

Proposed Waste Transfer Station

New Road Industrial Estate

Newhaven BN9 0HE



Environmental Noise Impact Assessment

**TECHNICAL REPORT**

**23434 R1**

# Proposed Waste Transfer Station

## Environmental Noise Impact Assessment

Prepared for: FOB Design, 72a Water Lane, Wilmslow SK9 5BB

Site location: New Road Industrial Estate, Newhaven BN9 0HE

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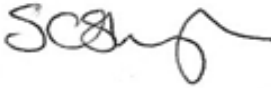
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DOCUMENT REVISION AND CHANGE CONTROL		
REVISION	CHANGE DESCRIPTION	SUPPLEMENT TO
1	Original Report	-

## 1. INTRODUCTION

- 1.1 Greenacre Recycling has been established for approximately 15 years and provides a waste collection and recycling service across East Sussex.
- 1.2 The company has plans to consolidate their operations and storage at one site to increase efficiency and recycling rates. Currently the grab lorry's waste goes to landfill so there is the desire to sort and recycle this material at site as much as possible.
- 1.3 In light of the above driving factors, a planning application was submitted to East Sussex County Council (Reference: LW/767/CM) for the *"Proposed Change of Use of an Industrial Unit to a Waste Transfer Station at New Road Industrial Estate, Newhaven BN9 0HE"*.
- 1.4 Further to consultation with the County Council's noise advisor it was recommended that the applicant provide an acoustic report to assess the potential noise effects of the proposal. The County Council expressed concerns that the proposal could significantly change the local acoustic environment. It was highlighted that any noise assessment should be conducted using reference to guidance provided in "Planning Noise Advice Document: Sussex" [1].
- 1.5 Sound Solution Consultants Ltd have been commissioned to carry out a noise assessment of the proposed waste transfer site and associated operations.
- 1.6 East Sussex County Council were consulted prior to the noise investigation to agree, in principle, a scope of methodology. It was confirmed the assessment will provide sound data, either measured at an existing site or from manufacturer's data so that a cumulative sound output of the site can be provided. In this way an assessment will be conducted in accordance with BS4142:2014 [2] and a Rating Level will be provided relative to background at the nearest noise sensitive receptor.
- 1.7 Calculations, of the sound output of the site, will be predicted at the nearest noise sensitive receptor in accordance with propagation calculations specified in BS5228-1:2009+1:2014 [3]. Consideration will also be given to any erroneous noise at site such as vehicle movements, idling engines and skip movements. A more thorough detailed listing of the County Council's potential noise concerns is provided with in Section 3 "Noise Criteria" of this report.
- 1.8 In the interests of keeping any noise to a practicable working minimum a noise management plan will be provided, in agreement with the developer, detailing best working practices with regard to noise reduction.
- 1.9 It is therefore the aim of this noise assessment to provide a report that complies with relevant guidance and specifically addresses the noise concerns of the County Council. Ultimately an assessment will be made to the suitability of the proposed changes at the development site, when considering the relevant noise criteria.
- 1.10 A Glossary of Acoustic Terms can be found in Appendix A that may assist with the terminology used within this report.

