

LONDON CONCRETE LIMITED

PROPOSED CONCRETE BATCHING PLANT
AT CRANFORD WAY,
FERME PARK,
HORNSEY

ENVIRONMENTAL NOISE ASSESSMENT

Project No: 034798

Report prepared by:

D. F. Sharps,
CEng. FIMechE. FIOA.

Acoustic Consultant,
Sharps Redmore Partnership.

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1.0 Introduction

- 1.1 The Sharps Redmore Partnership (SRP) has been instructed by London Concrete Limited to undertake an assessment of a proposed concrete batching plant at Ferme Park, Hornsey.
- 1.2 The objective of the assessment is to determine the degree of impact to residents of Chettle Court some 132 metres from the plant.
- 1.3 The impact of road traffic noise is discussed in the Transport Assessment report prepared by Bellamy Roberts.
- 1.4 In this assessment consideration has been given to the appropriate assessment methodology and criteria (section 2.0), details are provided of the existing noise climate of the area (section 3.0) and predictions have been made of noise emissions from the site (section 4.0).
- 1.5 The conclusions of the noise assessment are set out in section 5.0 of this report.
- 1.6 Appendix B provides a description of the acoustic terminology employed.

2.0 Assessment methodology and criteria

2.1 The impact of noise from a new source may be assessed by several generic methods that may be summarised as follows:

- i. the effect may be determined by comparing the noise level of the source with recommended, absolute, noise limits contained within guidance documents;
- ii. the effect may be gauged by considering the change in noise level, that would result from the proposal, against advice in guidance documents;
- iii. the impact may be determined by considering the noise level that would result from the proposal relative to pre-existing background noise level of the area (a BS 4142 approach).

2.2 Each of these methods of assessment has advantages and disadvantages in relation to the assessment of a particular noise source in a particular area.

2.3 The use of fixed limits (method i, above) is appropriate for the assessment of sources that are contained within a finite boundary, particularly where noise sensitive receptors are few or are grouped together. This assessment method has been employed in this assessment for the analysis of noise from activity on the appeal site.

2.4 The assessment of impact against changes in noise level (method ii, above) is well suited to the analysis of road traffic since such analysis is normally determined entirely by calculation (using the “with scheme” and “without scheme”, traffic flows). This is the method usually employed for the assessment of traffic noise but this is not applicable in this case.

2.5 The use of BS 4142 type assessment (method iii, above) is only appropriate to the analysis of noise that is industrial in nature. Moreover, BS 4142 is better suited to the assessment of steady noise. The use of BS 4142 is not applicable here.

Fixed limits

2.6 There are a number of guidance documents that contain recommended fixed limits. These are discussed below.

2.7 Planning Policy Guidance (PPG) 24 “Planning and Noise” contains comprehensive advice on the subject of noise both in the circumstances of a residential development or a noise producing development.

2.8 In relation to proposed residential development, PPG 24 sets noise limits in terms of “noise exposure levels” (NECs). At the lowest NEC (NEC A) where noise is not a determining factor, the PPG 24 limit for day (0700 – 2300 hours) is $L_{Aeq,16hr} < 55$ dB, and for night (2300-0700 hours) is $L_{Aeq,8hr} < 45$ dB.

2.9 PPG 24 Annex 3 paragraphs 19 and 20 address the subject of commercial and industrial development. In this section, reference is made to BS 8233:1987 (now superseded by BS 8233:1999).

2.10 This Standard is principally intended to assist in the design of new dwellings; however the Standard does state that it may be used in the assessment of noise from new sources being brought to existing dwellings.

