated

that the report should describe how the on-site limit of 70dB[3] relates to the receptor locations and why it was necessary to choose the monitoring position selected.

SLR will continue to liaise with Mr Harmer for the duration of the monitoring programme.

[3] Amended to 65dB from the 19th of November 2020

4.0 Monitoring Results

The results are for the monitoring period between the 25th of November and 15th of December 2020.

4.1 Analysis of Results

The measured noise data is presented in graphical form in Figure 02-1 in Appendix 02.

The data for Sunday the 29th of November, Sunday the 6th December and Sunday the 13th of December is not shown on the graph as the Site was not operating during these periods.

It can be seen from the graph that the noise limit was exceeded on the following occasions;

- Between 12:00 and 13:00 on Monday the 30th of November 2020;
- Between 08:00 and 09:00 on Tuesday the 1st of December 2020;
- Between 09:00 and 10:00 on Tuesday the 1st of December 2020; and
- Between 11:00 and 12:00 on Tuesday the 1st of December 2020

SLR has listened to the audio files for the above periods and liaised with TJT regarding the associated operations and the following reasons for the exceedances were determined.

4.1.1 Monday the 30th of December between 12:00 and 13:00

It was determined that the exceedance was due to material (hardcore) being tipped near the monitoring position in readiness for the construction of a new haul road (see Section 4.2.2).

A slight exceedance in the noise limits from a source so close to the meter, would still be well below the limits at the nearest receptors due to the distances involved.

To further justify the above, SLR has modelled the noise of material being tipped close to the monitoring position, within the Cadna/A modelling software.

With reference to the noise model, if the noise levels from material tipping were predicted to be 65.8 dB, $L_{Aeq,1\text{-}hour}$ at the monitoring position, which reflects the level measured on the 30th of November, the worst-case predicted noise levels at the nearest receptors would be 32.3dB which is well below the 55dB limit.

4.1.2 Tuesday the 1st December 2020

It was determined that all the exceedances in the on-site noise limit on the 1st of December 2020, were caused by operations associated with the construction of a new haul road into phase 1, close to the monitoring position.

The construction of the road was undertaken utilising the following plant;

- A 360-degree excavator.

Based on the above SLR have modelled the excavator operating on the new haul road within the Cadna/A modelling software.

It has been confirmed with TJT that between 08:00 and 12:00 the excavator was operating at a location close to the monitoring position.

With reference to the above, and the noise model, if the predicted noise levels from the excavator were predicted to be 75.9dB $L_{Aeq\ 1\ hour}$ at the monitoring position, which reflects the highest measured level on the 1st December, the worst-case predicted noise levels at the nearest receptors would be 42.4dB, which is well below the 55dB limit.

Finally, no noise related complaints were received by the Site for the monitoring period between the 25th of November and 15th of December 2020.

5.0 Noise Modelling

During a liaison committee meeting on the 12th of January 2021 regarding the results the monitoring, concerns were raised on the cumulative noise impact of the existing quarry operations and the planned infilling operations associated with phase 1 of the Site.

In view of the above it was agreed that a noise modelling exercise would be undertaken to predict the cumulative noise levels at the nearest noise-sensitive receptors to the Site and compare them to the limits contained within Condition 28 of the planning permission.

5.1 Noise Model

A noise model has been built using the CadnaA® noise modelling software which incorporates the calculation methodology outlined in BS 5228:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites, Part 1: Noise*

The model is based on the following factors and assumptions;

- Downwind propagation, i.e. a wind direction that assists the propagation of sound from the sources to the receptors;
- A reflection factor of 2;
- A ground absorption factor of 0.9;
- 2m high fence inside the site boundary;
- Site contour data based on a topographical survey undertaken by SLR in September 2020, which includes the bunding on the western boundary; and
- A receptor height of 1.5m above ground level at the nearest noise-sensitive receptors;

The noise source details of the plant associated with the existing operations and the infilling operations are shown in Table 5-1. The table also details the sound power level for each source, data source which this was derived from, the approximate location of each item of plant and its associated on-time.