## 2. DEVELOPMENT SITE

- 2.1 A site plan highlighting the proposed development site (The Site) and the intended locations for waste operations is provided in Appendix B, Figure B1.
- 2.2 The sound climate in the vicinity of The Site is dominated by vehicles using the busy A26. Traffic includes a percentage of HGV's servicing local industry and utilising the nearby port of Newhaven. To the rear of the site is a railway line and the location of the Newhaven incinerator that is audible to the rear of The Site.
- 2.3 The site plan illustrates the location of the main waste transfer building. Photographs of the building, both externally and internally, are provided in Appendix C, Figures C1 and C2. The building is of good integrity with block walls, a corrugated roof and good quality electric shutter doors, sealed well to the opening structure.
- 2.4 It is the intention for the building to house the electrically power driven trommel (Baughan Majorette) waste sorting operations. Associated internal activities include the use of a 2 tonne excavator (Kubota 020) to serve the trommel, a 5 tonne excavator (Hyundai 55-9) to sort and a Telehandler (JCB 535-95) for loading. Photographs and further detail of all the machinery to be used at the proposed site can be found with in the Planning Statement submitted with the planning application dated October 2015.
- 2.5 Of note, when considering noise control, the proposed waste transfer building has a floor space of approximately 1,000m<sup>2</sup>. This provides adequate space for skip lorries and vans to reverse into the building and for shutters to be closed before the waste is unloaded. Any tipping and sorting activity would take place within the waste transfer building with all roller shutters down. The main access door is shown as open in Appendix C, Figure C1. It takes a total of 30 seconds for this door to be fully opened and closed. The larger roller shutter door would only facilitate access for the larger 38 tonne lorries that carry the load on load off 40 yard skips. When the larger shutter is open all waste transfer operations will cease within the building.
- 2.6 The large size of the building allows for the trommel to be located to the far north east section of the building some 25 meters away from the main shutter. The electrically powered trommel was selected specifically to minimise noise. The Hyundai 55-9 excavator is fitted with low noise anti restart function and advanced hydraulic system.
- 2.7 In conjunction with the internal waste transfer operations it is intended to conduct the tipping and screening of soil and hard-core to the northern most point of the site. This area has been selected as it is the furthest point from the nearest noise sensitive residential location at 1 New Road. The area is also afforded screening by way of the existing industrial unit, Unit 2 North Industrial Estate. The screening operations will be carried out using a Powertrack 800 power screen serviced by a JCB-416 loading shovel. The screener will be orientated so the lowest emission emanates toward residential properties.
- 2.8 The only other outdoor activities would be the loading and unloading of empty skips, those up to 8 yards in length adjacent to the goods entrance and the larger 40 yard skips located to the eastern

boundary. Greenacre's current fleet of vehicles comprises of 3 x 32 tonne grab lorries, 1 x 38 tonne skip lorry for the 40 yard skips, 4 x 18 tonne skip lorries for the smaller skips. 2 x grab lorries and 3 x skip lorries have been replaced for newer quieter versions recently. It is the intention to replace the remaining fleet shortly.

2.9 An 18 tonne skip lorry has the maximum capability of making 5 visits to the proposed development site a day, a total of 20 movements to site over a whole weekday for the fleet of 18 tonne skip lorries. The 32 tonne grab lorries tend to leave site in the morning returning at the end of the day. As an absolute maximum they may attend site twice a day each. The 38 tonne lorry can visit site a maximum of 4 times a day. Each lorry would park at the designated weighbridge on arrival at site. The weighing process lasting 30 seconds in each instance.

2.10 For clarification, it is the intention to allow access to the site from 06:30 to 07:00 to open the offices. Staff will park their cars in the staff car park shielded from local residential properties. Lorries would leave the site from 07:00 and trommel waste operations would start no earlier than 08:00. The site would be closed by 17:30 Monday to Friday and 13:00 Saturday. No operations during Sundays or Bank Holidays.

2.11 Typically, during a working weekday, the hours of operation for each item of plant or machinery will be observed as follow:

- Baughan Majorette Trommel – 4 hours
- Kubota 020 (2 tonne excavator) – 4 hours
- Hyundai 55-9 (5 tonne excavator) – 4 hours
- JCB 535-95 (Telehandler) – 6 hours
- Powertrack 800 (powerscreen) – 3 hours
- JCB-416 (loading shovel) – 3 hours

2.12 The site plan highlights the proximity for the nearest noise sensitive receptors (NNSR's). AMC Car Sales to the south. Industrial units at North Industrial Estate to the west and the nearest residential property, 1 New Road, to the east. 1 New Road is located 43m from the main shutter door and 16.5m from the site boundary at the nearest point. The proposed soil and hard-core screening area shares a boundary with Unit 2 North Industrial Estate, shown in Appendix C, Fig C3. Appendix C, Figure C4 illustrates the proximity of the nearest residential property.

2.13 Appendix C, Figure C1 highlights the solid smooth surface of the main yard. The remainder of the yard is in good flat condition. The area is large enough for lorries to manoeuvre easily without unnecessary time spent idling or waiting for other vehicles.

2.14 It has been demonstrated that thought has been given to the selection, location and orientation of machinery when considering noise control at the proposed development site. Further practicable noise reducing measures will be detailed further with in this report.

