NOISE ASSESSMENT – Waste Recycling

Stairfoot Metals Ltd

Proposed Siting of Activities to –
The Recycling Centre, Shaw Lane, Barnsley, S71 3HZ

Noise Impact Assessment

Report by
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Report Date: 18th September 2017
Ref: E13183
Site Visited by: S.B. Mellor
Site Visit: 9th September 2017

Signed:

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1.0 INTRODUCTION

On the instructions of Stairfoot Metals Ltd, AC Environmental Ltd. carried out a noise impact assessment in regard to residents located close to "The Recycling Centre, Shaw Lane, Barnsley". Our client proposes to establish a waste recycling facility at this existing industrial estate – the proposed plot on the site is highlighted below. The locations of the nearest receptors are also highlighted.

Figure 1

The purpose of the assessment was to establish if plant and activity noise levels are likely to impact on nearby residents.

The survey would establish the current noise levels without the activity noise at the nearest noise sensitive properties (NSP's).

Proposed operating hours will be from 07.00 – 18.30 (Monday to Friday) and 07.00 – 14.00 on Saturday.

Because no activities are yet occurring and no plant or equipment has been specified for the site we have used data from a similar sized site which will have the type of plant and equipment (and activities) that it is anticipated will be used at this site – including vehicle movements (Moore's Metals based in Stoke-on-Trent). In particular, this includes 2 x Liebherr type "grabs".

The measurements made at the Stoke-on-Trent site were for all processes inclusive of all plant and equipment,

made at a position approximately 20m from the principal activities.

Acoustic terminology is explained at Appendix 1 of this report and the author's qualifications and experience are described in Appendix 2.

2.0 SITE DESCRIPTION

The proposed plot on the existing industrial estate will sit adjacent to similar facilities (see image below).

Figure 2

Away from the industrial estate the closest residential properties are positioned in a semi-rural location adjacent to Shaw Lane (grid ref SE37912 10360). There are also residential properties located to the west through the industrial estate on Shaw Lane and towards a Premier Foods site.

Vehicles were observed driving at speed along this road, far in excess of 30mph.

3.0 NOISE CRITERIA

For industrial noise, BS4142 is normally referenced and used to assess the likelihood of any potential impact on nearby residents.

3.1 BS4142:2014 – Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

BS4142:2014 states, *"Response to sound can be subjective and is affected by many factors, both acoustic*

and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood…This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature".

BS4142 describes a method for assessing whether a specific sound may have an adverse impact.

The Standard requires that the ambient noise *(**totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far)*** including the "specific" sound from the source in question is measured in terms of the equivalent continuous sound level LAeq [see Appendix 1 for acoustic terms], which is then corrected for the residual sound (total LAeq excluding the "specific" sound).

A correction for character is made if "***a tone, impulse or***

other characteristic occurs". For tonality, a correction of between +2dB and +6dB is considered acceptable and for impulsivity between +3dB and +9dB. See table below.

Character	Just Perceptible	Clearly Perceptible	Highly Perceptible
Tonality	+2dB	+4dB	+6dB
Impulsivity	+3dB	+6dB	+9dB

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied.

Intermittency

"When the specific sound has identifiable on/off conditions…if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied".

Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant, then it might be appropriate to

apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

The final figure, including any character correction is known as the Rating level. This Rating Level is then compared with the measured background [LA90] level. The greater this difference the greater the likelihood of "adverse impact" (See Notes 1 & 2 from BS4142:2014 below).

"NOTE 1
a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) 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 or a significant 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, depending on the context.

NOTE 2 *Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

4.0 MEASUREMENT PROCEDURE

The site was visited on 9th September 2017 and measurements were made at the nearest receptors as noted above; to establish the typical ambient and background L90 levels, without the introduction of the source noise (new facility).

The meter was mounted on a tripod at an approximate height of 1.4m at the receptor. The measurement positions approximated to free field conditions.

The weather conditions during the monitoring period were dry on the whole but there was some rain for the first 10-15 minutes of the first hour of measurements, conditions were then overcast for the remainder of the monitoring period. There was a temperature of around 14 degrees centigrade and a wind speed of 3m/s SW. It is not considered that the weather conditions would have affected the results.