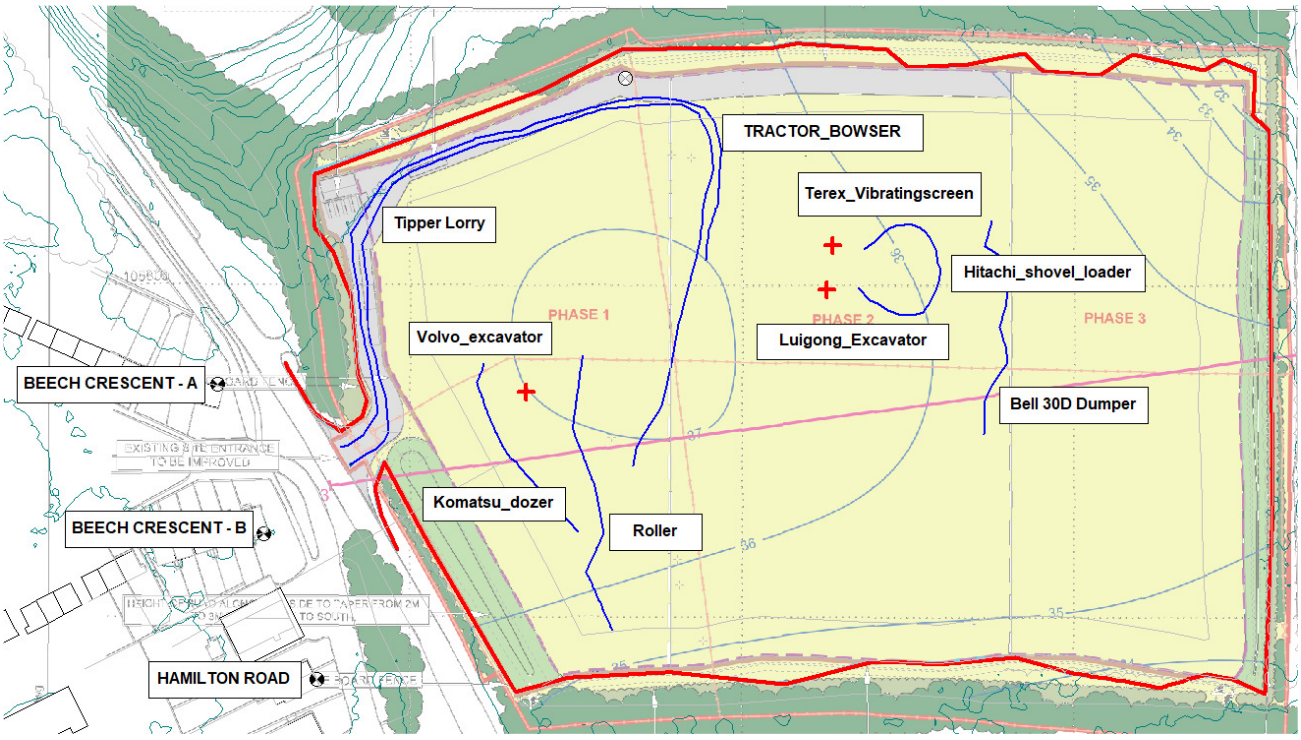
Table 5-1
Operational Plant

Plant/Equipment Item (Data source)	Location on Site	Sound Power Level, L_{WA} dB	Data Source	On-time (%) or movements per hour
Existing Operations				
Luigong 925 Excavator	Phase 2	102.0	Manufacturers Data for Luigong 925E	90%
Bell 30D Dump Truck	Phase 2	110.0	Manufacturers Data for Bell 40 A40D	40 per hour
Terex Finlay 683 Supertrak-Engine Deutz TCD 2012 LO4 Vibrating screen	Phase 2	98.0*	Manufacturers Data	90%
Hitachi ZW310 Shovel Loader	Phase 2	106.0	Manufacturers Data for Hitachi ZW220-5B	40 per hour
John Deere 6105M Tractor & Water Bowser	Haul Route	111.5	BS 5228-1:2009+A1:2014 Table C.6:38	2 per hour
Tipper Lorries (HGV's)	Haul Route, Phases 1 & 2	105.0	SLR previously measured Data	10 per hour
Infilling Operations				
Komatsu D65PX -18 Dozer	Phase 1	108.0	Manufacturers Data for D65 Dozer	40 per hour
Volvo EC 250 Excavator	Phase 1	103.0	Manufacturers Data for Volvo EC250E	90%
Vibromax VM651 Roller	Phase 1	107.5	Table D.3:116 in BS 5228-1:2009+A1:2014	40 per hour