### 3. NOISE CRITERIA

#### PLANNING NOISE ADVICE DOCUMENT: SUSSEX (JULY 2015)

- 3.1 The Planning Noise Advice Document: Sussex is provided to offer advice for developers and their consultants when making a planning application. The document seeks to complement the noise policy aims as set out by the Noise Policy Statement for England (NPSE) 2010 [4].
- 3.2 Section 2.2.1 of the Planning Advice Document stipulates that *“The starting point for designing any industrial / commercial development should be to minimise noise “as far as reasonably practicable. The rating level of the plant / process, when measured in accordance with BS4142:2014, should, where practicable, be no greater than the existing background levels.”* It is further stated that *“Where these criteria are not attainable, the noise report should explain why, and how best practicable means will be implemented to control noise in order to satisfy the Local Planning Authority (LPA) that the development is acceptable”*.
- 3.3 Annex 1 of the Planning Advice Document provides a summary of key information from relevant standards and guidance documents. Listed under the development category titled “Waste Sites” the BS4142:2014 criteria is reiterated. Reference is also made to The Department for Transport’s Design Manual for Roads and Bridges (DMRB) and also Horizontal Guidance Note IPPC H3(Part2). It is further stated that background levels are very low other criteria such as BS8233:2014 and WHO (2009) may be of relevance further to the agreement of the LPA.
- 3.4 As previously stated the County Council have expressed concerns that the proposal for a waste transfer station at site could significantly change the local acoustic environment. It was stated that such changes could occur through:
- 1) *the proposed fixed & mobile plant (trommel, power screen, loading shovel, excavator, HGVs);*
  - 2) *the location of some of the plant & operations (e.g. the external skip storage area & bin for metals storage, together with HGV manoeuvring, taking place immediately on the other side of the A26; the doors of the WTS opening towards New Road);*
  - 3) *the proposed operating hours (it is however unclear whether the proposed start is 06.30 or 07:00, and what plant would operate during which hours).*
- 3.5 Further assistance was provided by the County Council through consultation. In line with the Planning Noise Advice Document, it was stated that if mitigation measures are required to meet the specified criteria that full details and predicted attenuation levels should be provided.

#### NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

- 3.6 The Noise Policy Statement for England (NPSE) was published in March 2010. It sets out the long term vision of government noise policy, which is fundamentally to: “Promote good health and good quality of life through the effective management and control of noise within the context of Government policy on sustainable development”. The vision is supported by three key aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and reduce to a minimum other adverse impacts on health; and
- Where possible, contribute to the improvement of health and quality of life.

3.7 The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The NPSE adopts the following concepts, to help consider whether noise is likely to have “significant adverse” or “adverse” effects on health and quality of life:

**SOAEL** – Significant Observed Adverse Effect Level.

This is the level above which significant adverse effects on health and quality of life occur.

**LOAEL** – Lowest Observed Adverse Effect Level.

This is the level above which adverse effects on health and quality of life can be detected.

**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.

3.8 The NPSE emphasises that:

*“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.” (Defra, 2010).”*

## NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

3.9 The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) [5] in March 2012. The Framework replaced most planning policy, circulars and guidance including Planning Policy Guidance 24: Planning and Noise (1994). The NPPF defines the Government’s planning policy for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government’s stated purpose in producing the NPPF is to streamline policy so the planning process is less restrictive and provide a more easily understood framework for delivering sustainable development.

3.10 With particular reference to noise, under the heading of “Conserving and Enhancing the Natural Environment”, aims are detailed in Section 123 of the NPPF. It is stated that 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 the 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 business 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.

3.11 Further NPPF aims related to noise include:

*Section 109: The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;*

*Section 111: Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value. To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account...*

3.12 It is stressed that the above references to noise should not be considered in isolation and that the theme, referred to as the “golden thread”, of sustainability that runs through the NPPF is integral to noise.

3.13 The NPPF acknowledges that there is a host of existing sources of national and international guidance which can be used, in conjunction with the Framework, to inform the production of Local Plans and decision making.