The sound level meter used was a Type 1 Cirrus CR:821B (s/n C18361FE) and microphone system mounted on a tripod and fitted with a windmuff. The meter calibrated correctly before and after the measurements using a Cirrus calibrator type CR:551E (s/n 039816); the instrumentation had been laboratory calibrated within the preceding 2 years.

5.0 RESULTS

5.1 Measurements

The measurement results are shown in tables 1 and 2 below:

Table 1: Measurements at Receptors

Date	Time	Run Time	Leq	Lmax	L1	L10	L50	L90	L95	Lmin
09/09/2017	07:01	00:59:00	67.6	86.6	80.0	70.0	56.5	49.6	46.5	41.9
09/09/2017	08:00	01:00:01	68.0	87.1	79.9	72.0	52.2	42.2	41.4	38.4

5.2 Source Levels at Receptors

As noted, the following data is taken from an earlier assessment made at a waste recycling site in Stoke-on-Trent (2011). Plant and equipment on site included the

following and it is anticipated that similar plant will be used at the application site and source noise levels including impact noise will also be similar.

- 914 & 924 Liebherr 'Grabbers' – used for significant periods
- 904 Liebherr 'Grabber' – used occasionally
- Depositing of metals
- Shearer (compacting metals)
- Weighbridge
- Vehicle movement in / out including articulated vehicles (up to 80 movements per day)
- Hand sorting of waste materials
- Reversing alarms
- Metal-on-metal impact noise
- Associated plant and equipment (powered hand tools and compressors etc.)

Table 2: Waste Facility Noise

Date	Time	Run Time	Leq	Lmax	L1 dB	L10 dB	L50 dB	L90 dB	L95 dB	Lmin
02/03/2011	08:00	01:00:00	80.2	102.5	87.4	82.6	78.7	76.3	74.9	67.9
02/03/2011	09:00	01:00:00	80.9	100.0	88.7	82.5	79.3	76.6	75.1	71.7
02/03/2011	10:00	01:00:00	79.7	99.0	87.6	82.1	77.8	71.5	69.6	62.7
02/03/2011	11:00	01:00:01	81.9	104.1	91.5	83.1	79.4	77.3	76.1	72.1
02/03/2011	12:00	01:00:03	79.8	98.4	87.5	81.5	78.6	76.6	74.4	69.4
02/03/2011	13:00	01:00:01	77.5	99.7	88.4	79.6	72.1	68.1	67.7	65.9
02/03/2011	14:00	01:00:02	78.8	99.9	86.2	81.0	77.6	73.5	72.7	65.5
02/03/2011	15:00	01:00:02	78.8	98.5	87.8	80.4	77.2	74.3	72.2	68.7
02/03/2011	16:00	01:00:03	78.9	98.3	88.2	80.4	76.5	75.0	71.8	66.4
02/03/2011	17:00	01:00:00	72.2	89.5	77.7	76.5	65.7	43.3	42.7	40.5
03/03/2011	08:00	01:00:01	79.0	95.6	85.5	81.1	78.1	74.4	73.5	70.4
03/03/2011	09:00	01:00:05	82.5	110.5	92.4	83.9	78.7	75.3	74.5	70.3
03/03/2011	10:00	01:00:03	78.1	99.7	86.9	79.7	77.1	66.0	65.7	63.6
		Tota	Leq							
		13:00:21	79.6							

5.3 Distance Correction

"The recycling activities were measured in a relatively close proximity (20m) to ensure that there were no additional noise influences from adjacent businesses".

Therefore, to calculate the levels of noise propagating from the facility to the nearest residents (265m), a 'distance correction' is necessary.

