Noise Assessment of Proposed Waste Recycling Facility at Great Billing, Northamptonshire

MICK GEORGE LIMITED

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QUALITY MANAGEMENT

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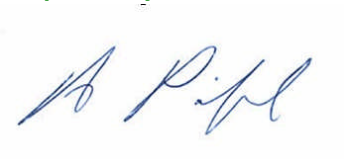

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1.0 INTRODUCTION

1.1 At the request of Mick George Limited, Vibrock Limited were commissioned to undertake a noise assessment in support of a planning application for a proposed waste recycling facility at Great Billing, Northamptonshire.

1.2 This report presents the findings of a baseline noise survey undertaken in December 2012 and assesses the potential impact of the proposals at existing noise sensitive locations within the vicinity of the proposed site by comparison of predicted noise levels with relevant guidance and criteria.

2.0 NOISE CRITERIA

2.1 National Planning Policy Framework (NPPF)

2.1.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The Framework provides guidance at which local people and their councils can produce their own plans which reflect their local needs and priorities.

2.1.2 The planning system is required to contribute and enhance the natural and built environment. As a result, the system should prevent both new and existing developments from contributing to or being adversely affected by unacceptable levels of noise.

2.1.3 Paragraph 123 of NPPF states:

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of a new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.1.4 The terms 'significant adverse impact' and 'other adverse impacts' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE). NPSE sets out the long term vision of the government's noise policy by promoting good health and quality of life through the effective management of noise within the context of policy of sustainable development.

2.1.5 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- NOEL (No Observed Effect Level) – this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;

- LOAEL (Lowest Observed Adverse Effect Level) – this is the level above which adverse effects on health and quality of life can be detected.

2.1.6 Extending these concepts further, NPSE leads to the concept of a significant observed adverse effect level:

- SOAEL (Significant Observed Adverse Effect Level) – this is the level above which significant adverse effects on health and quality of life occur.

2.1.7 NPSE acknowledges that it is not possible to have a single objective noise-based measure that defines NOEL, LOAEL and SOAEL that is applicable to all sources, for different receptors and at different times. Guidance from other noise standards should therefore be employed to determine suitable levels within the overall principles of the NPPF.

2.1.8 The three aims of NPSE can therefore be summarised as follows:

1. avoid significant adverse effects (SOAEL) on health and quality of life;

2. the second aim refers to situations where noise levels are between the LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. However this does not mean that such adverse effects cannot occur;

3. the third aim refers to situations where noise levels are between the NOEL and LOAEL. In such circumstances, where possible, noise reductions should be sought through the pro-active management of noise.

2.2 Planning Practice Guidance (PPG)

2.2.1 PPG is written in support of the NPPF and provides an increased level of specific planning guidance. PPG states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. PPG also states that, where practicable, there may be opportunities to consider improvements to the acoustic environment and that noise can over-ride other planning concerns but should not be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development. PPG reflects the overall aim of NPSE and expands on many of its concepts, in particular NOEL, LOAEL and SOAEL.

2.2.2 PPG:Minerals includes the appropriate noise criteria for 'normal operations';

"Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without

imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) $L_{Aeq,1h}$ (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) $L_{Aeq,1h}$ (free field). For any operations during the period 2200 – 0700 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) $L_{Aeq,1h}$ (free field) at a noise sensitive property.

2.2.3 In terms of noise emissions, PPG considers aggregates recycling and disposal of construction waste to be 'related similar processes' to mineral development proposals. It is therefore considered appropriate to apply this guidance to the assessment of noise from the proposed waste recycling facility given the similarities that exist between mineral sites and waste sites particularly in terms of the plant and machinery used along with the types of activities involved which include the loading, movement and storage of material.

3.0 NOISE SURVEY

3.1 Introduction

3.1.1 Noise monitoring was undertaken on Monday 17th December 2012 by Mr P Clayton of Vibrock Limited.

3.1.2 The baseline data collected during the survey period has been used to characterise the existing noise levels at the nearest existing noise sensitive receptor to the proposed development site as shown in Figures 1 and 2.