## NATIONAL PLANNING PRACTICE GUIDANCE (PPG)

3.14 Revised Planning Practice Guidance [6] was released in March 2014 to support the NPPF. The Guidance stipulates that Local Planning Authorities’ plan making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

3.15 The table below is in the Guidance to assist recognising “when noise could be a concern”.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Unnoticeable	No Effect	NOEL	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	
		LOAEL	Mitigate and reduce to a minimum
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for sleep disturbance. Affects acoustic character of the area and creates a perceived change in quality of life.	Observed Adverse Effect	
		SOAEL	Avoid
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	
			Prevent
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	

**Table 1 – Planning Practice Guidance to Support National Planning Policy Framework.**

## BS4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

- 3.16 The recently revised British Standard BS4142: 2014 “Methods for Rating and Assessing Industrial and Commercial Sound” describes methods for rating and assessing sound of an industrial or commercial nature. The scope of the standard includes relevant topics for commercial development, such as sound from fixed installations (mechanical and electrical plant and equipment). The standard is applicable to the determination of rating levels for sources of sound as well as ambient, background and residual levels.
- 3.17 Certain acoustic features can increase the significance of impact that might be expected from a comparison of the specific sound level to the background sound level. Where such features are present at the assessment location, a character correction to the specific sound level is made to obtain the rating level. This can be approached from subjective, objective and reference methods.
- + Tonality: A correction of 0dB to +6dB for sound ranging from not tonal to prominently tonal; using the Joint Nordic Method or subjectively.
  - + Impulsivity: A correction of up to +9dB can be applied for sound that is impulsive.
  - + Other characteristics: A correction of 3dB can be applied where the sound is neither tonal nor impulsive, but distinctive in the residual acoustic environment.
- 3.18 Corrections can apply either as a single factor if one feature is dominant, or added linearly if both features are likely to affect perception and response. The rating sound level is equal to the specific sound level if there are no acoustic features present or expected to be present.
- 3.19 The significance of sound depends upon both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. An initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level. The context of the development is important in assessing the impact.
- Typically, the greater this difference, the greater the magnitude of the impact.
  - A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.
  - 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... Where the rating level does exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- 3.20 The scope of the Standard recognises that human response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact can depend on various factors such as the exceedance to the background level, its absolute level, time of day and change in environment, as well as local attitudes to the source of sound and character of the neighbourhood.

## 4. ENVIRONMENTAL SOUND SURVEY

4.1 An environmental sound survey was conducted between Thursday 26/11/15 and Tuesday 1/12/15. The measurements were undertaken in accordance with BS7445-2:1991 [7].

4.2 The timing and duration of sound level measurements covered:

- Short-term, attended sound monitoring on Thursday 26/11 and Tuesday 1/12/15.
- Longer-term, unattended sound monitoring from 11:45 Thursday 26/11 to 12:00 Saturday 28/11/15, without the proposed development site in operation.

4.3 The sound level measurements are used as part of the noise impact assessment to establish:

- Machinery and plant sound levels (in terms of  $L_{Aeq,T}$ ) in order to predict operational sound levels at the nearest sensitive properties, in accordance with BS 5228:2009-A1:2014 [4].
- Background sound level (in terms of  $L_{A90,T}$ ) which is representative of the nearest noise sensitive residential property, in accordance with BS 4142:2014 [2].

4.4 The equipment used during the survey consisted of the following precision sound monitoring equipment listed below in Table 2. All equipment listed has traceable calibration history to relevant British Standards, valid in accordance with BS4142:2014.

Manufacturer	Model No.	Description	Serial No.	Next Calibration Due Date
Larson Davis	LxT	3 <sup>rd</sup> Octave Band Sound Level Meter	3934	July 2017
Larson Davis	LxTPRM1L	Microphone pre-amplifier	29332	July 2017
Larson Davis	337B02	½" Electret microphone	146990	July 2016
Larson Davis	CAL200	Sound Level Calibrator	11165	April 2016

**Table 2 – Sound level monitoring equipment.**

4.5 The calibration of the sound level meter was checked using a reference tone of 114dB at 1kHz before any measurements were taken. A validation check at the end of the survey indicated that all instruments had operated within permitted tolerances for drift and measured level.