Shaw Lane

20log (r1/r2)

Nearest affected properties at approx. 265m from source (centre of the site):

Correction = 20log (r1/r2)

r1 = Measurement Distance from activities (20m)

r2 = Receiver Distance 265m

= - 22.4dBA

Leq, t for waste recycling activities from sampling = 79.6dBA @ 20m

Therefore: 79.6dBA – 22.4dBA = 57.2 dBA

Ground absorption: Soft sites are sites that have an absorptive ground surface (e.g., grass, or soil) and receive an excess ground attenuation value of approximately 1.5 dBA per doubling of distance. Predictions using Table 8 from CRTN and a height of propagation of 1.5m = approximately -8dBA.

Therefore: 57.2dBA – 8dBA = 49.2dBA

Source levels at Shaw Lane propagating from recycling activities on the industrial estate are likely to be up to 49.2dBA in any hour.

5.4 Subjective Impressions (other information)

Shaw Lane is relatively busy and vehicles tend to drive at high speed which increases ambient noise levels at this location.

Other sources of noise audible to the observer included birdsong and distant industrial-type noise. Therefore, even without the introduction of a new facility, industrial-type

noise will still be present.

6.0 ASSESSMENT OF RESULTS

6.1 Resultant Level

Before calculating possible impact using BS4142, the estimated resultant level of 49.2dBA suggests that additional noise reduction measures will be necessary to reduce estimated noise at the receptors at the weekend. Noise levels in the week are likely to be higher due to increased activity in general. However, we must consider that this site will have fewer vehicle movements and two and not three "grabs" so may overestimate the actual noise levels in practice (discussed below).

The adoption of industry best practice is usually the most effective means of controlling noise from recycling sites.

The following measures should be considered, where

appropriate (Guidance set out in BS5228[1]):

- Phasing the works to maximise the benefit from perimeter structures;
- Any compressors brought on to site should be silenced or sound reduced models fitted with acoustic enclosures;
- All pneumatic tools should be fitted with silencers or mufflers;
- Care should be taken when unloading vehicles to minimise disturbance to local residents;
- Delivery vehicles should be prohibited from waiting within the site with their engines running;
- All plant items should be properly maintained and operated according the manufacturers' recommendations in such a manner as to avoid causing excessive noise.
- All plant should be sited to that the noise impact at nearby noise-sensitive properties is minimised;
- Local hoarding, screens or barriers should be erected as necessary to shield particularly noisy activities;

[1] BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise

- Problems concerning noise from works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents.

Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can be reduced by 5dB(A) or more.

It is understood that there will be vehicle movements of a maximum of 50 per day and more likely to be 30 per day, ranging from small vans to 8 wheelers. This is less than our example used (80 per day) which would reduce noise levels. Activities on a Saturday are also likely to be much reduced. There will also be two and not three Liebherr grabs as were used at the Stoke facility, which, again, would reduce noise levels overall. While not halving sound power levels (-3dBA) we can anticipate an estimated reduction of between 1-2dBA.

Assuming that the data used overestimates the level of noise at the proposed site and that noise management on

site reduces noise by a minimum of 5dBA and fewer vehicle movements etc. by 1dBA we can use BS4142 to calculate possible impact.

Table 3: BS4142:2014 Assessment 1

	Site Activities
Workshop – (1-hour ref less 6dBA)	43 dB LAeq
Impulsive Character Correction	3 dB
Other Sound Characteristics	0 dB
Intermittency Correction	0 dB
Rating Level	46 dB
Background Noise Level LA90 (8-9am no activities)	42 dB
Excess over Background [Rating – Background]	= +4dB

Assuming impulsive characteristics "just perceptible" – dropped waste etc.