3.2 Measurement Details

3.2.1 Noise monitoring was undertaken using the following equipment.

Manufacturer	Description	Type
Cirrus	Integrating Sound Level Meter	CRL 811C
Cirrus	½" Pre polarised Condenser Microphone	CRL 224
Cirrus	Acoustic Calibrator	CRL 511D

3.2.2 The instrumentation was calibrated on site immediately before and after the survey period using a portable calibrator, no significant drift in the calibration level was observed. Calibration certificates are available upon request.

3.2.3 Measurements were undertaken in general accordance with the procedures outlined in BS 7445. Measurements at the monitoring location were 'free field' (no vertical reflective surfaces within 3.5 metres of the microphone) at a height of between 1.2 – 1.5 metres above ground level. During all measurements the microphone was protected with a windshield.

3.2.4 The sound level meter was set to measure various noise parameters including the L_{Aeq}, L_{A10}, L_{A90} and L_{Amax} values using a 'fast' time weighting over 15 minute averaging periods.

3.3 Observations

3.3.1 Weather conditions during the survey were dry and mild with an estimated 3 oktas high altitude cloud cover and a light south-westerly breeze of 2 ms^{-1}.

3.3.2 Noise levels at the monitoring location were influenced largely by road traffic noise from vehicles using the A45 Nene Valley Way along with industrial noise from the nearby sewage works.

3.4 Results

3.4.1 A summary of the results of the noise survey are presented in Table 1.

4.0 NOISE LEVEL PREDICTIONS

4.1 Introduction

4.1.1 The level of noise in the local environs that arises from a site will depend on a number of factors. The more significant of which are:

(a) The sound power levels (L_{WA}) of the plant or equipment used on site.

(b) The periods of operation of the plant on site.

(c) The distance between the source noise and the receiving position.

(d) The presence or absence of screening effects due to barriers, or ground absorption.

(e) Any reflection effects due to the façades of buildings, etc.

4.1.2 The parameter that is in general use and is recommended internationally for the description of environmental noise at a receptor position is the equivalent continuous sound pressure level, L_{eq} (expressed in dB).

4.1.3 The L_{eq} describes the total amount of acoustic energy measured but does not take any account of the ear's ability to hear certain frequencies more readily than others. Instead an A-weighting is applied to form the L_{Aeq} (expressed in dB(A)) as this is found to relate better to the loudness of the sound heard.

4.2 Prediction Methodology

4.2.1 In order to assist in the calculation of predicted L_{Aeq} noise levels from the proposals, CadnaA noise modelling software has been used. The noise prediction software has been configured to undertake the noise calculations in accordance with BS 5228.

4.2.2 Point sources have been used to represent proposed plant, machinery and equipment with the exception of vehicle movements which have been modelled as moving point sources and noise break-out from the shed which has been modelled as horizontal and vertical area sources.

4.2.3 The topography between the proposed development site and the existing nearest receptor location (caravan site) is generally flat but does contain some localised undulations which are likely to provide a small amount of screening of noise from the site. However, for the purposes of this assessment, the underlying ground between new noise sources and the receptor location is assumed to be flat thus in terms of natural screening the noise level predictions are considered to be worst case.

4.2.4 For all noise prediction calculations, the ground absorption coefficient of the site has been set to '0.0' representing hard ground. The ground absorption coefficient of the area surrounding the site has been set to '1.0' representing soft ground. Hard ground is taken to refer to ground surfaces which reflect sound, e.g. paved areas, rolled asphalt and surface water. Soft ground is taken to refer to surfaces which are absorbent to sound, e.g. grassland, cultivated fields or plantations.

4.2.5 Given that all prediction methods are estimates and that in practice measured levels are invariably lower due to the effects of interactions between such things as meteorological conditions and air absorption, these predicted levels are a reasonable representation of the worst case predictions assuming ideal meteorological conditions for sound propagation.

4.3 Proposed Plant Complement

4.3.1 A list of plant sound power levels (L_{WA}) from which the noise predictions have been made are presented in Table 2. The plant complement is based on information provided by Mick George Limited.

4.3.2 The sound power levels used are sourced from the information contained within Annex C and D of BS 5228 which presents current and historic sound level data on site equipment and site activities.

4.4 Noise Prediction Assumptions

4.4.1 The noise predictions are based on a number of assumptions as follows:

- Proposed site layout as per Drawing No. G15/14/2.