2.11 The BS 8233:1999 limits may be summarised as follows:

Gardens	$L_{Aeq,16hr}$	= 50 to 55 dB
Living rooms (internal)	$L_{Aeq,16hr}$	= 30 to 40 dB
Bedrooms (internal)	$L_{Aeq,8hr}$	= 30 to 35 dB

- 2.12 BS 8233:1999 was based on the advice contained in a draft of World Health Organisation document "Community Noise". This document was released in final form in 1999.
- 2.13 The WHO advice is the most useful, comprehensive, and pertinent advice in this case, because it is not specific to the circumstances of the assessment. Instead, it provides guidance on acceptable noise values in for example schools, dwellings and offices.
- 2.14 The WHO guideline values are appropriate to what are termed "critical health effects". This means that they are at the lowest noise level that would result in any psychological, physiological or sociological effect. A report written by the National Physical Laboratory and commissioned by the DETR summarises the status of the WHO values thus *"In essence, the WHO guidelines represent a consensus view of international expert opinion on the lowest threshold noise levels below which the occurrence rates of particular effects can be assumed to be negligible"* (NPL report CMAM 16).
- 2.15 In this respect the guideline values are much more robust than the national planning policy objective, this being to "avoid demonstrable [i.e. real] harm to interests of acknowledged importance" (ref PPG 1, paragraph 40).
- 2.16 The WHO criteria for daytime (moderate or serious annoyance) are $L_{Aeq,16hr} = 50$ to 55 dB.

3.0 Survey results

3.1 A survey was undertaken of noise levels in the area on the 17th April 2003 from 0600 to 1345 hours.

3.2 Initially measurements were undertaken at Chettle Court. However, this complex of flats has security gates and so it was not possible to gain access to the grounds facing the site. Thus, instead, measurements were undertaken at the entrance gate to Chettle Court and at the entrance to the application site. The background noise levels in these locations were found to be the same and so the longer term survey was undertaken entirely at the entrance to the application site. Only those measurements are displayed below.

3.3 All levels were recorded using a precision grade sound level meter, type: Bruel and Kjaer 2231. The meter was fitted with a statistical module allowing the direct measurement of the three indices shown (see appendix B for a full description of these indices).

3.4 The weather during the survey was very good being dry, warm (8-16°C) and no wind.

3.5 The following sound levels were recorded and are rounded to nearest 0.5 dB:

Time period (hrs)	Sound level (dB)		
	L _{A90}	L _{AeqT}	L _{Amax}
0700-0745	49.5	53.0	62.5
0800-0845	51.5	56.5	69.5
0900-0945	53.0	57.5	71.0
1000-1045	52.0	57.0	70.0
1100-1145	52.0	57.5	69.5
1200-1245	54.0	58.0	71.5
1300-1345	52.5	59.0	72.0

- 3.6 A typical background noise level (L_{A90}) for the area may be taken to be the average of the 7 readings shown at $L_{A90} = 52.0$ dB. A typical ambient noise level (L_{AeqT}) may be taken to be the logarithmic average of the values shown at $L_{AeqT} = 57.0$ dB.
- 3.7 The background noise level of the area is dictated by traffic on the surrounding roads, as well as distant plant. Ambient noise levels were dictated by a multitude of sources: rail traffic, local road traffic and noise from the nearby commercial development.

4.0 Calculations of site noise emissions

4.1 The main sources of noise on a concrete batching plant site are: a) vehicle movements, and b) the concrete fill operation. Of these, the fill operation is the noisier due to the requirement for the vehicle engine to operate at fast idle, in order to power the rotating mixing barrel on the vehicle during the pour.

4.2 A series of measurements were made at a similar London Concrete facility at Wembley. These measurements were undertaken on the 23rd April 2003 using a Bruel and Kjaer type 2260 precision sound level meter. This meter enabled the collection of noise data in octave bands for a subsequent ISO 9613 prediction of environmental noise levels.

Lorry movements

4.3 The following data tables show:

- a) the typical SEL value at 10 metres (minimum) from a moving vehicle over a 180° arc of view. These values were determined by measurement of 6 events of vehicle arrival/departure and passby.
- b) the typical sound power level (in terms of SEL also) for a moving vehicle (based on a duration time of nominally 20 seconds).

a)

63	125	250	500	1k	2k	4k	8k	dB(A)
66	71	75	80	83	83	75	66	88

- i. this is slightly higher than SRP standard for 6/8 wheel tipper lorry accelerating from rest of $L_{AE} = 85$ dB.