4.6 The weather conditions were recorded at the start and the finish of the survey using a Hold-peak anemometer. Weather conditions at the start were 9°C, light west wind, 90% humidity, 80% cloud cover and no rain. Weather conditions at the finish were 15°C, light south west wind, gusts up to 2m/s, 88% humidity, 100% cloud cover and no rain. Adverse weather conditions, non-conducive to a sound survey, were reported during periods of the unattended monitoring period. Only data utilised in the assessment was measured in the absence of winds over 5 m/s and when there was no rain on the roads. Appendix D, Figure D1 highlights data bounded in red that was suitable to use. For example, it rained in the afternoon on Friday 27/11/15 so this data was omitted. Wind speeds on Sat 28<sup>th</sup> after 12:00 were deemed to be too high so again the data was omitted from assessment.

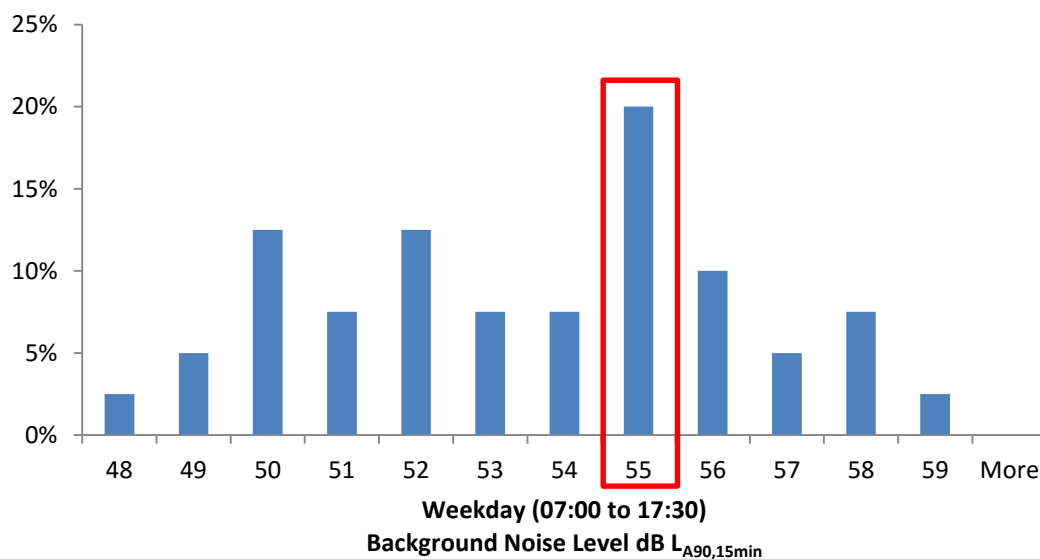
4.7 The measurement position 1, selected for the purposes of the unattended survey is highlighted on the site plan in Appendix B, Figure B1, illustrated in Appendix C, Figure C4 and is described as:

*Position 1) A location 3.5m from the eastern boundary of the proposed development site at a position representative of the nearest noise sensitive residential property, equidistantly positioned on the opposite side of the A26 road. The microphone was located 1.5m from the ground and was over 3.5m from any other reflective surface so represents a free field measurement position.*