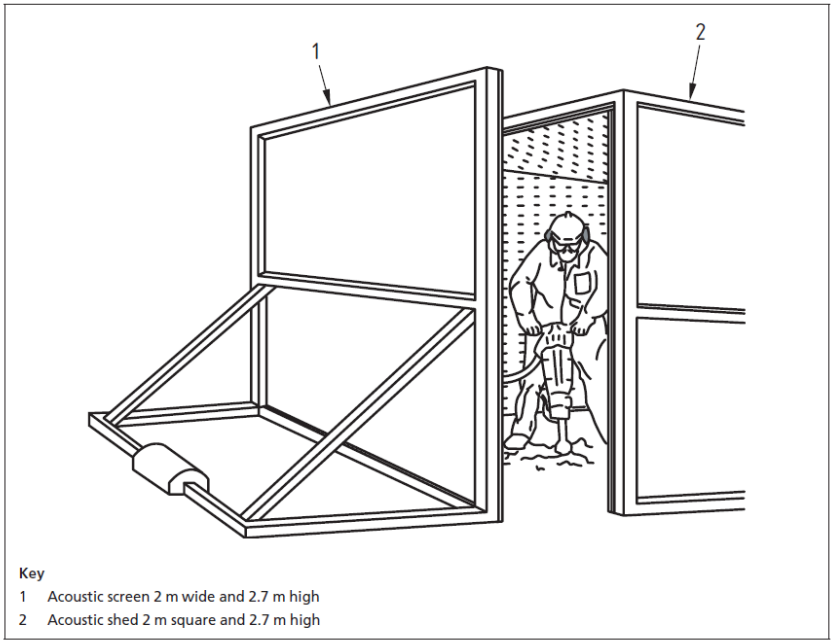
Conclusion – below 5dB – "*less likely it is that the specific sound source will have an adverse impact…depending on the context".*

In which case, given the other industrial uses in the area and the audibility of existing industrial-type noise, then this activity would not be out of context.

It is not considered necessary (see conclusion) but another option is to use small screens for cutting operations etc. on site as an additional control. These small screens would need to be positioned close to the

sources of noise and free from gaps and holes.

Figure 3



Key
1 Acoustic screen 2 m wide and 2.7 m high
2 Acoustic shed 2 m square and 2.7 m high

Type of enclosure (see Figure B.3)	Reduction dB(A)		
	Facing the opening(s)	Sideways	Facing rear of shed
Open-sided shed lined with absorbent material; no screen	1	9	14
Open-sided shed lined with absorbent material; with reflecting screen in front	10	6	8
Open-sided shed lined with absorbent material; with absorbent screen in front	10	10	10

7.0 CONCLUSION

Although BS4142 is the standard which is normally referenced when considering industrial-type noise in a residential environment, BS8223:2014 *Guidance on sound insulation and noise reduction for buildings* and WHO *Guidelines for Community Noise* refers to desirable external and internal noise levels.

From BS8233, desirable external levels during the day should not exceed LAeq 50-55dB to prevent annoyance. This range is not likely to be exceeded when considering the site noise levels in isolation – levels estimated at 49.2dBA.

The current ambient level (LAeq,t) with no plant operating at this location for the monitoring period was 68dB i.e. already above the desirable external levels from BS8223 (50-55dB). Site activity levels are not likely to add appreciably to the existing LAeq.