- ii. the sound power level (SEL) for use in ISO 9613 calculation may be taken to be:

b)

63	125	250	500	1k	2k	4k	8k	dBA
96	101	105	110	113	113	105	96	118

Loading of vehicle

4.4 The following data tables show:

- a) the average measured $L_{Aeq5min}$ level at a distance of 15 metres (6 records);
and
- b) the derived sound power level (SEL).

a)

63	125	250	500	1k	2k	4k	8k	dBA
56	60	67	71	74	74	69	59	79

b)

63	125	250	500	1k	2k	4k	8k	dBA
113	117	124	128	131	131	126	116	136

4.5 The above sound power levels of 118 and 136 dB, expressed as an SEL ($L_{Aeq1sec}$) were employed to calculate noise levels at Chettle Court using a program based on the provisions of ISO 9613.

4.6 The following assumptions were employed:

- a) distance to receptor = 132 metres (Chettle Court); and
- b) source area = hard ground; middle area = soft ground; receiver area = hard ground.

4.7 The summary calculation sheets are produced at appendix C. The SEL values at Chettle Court are calculated at: lorry fill = 84.5 dBA; lorry movement = 66.4 dBA.

4.8 In order to determine the L_{AeqT} value it is necessary to factor for the number of events per working day (0700 to 1900 hours). The Bellamy Roberts' Transportation report estimates daily activity as 25 loads of concrete (50 movements), with a maximum of 3 deliveries of cement (6 movements).

4.9 The $L_{Aeq12hr}$ value may be determined using the equation $L_{Aeq12hr} = SEL + 10 \log N - 10 \log T$ (where N = number of events and T = number of seconds in 12 hours).

4.10 As follows:

$$\begin{aligned} \text{Lorry Fill} \quad L_{Aeq12hr} &= 84.5 + 10 \log 25 - 10 \log 43200 \\ &= 84.5 + 14 - 46.4 \\ &= 52.1 \text{ dB} \end{aligned}$$

$$\begin{aligned} \text{Lorry Movement} &= 66.4 + 10 \log 56 - 10 \log 43200 \\ &= 66.4 + 17.5 - 46.4 \\ &= 37.5 \text{ dB} \end{aligned}$$

4.11 Thus, the overall site noise emission level at Chettle Court (dominated by fill operations) would be $L_{Aeq12hr} = 52.1$ dB, rounded to 52 dB.

4.12 It is accepted that there may be some extraneous vehicle movements on site that are not accommodated in the calculation process. However, bearing in mind the low contribution from the source relative to the fill operation, this would not be likely to affect the overall level materially. It is believed that the noise emission level displayed (free field) is accurate to ± 3 dB.

4.13 There are no other sources of noise on the main site itself that would affect the emission levels displayed. Aggregate would be delivered by train but at a drop point that is well away from Chettle Court (see location plan, appendix A). Noise from equipment itself would be at very low levels.

5.0 Assessment conclusions

- 5.1 The prevailing noise level at Chettle Court, from site activity, is estimated to be $L_{Aeq12hr} = 52 \text{ dB} \pm 3 \text{ dB}$.
- 5.2 This noise level is the same as that recorded for the existing background noise level of the area and below the ambient level recorded (paragraph 3.6).
- 5.3 The noise level from site activity would be within the WHO guideline values where annoyance (moderate or severe) may be assumed to be negligible (paragraph 2.16).
- 5.4 Thus, it is concluded that noise from operation of the proposed concrete batching plant would not harm the amenities of the residents of Chettle Court.

Appendix B

ACOUSTIC TERMINOLOGY

1. Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sound is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. $50 \text{ dB} + 50 \text{ dB} = 53 \text{ dB}$. A 10 dB increase in sound is perceived as a doubling of loudness.
2. Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.
3. To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability to automatically weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).
4. The second important characteristic of sound is amplitude or level. Two units are used to express level a) sound power level - L_w , and b) sound pressure level - L_p . Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity etc. The sound level that is measured on a meter is the sound pressure level, L_p .
5. External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to difference noises has been found to vary dependent on its temporal distribution (i.e. its variation with time). For this reason a set of statistical indices have been developed.