- It is understood that the proposed site operating hours are as follows:

Monday – Friday	06:00 – 19:00
Saturday – Sunday	07:00 – 16:00

- During the periods Monday – Friday 06:00 – 07:00 no recycling activities will take place. Site activities will be restricted to HGVs arriving on site and unloading material into the enclosed shed.

- From Monday – Saturday an estimated 220 HGVs per day will arrive at the site during the proposed operational hours. In order to calculate an $L_{Aeq,1hour}$ (dB) required for the assessment it has been assumed that 17 vehicles per hour travelling at 20 mph will enter, use and leave the site.

- During Sunday operations no recycling activities will take place. Site activities will be restricted to up to 20 HGVs arriving on site and unloading material into the enclosed shed. In order to calculate an $L_{Aeq,1hour}$ (dB) required for the assessment it has been assumed that 3 vehicles per hour travelling at 20 mph will enter, use and leave the site.

- It is understood that the proposed enclosed shed will be 10 metres in height and open fronted on the eastern face. The shed construction is to comprise steel framed corrugated metal sheet with concrete walls up to 6 metres high. The assumed sound reduction indices of the proposed building elements that have been used in the noise predictions are presented in Table 3.

- Material arriving at the site will be delivered to and unloaded within the enclosed shed before being segregated and stockpiled outside. For the purposes of this prediction exercise, it has been assumed that a single unloading event lasts for a duration of 1 minute.

- In order to ensure that activities across the site are fully represented, it has been assumed that the proposed mobile plant (2no. loaders and 2no. excavators) will spend an equal proportion of the working day operating in each of the four main external stockpile areas (aggregate, bio-remediation, wood and hardcore).

- The remaining items of plant (such as the concrete batching plant and mobile crusher) are assumed to be operating continuously and simultaneously during relevant periods to ensure that the assessment is worst case. In reality, noise emissions from these operations are not likely to be continuous and are dictated by demand for material. For example, it is understood that hardcore crushing operations will only take place on approximately 3 – 4 days per 6 week period.

- All predictions have been calculated with the combinations of plant working at the closest point to the identified receptor location. They are therefore worst case scenarios which may be of relatively short duration. However, they indicate the maximum L_{Aeq} noise level to which a receptor may be exposed during the working of the site. By definition, the worst case situation may occur intermittently over the lifetime of the site, but longer term noise levels perceived outside of the site boundary would normally be significantly less.

4.5 Results

4.5.1 Predicted noise levels for the proposed site have been calculated for the relevant assessment periods at the identified receptor location. The results are presented in Table 4 along with a comparative assessment of these predicted levels against the recommended criteria.

5.0 SUMMARY

5.1 A series of noise predictions based upon BS 5228 calculation methodology and including the assumptions embodied in Section 3 of this report, have been made at the nearest noise sensitive dwelling to the proposed site.

5.2 A visual inspection of the area around the proposed site and a noise survey has been undertaken to characterise the existing noise levels at a location representative of the identified receptor location.

5.3 Predicted noise levels associated with the proposals have been assessed against relevant planning guidance and the results demonstrate that noise levels from the proposed waste recycling facility are expected to be within recommended noise limits. In addition, predicted site noise levels are also expected to be significantly below the existing ambient and background noise levels measured during the survey.

5.4 When operated in accordance with the assumptions included within this assessment report, the noise impact of the proposed scheme is not considered to be significant.

6.0 REFERENCES

1. Noise Policy Statement for England (NPSE). DEFRA, 2010.

2. National Planning Policy Framework – Department for Communities and Local Government. March 2012.

3. Planning Practice Guidance (PPG) – Department for Communities and Local Government. March 2014.

4. British Standard 7445-1:2003 Description and measurement of environmental noise – Part 1 Guide to quantities and procedures. British Standards Institution 2003.

5. British Standard 7445-2:1991 Description and measurement of environmental noise – Part 2 Guide to the acquisition of data pertinent to land use. British Standards Institution 1991.