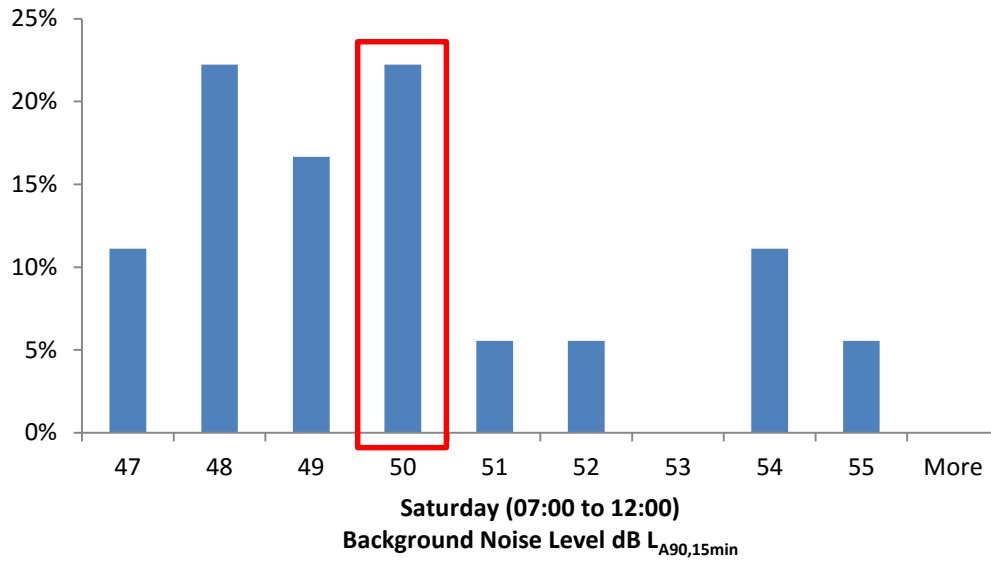
## BACKGROUND SOUND LEVEL

4.8 In line with Section 8.1.4 of BS 4142:2014, the monitoring duration of a background measurement should reflect the range of background sound levels for the period being assessed. The background measurement period for this assessment was conducted to include a whole working weekday and a period representative of a Saturday morning working period. In practice, there is no single level for background sound as this is a fluctuating parameter, although a representative value of the period should be used. A representative value is not either the lowest or mean average value of  $L_{A90,15min}$ .

4.9 The 'typical' background sound levels for assessment have been established from histograms, Figures 1 and 2, of the recorded data at the unattended measurement position 1. It is demonstrated that a background level of 55 dB  $L_{A90,15min}$  is the most commonly occurring recorded value for a weekday and the most equally commonly occurring recorded value for a Saturday morning was 50 dB  $L_{A90,15min}$ . These values are deemed as the most representative background sound levels to be used in the BS4142:2014 assessment.



**Figure 1 – Histogram of  $L_{A90,15min}$  data at Position 1 from 11:45 to 17:30 Thursday 26/11/2015 and 07:00 to 11:4 Friday 27/11/15.**



**Figure 2 – Histogram of  $L_{A90,15min}$  data at Position 1 from 07:00 to 12:00 Saturday 28/11/15.**

## 5. NOISE IMPACT ASSESSMENT

- 5.1 Sound levels from the proposed development have been assessed at the nearest noise sensitive locations. Prime consideration has been given to the nearest residential property, No. 1 New Road adjacent to the proposed operations, by means of BS5228 model calculations and BS4142 assessment. The predicted sound levels will be compared against daytime background sound levels defined in Section 4.9. The calculations are segregated by specified operations and the cumulative sum of sound from concurrent activity are considered at the receptor position.
- 5.2 A series of attended sound measurements were taken during a variety of operations. The details and results of each measurement are provided in Appendix D, Figure D2. A number of measurements were made at Greenacres existing site Unit 2H, Hawthorn Estate, Avis Way, Newhaven BN9 0DJ with plant, machinery and vehicles in operation. It is the intention to utilise the existing plant at the proposed site so the sound data recorded is representative and appropriate for the purposes of this assessment. In addition the sound data provided by the manufacturers' verified datasheet (assumed to EC directive 200/14/EC) for the proposed power screen has been used (see Appendix E, Figure E1).
- 5.3 Whilst at the existing site, the opportunity was taken to conduct a subjective assessment of operations. With the main entrance open at Unit 2H the operation of the trommel and associated excavators was barely audible at the nearest sensitive office façade some 35m away. It is reported by the applicant that no noise complaints have been received at the current site in relation to operations. The staff utilising offices at the nearest commercial building stated they are not disturbed by noise from the existing site.
- 5.4 The telescopic handler was audible at a distance of 35m whilst loading a skip towards the open entrance. The reversing alarm was very evident as was the clanking of the loading bucket whilst in operation. Both these noises were impulsive and potentially disturbing in character. It was agreed that both these issues will be addressed prior to any operation at the proposed new site. All on site vehicles and the whole fleet of lorries would be fitted with "white noise" broadband reversing sounders. This will reduce the volume at distance and also remove the impulsive character of the alarms. The bucket of the telehandler would be replaced to a waste clamp that does not clank and leads to a smoother quieter operation, again removing impulsive character.
- 5.5 The following sound levels, detailed in Table 3 below, are taken to be representative of works to present an outline impact assessment of the proposed Site at nearest sensitive locations.