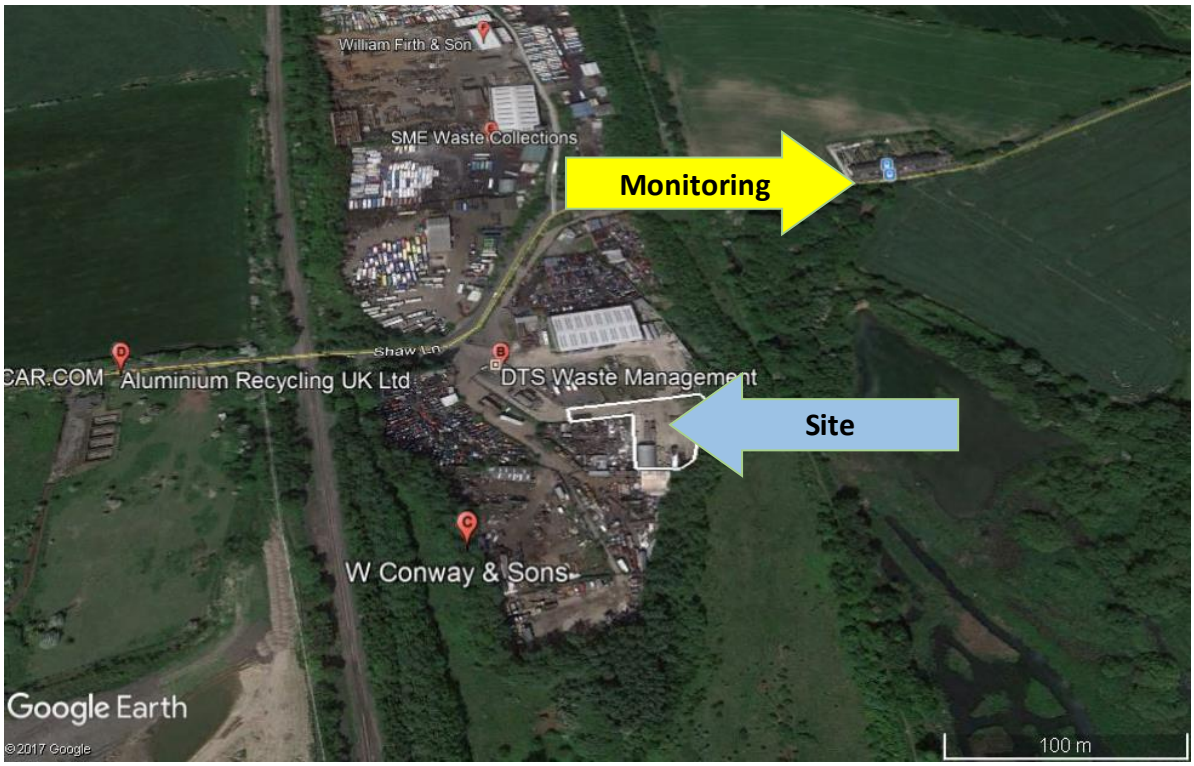
Outdoor amenity areas are located at the rear of the receptors and so will be afforded additional screening by the properties themselves.

It is estimated, subjectively and with reference to BS8233 that given the environmental context, location of external amenity areas, possible overestimation of facility noise and existing road noise that even without additional noise reduction measures, the introduction of additional industrial noise at this location is not likely to impact on nearby residents.

If we refer solely to BS4142, then the associated calculation suggests that with the best practice site management controls noted above, reduced activities at the weekend (likely), positioning of individual activities behind screens; or a combination of these measures then, again there is unlikely to be adverse impact given the existing context into which the new facility is introduced.

It is the observer's conclusion that noise should be not be an impediment to granting permission to operate this site as a waste facility.

Figure 4: Location Plan (Monitoring Position)



Source: Google Earth

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB(A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB(A). The least discernible difference is 2 dB(A). Thus, most people cannot distinguish between, say 30 and 31 dB(A).

The Background level of noise is most commonly represented by the level which is exceeded for 90% of the time i.e. the LA90.

If a noise varies over time then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	**dB(A)**	**Nature of Noise**
Inside Quiet bedroom at night	30	Very Quiet
Quiet office	40	
Rural background noise	45	
Normal conversational level	60	
Busy restaurant	65	
Typewriter @ 1m	73	
Inside suburban electric train	76	
Alarm clock ringing @ .5m	80	
Hand clap @ 1m	80	
HGV accelerating @ 6m	92	Very Loud

APPENDIX 2

QUALIFICATIONS AND EXPERIENCE OF M. S. MELLOR

My full name is Steven Brian Mellor. I am the principal consultant at the firm of SBM Safety Solutions Ltd, a consultancy company that specialises in health, safety and environmental services including noise assessment and control.

I hold a Master's degree in Health, Safety and Environmental Law, British Occupational Health Society (BOHS) M104 certificate in Noise and Vibration and Institute of Acoustics Certificate of Competence in Environmental Noise Measurement (Derby University), plus Diploma in Acoustics and Noise Control (Bristol University). I am member of the professional body for noise and vibration specialists, the Institute of Acoustics, MIOA.

I have some 14 years' experience of dealing with problems caused by noise and vibration, both regarding noise and vibration in the environment, the workplace and the home. The firm of SBM Safety Solutions Ltd. was formed 12 years ago. During that time, we have advised many groups including employers, residents and developers about the problems of noise and vibration in the workplace and environment.

APPENDIX 3

Views from Location

Other Industrial Uses

Residents on Shaw Lane