6. There are four main statistical indices in use in the UK:

- L_{A90} : The sound level (in dBA) exceeded for 90% of the time. This unit gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the “background noise level” of an area.
- L_{AeqT} : The equivalent continuous sound level over a period of time, T. this unit may be described as “the notional steady noise level that would provide, over a period, the same energy as the varying noise in question”. In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as road traffic, aircraft and trains.
- L_{A10} : The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.
- L_{AMAX} : The maximum level of sound, i.e. the peak level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

APPENDIX C ISO 9613 Calculation sheets

Lorry movement

Summary & Results

Title:
Project:

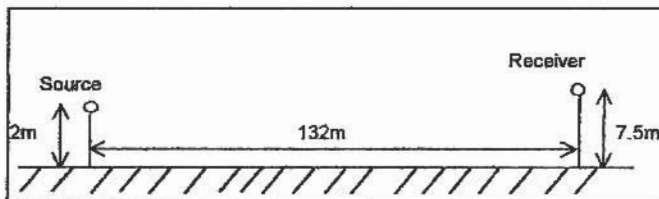
Calc. Sheet
Date:

Frequency	31.5	63	125	250	500	1000	2000	4000	8000
L_w / dB		96.0	101.0	105.0	110.0	113.0	113.0	105.0	96.0
Attenuation / dB:									
Divergence: A_{div}	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4
Atmospheric Absorption: A_{atm}	0.0	0.0	0.1	0.1	0.3	0.5	1.2	4.0	13.9
Ground Effects: A_{gr}	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total: A_{total}	50.4	50.5	50.5	50.6	50.7	51.0	51.6	54.4	64.3
A-Weighted L_p / dB		45.5	50.5	54.4	59.3	62.0	61.4	50.6	31.7
								dBA:	66.4

Horizontal Distance From Source to Receiver, d: 132 m

Temperature: 10 °C
Humidity: 70-80 %

	Source	Receiver
Height above Ground / m	2	7.5
Ground Level (above Ref.) / m	0	6



Ground Effects

Source Region

(A Region 60m around the source)

Ground Factor 0.00

Middle Region

N/A

Ground Factor 1.00

Receiver Region

(A Region 225m around the receiver)

Ground Factor 0.00

Lorry fill

Summary & Results

Title:
Project:

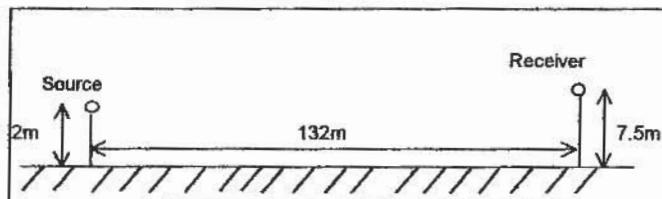
Calc. Sheet
Date:

Frequency	31.5	63	125	250	500	1000	2000	4000	8000
L_w / dB		113.0	117.0	124.0	128.0	131.0	131.0	126.0	116.0
Attenuation / dB:									
Divergence: A_{div}	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4	53.4
Atmospheric Absorption: A_{atm}	0.0	0.0	0.1	0.1	0.3	0.5	1.2	4.0	13.9
Ground Effects: A_{gr}	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total: A_{total}	50.4	50.5	50.5	50.6	50.7	51.0	51.6	54.4	64.3
A-Weighted L_p / dB		62.5	66.5	73.4	77.3	80.0	79.4	71.6	51.7
									dB(A): 84.5

Horizontal Distance From Source to Receiver, d: 132 m

Temperature: 10 °C
Humidity: 70-80 %

	Source	Receiver
Height above Ground / m	2	7.5
Ground Level (above Ref.) / m	0	6



Ground Effects

Source Region

(A Region 60m around the source)

Ground Factor 0.00

Middle Region

N/A

Ground Factor 1.00

Receiver Region

(A Region 225m around the receiver)

Ground Factor 0.00