Equipment	dB L <sub>Aeq,10m</sub>	Location	Data Source
Trommel, 2T & 5T Excavator	86	Internal	Measured
JCB-535 Telescopic Handler	82	Internal	Measured
Power Screen	72	External	Data Sheet
JCB-416	68	External	Measured
HGV Movement	73	External	Measured

**Table 3 – Summary of considered vehicle activity and equipment.**

5.6 To predict the resulting sound level at the nearest noise sensitive residential premise, equipment on-times have been estimated from information provided by the applicant, as detailed in Section 2.11. It is recognised that the prediction of equipment on times during any working period is difficult to determine accurately and as such estimates are conservative.

Equipment	Usage Assumptions	
	On-Time (%)	Height (m)
Trommel, 2T & 5T Excavator	40	1.5
JCB-535 Telescopic Handler	60	1.5
Power Screen	30	1.5
JCB-416	30	1.5
HGV Movement	10*	1.5

**Table 4 – Summary of considered vehicle and equipment on times for typical activity.**

*\*A time correction has been added for HGV's utilising the front yard. Considering 30 lorry visits to site over a 10 hour working day and the time it takes to complete the weighbridge operation it is reasonable to assume no more than 6mins of HGV activity in any one hour period.*

5.7 The information detailed with in Tables 3 and 4 has been incorporated into the BS5228-1 model calculations presented in Figure F1, Appendix F. The calculations are fully annotated to detail all the relevant assumptions that have been made. Of further note, the primary equation used in order to calculate noise break-out from a building is provided by Watson and Downey (2008) [ 8] as:  $SPL_{ext} = SPL_{INT} - SRI - 6$

Where  $SPL_{ext}$  is the sound pressure level at a distance of 1m outside the building.

$SPL_{INT}$  is the sound pressure level just inside the building.

SRI is the sound reduction index for the building envelope.

A 6 dB reduction arises because of a correction between an internal diffuse field and an external free-field.

## PREDICTION RESULTS

5.8 The prediction results from BS 5228 model calculations are shown in Appendix F, Figure F1 and is summarised in Table 5 below. The predicted value of 49 dB LAeq, 1hour is to be used as the specific sound level with in the BS4142 assessment detailed in Table 6. Firstly, the predictions are to be further examined with the use of computer modelling detailed in the next Section.

Receptor	Sound pressure level $L_{Aeq,1hr}$
No. 1 New Road	49

**Table 5 – Summary of BS 5228 assessment.**

## NOISE PREDICTION AND MODELLING

5.9 IMMI noise prediction and noise mapping software V2015 has been used to calculate and illustrate the resulting sound levels 1m from the nearest residential premise about the proposed development site. Calculations for sound emission are made in accordance with BS 5228 Part 1. This method was agreed with the County Council prior to attempting.

5.10 The modelling software is used to generate sound pressure level emission with the following assumptions:

- The A-weighted sound level data in Table 3 is used as sound pressure level occurring from 10m from each piece of equipment. Points are used to describe fixed plant locations (e.g power screen); operations that occur over a known route are described by a line (e.g. lorry movements) and those within the works building are described by an area.
- The equipment quantities, on-times and heights follow the assumptions of Table 4.
- Transmission loss of the works building is modelled as corrugated steel. This is a conservative assumption as some areas to the building are masonry blockwork.
- Site geometry and layout is based on scaled information obtained from licensed ordnance survey maps and architectural scheme proposals.
- Simplified building structures are modelled for ease of calculation whose dimensions are approximate.
- Surface attenuation (ground effect) factors are accounted for in the model as perfectly reflecting to create a worst-case assumption.
- Receiver locations are taken to be 4.5m above the ground, 1m from the façade of receptor locations about the development. No boundary walls or fences are modelled outside of the works site for ease of modelling.
- Screening attenuation has been estimated from the sound model in accordance with BS 5228 where line-of-sight may be partially or fully restricted between proposed development and nearest noise-sensitive receiver. In all cases, the equipment was located in a representative area as not to under-predict the result.
- Atmospheric absorption is calculated in accordance with the model assuming environmental conditions of 10°C and 70% relative humidity.

5.11 The success of any software prediction model is dependent on the user to generate valid and representative results. Reasonable care needs to be taken with the design of the model and ensuring that the topography is representative of the design proposals.

5.12 Appendix F, Figure F2 details a noise map of the software model.

5.13 Results from the model are verified using manual calculations from Annex E of BS 5228, as shown in Appendix F, Figure 1.