*Sound power level calculated from sound pressure level of 90 dB at 1m

The noise model output showing the locations of the plant described above is provided in Figure 5-1. The model output also shows the locations of the most sensitive receptors to the west of the Site.

Figure 5-1
Operational Plant Locations



5.2 Predicted Noise Levels and Assessment

Based on the assumptions outlined in Section 5.1 and the plant list contained in Table 5-1, the cumulative noise levels from existing operations and the infilling operations within Phase 1 have been predicted at the nearest noise-sensitive receptors and compared to the limit specified within Condition 28 of the planning permission, as shown in Table 5-2 below.

The predicted noise levels have been rounded to the nearest decibel.

Table 5-2
Predicted Nosie Levels and Assessment

Noise Sensitive Receptor	Predicted Noise Level, L_{Aeq}	Planning Condition 28 Limit $L_{Aeq,1hour}$	Difference
Beech Crescent A	51	55	-4
Beech Crescent B	52		-3
Hamilton Road	49		-6

It can be seen from the above table that the predicted noise levels from cumulative operations at the Site are below the limit specified within Condition 28 of the planning permission at the most sensitive receptors.

5.3 Further Monitoring

During the liaison committee meeting on the 12th of January 2021 the prospect of further noise monitoring was discussed.

It was agreed that if permission was granted for the additional plant on site (required for restoration obligations) then further continuous noise monitoring would be undertaken at the Site, to determine that restoration operations would continue to be carried out in accordance within the noise limits specified within Condition 28 of the planning permission.

Further to the above, it has been agreed that the requirement for continuous noise monitoring would be written into a relevant planning condition should permission be granted for the additional plant.

6.0 Conclusion

SLR Consulting Limited (SLR) has been appointed by TJ Transport Limited (TJT) to undertake a programme of real-time noise monitoring and noise modelling at their quarry facility at Forest Lodge Home Farm, Fawley Road, Hythe, Hampshire, SO45 3NJ (the Site).

The noise monitoring is required in response to a deferment made by Hampshire Country Council's (HCC) planning department for the variation of Condition 28 of the planning permission to allow the use of additional mobile screening kit to improve operational efficiency of the Site.

This report outlines the monitoring methodology, noise limits and results for the period between Wednesday 25th of November and Tuesday the December 15th2020.[4]

Following a review of the monitoring report and a liaison committee meeting on the 12th of January 2021, it was agreed that this addendum report would be produced showing the results of a noise modelling exercise of the cumulative impact of existing quarry operations and the additional plant associated with proposed infilling operations within Phase 1 of the Site.

The results of the monitoring have shown that the noise limit at the monitoring location was exceeded on four occasions; however it was determined that the exceedances was due to the tipping of material and haul route construction near the monitoring location and not from everyday operations in the working area.

No noise related complaints were received by the Site for the monitoring period between the 25th of November and 15th of December 2020.

The results of the noise modelling have shown that the predicted noise levels from cumulative operations at the Site are below the limits specified within Condition 28 of the planning permission at the most sensitive receptors.

Finally, it was agreed that if planning permission was granted for the infilling operations a further programme of continuous noise monitoring would be undertaken at the Site, and the requirement for this would be written within a relevant planning condition.

[4] First version of the report (Ref: 416.00492.00026.002) issued on the 21/12/2020

APPENDIX 01

Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 01-1
Sound Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

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 ($2x10^{-5}$ 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} — L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & 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.