6. British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise. British Standards Institution 2014.

TABLE 1

Noise Survey Results

Measurement Period	Duration (T)	Statistical Parameters (dB)			
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	$L_{Amax,T}$
12.00 – 12.15	15 mins	63.3	60.2	55.8	87.4
12.15 – 12.30	15 mins	67.5	64.6	55.9	88.4
12.30 – 12.45	15 mins	65.5	61.3	55.6	87.7
12.45 – 13.00	15 mins	67.0	63.6	54.7	88.5
12.00 – 13.00	**60 mins**	**66.1**	**62.4**	**55.5**	**88.5**
13.00 – 13.15	15 mins	65.7	62.8	55.3	87.3
13.15 – 13.30	15 mins	65.0	61.7	55.9	87.5
13.30 – 13.45	15 mins	66.3	63.3	56.6	86.8
13.45 – 14.00	15 mins	66.4	62.8	56.4	87.4
13.00 – 14.00	**60 mins**	**65.9**	**62.7**	**56.1**	**87.5**

TABLE 2

Proposed Plant and Sound Power Levels

Plant Description	Quantity	Sound Power Level (dB(A))	Source	Assumed Activity/On-time
Dumper/HGV/Skip Wagon	1	104	BS 5228 Table C.4 Ref No. 4	220 per day (Mon - Sat) 20 per day (Sun)
Dumper/HGV/Skip Wagon (idling)	1	91	BS 5228 Table C.4 Ref No. 5	220 per day (Mon - Sat) 20 per day (Sun)
Dumper/HGV/Skip Wagon (Unloading Material)	1	107	BS 5228 Table C.2 Ref No. 30	220 per day (Mon - Sat) 20 per day (Sun)
Wheeled Loader	2	104	BS 5228 Table C.2 Ref No. 28	60 mins per hour
Tracked Excavator	2	103	BS 5228 Table C.4 Ref No. 64	60 mins per hour
Lorry Concrete Mixer	1	105	BS 5228 Table C.4 Ref No. 21	60 mins per hour
Concrete Batching Plant	1	106	BS 5228 Table D.6 Ref No. 10	60 mins per hour
Mobile Crusher	1	110	BS 5228 Table C.1 Ref No. 14	60 mins per hour

TABLE 3

Sound Reduction Indices

Construction Material	Façade Element	Octave Band Spectrum						R_w (dB)	Source
		125	250	500	1k	2k	4k		
Concrete Block 175mm	Low level walls	31	35	40	47	52	56	45	CadnaA Library
Corrugated Steel Sheet	High level walls and roof	14	16	20	25	29	23	25	CadnaA Library

TABLE 4

Summary of Noise Assessment Results

Assessment Period	Predicted Noise Level from Proposed Waste Recycling Facility dB $L_{Aeq,1h}$	NPPF / PPG Assessment Criteria dB $L_{Aeq,1h}$	Difference Predicted Site Noise and Assessment Criteria dB(A)
Monday – Friday 06:00 – 07:00	41	42	-1
Monday – Friday 07:00 – 19:00	52	55	-3
Saturday 07:00 – 16:00	52	55	-3
Sunday 07:00 – 16:00	34	55	-21

FIGURE 1

Baseline Noise Monitoring Location

Not To Scale. For Illustrative Purposes Only

FIGURE 2

Location of Nearest Noise Sensitive Premises

Not To Scale. For Illustrative Purposes Only

APPENDIX 1

Terminology and Definitions

Sound power level, L_{WA}
Ten times the logarithm to the base 10 of the ratio of the sound power radiated by a sound source to the reference sound power, determined by use of frequency-weighting network "A" (see BS EN 61672-1), expressed in decibels.

Equivalent continuous A-weighted sound pressure level
Value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval *T*, has the same mean square sound pressure as a sound under consideration whose level varies with time.

A-weighting
The human ear is most sensitive to frequencies in the range 1 kHz to 5 kHz. On each side of this range the sensitivity falls off. A-weighting is used in sound level meters to replicate this sensitivity and respond in the same way as the human ear.

Ambient noise
Noise in a given situation at a given time, usually composed of sound from many sources near and far, but excluding site noise. The ambient noise is normally expressed as the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$).

Site noise (also known as 'specific' noise)
Noise in the neighbourhood of a site that originates from the site.
NOTE Ambient noise plus site noise gives total noise.

Residual noise
Ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

Background noise
A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval, *T*, measured using time weighting, *F*, and quoted to the nearest whole number in decibels.

Free-field Level
The sound pressure level away from reflecting surfaces.
NOTE Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Noise-sensitive premises (NSPs)
Any occupied premises outside a site used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in noise level.