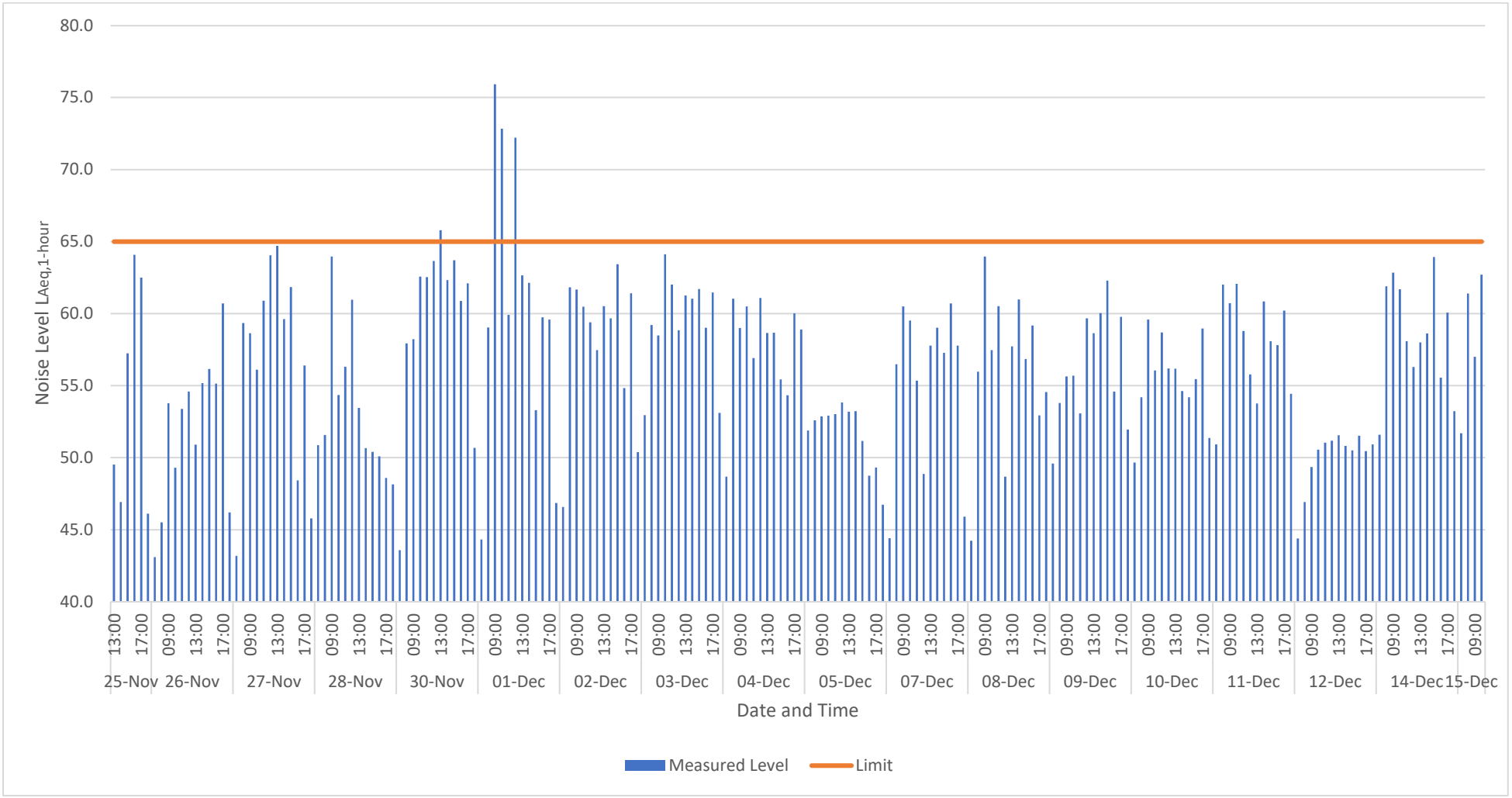
L_{Amax} — L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which

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.

APPENDIX 02

Noise Data Graph

Figure 02-1
Measured Noise Levels, dB



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