5.14 The computational and manually calculated results show good correlation, generally less than 1dB. This is expected where the calculation method is identical but the model predictions have the added benefit of allowing more complex spatial and geometric considerations.

#### BS4142:2014 ASSESSMENT

5.15 As stated, one of the primary aims of this assessment is to provide a rating level at the nearest noise sensitive residential property in accordance with BS4142:2014. This will give an appropriate indication of the predicted cumulative sound level impact at this location. The assessment is detailed in Table 6 below:

Assessment at 1 New Road, Nearest Residential Noise Sensitive Premises			
Result	Weekday (07:00 to 17:30)	Saturday (07:00 to 13:00)	Commentary
Background sound level dB $L_{A90}$	55	50	See Section 4.9
Reference time interval	1 hour	1 hour	Daytime
Specific sound level dB $L_{Aeq,T}$	49	49	Predicted from sound data, see Table 3
Tonality Correction dB	0	0	No tonality subjectively at a distance of 35m
Impulsivity Correction	0	0	Impulsivity issue to be addressed, see section 5.4
Other characteristic Correction	0	0	No further character correction
Rating level	49	49	No acoustic feature corrections.
Excess of rating level over background sound level	-6	-1	The predicted rating level minus the measured background level
Assessment indicates likely indication of <i>*depending on context</i>	Low impact	Low impact	When the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.
Uncertainty of the assessment	Not significant	Not significant	See section 5.8 for a statement of uncertainty.

**Table 6 – Assessment of combined sound output of the proposed site at the nearest noise sensitive residential property in accordance with BS 4142:2014.**

5.16 Table 6 highlights the results of the BS4142 assessment which illustrates a rating level of 6dB below background for weekday operations and 1 dB below background for Saturday morning operations. A low impact is therefore indicated at the nearest noise sensitive residential receptor when considering the cumulative impact of all the plant, machinery and HGV's in operation during

a one hour assessment period. The impact is low and therefore demonstrates avoidance of any significant impact.

## STATEMENT OF UNCERTAINTY

5.17 There are a variety of factors that inevitably limit the accuracy associated with all steps of any noise assessment, including measurement, calculation or prediction. Factors include, but are not limited to:

- The inherent limitation of calculation / prediction methodology in Standards and guidance.
- Variability in meteorological conditions.
- The accuracy of sound source input data of a calculation or noise model.

5.18 It is imperative to minimise the uncertainty to a level commensurate with the intention of the assessment objective. Measures taken in this assessment to minimise uncertainty are:

- Baseline sound levels have been measured over an extensive time frame therefore a good indication of representative background sound levels without the proposed development site in operation.
- Sound level measurements were undertaken in accordance with recognised Standards and were undertaken during suitable weather conditions, e.g. acceptable wind speeds and no precipitation.
- Field calibration checks were undertaken prior and after measurements to record acceptable drift.
- The sound source data was either measured on site or provided by manufacturer's data.
- Subjective observations of any acoustic features was made at an existing site at a distance representative of the nearest residential receptor and no perceptible feature was present from the waste transfer building which has informed this assessment.
- Recognised sound prediction calculations have been used to calculate sound levels at sensitive locations and any assumptions have been stated.

5.19 The aforementioned measures reduces uncertainty to a level considered not to have any significance to the outcome of the assessment.

## CONTEXT

- 5.20 The concept of “context” is important within BS4142:2014. Section 11 of the Standard stipulates *“that an effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context”*.
- 5.21 BS4142:2014 points out that in certain cases the initial numerical impact needs to be modified due to the context, all pertinent factors should therefore be taken into consideration and may include:
- Consideration of the permitted use, locality, time, duration and frequency of the specific sound.
  - The character and level of the residual sound compared to the character and level of the specific sound.
  - The absolute level of sound.
  - The sensitivity of the receptor and the ability to mitigate by way of physical means.
- 5.22 In light of the above it is therefore important to account for site specifics. The planning statement stipulates the site currently has unrestricted B2 use. It is therefore accepted the location is industrial in nature and a level of industrial sound is in keeping with the locale. The proposals seek to implement a level of operational restriction to the area.
- 5.23 It is understood that the Site was formerly a Titam Maritime site which accommodated large maritime engineering projects which involved HGV deliveries to site of large materials. It should be noted that the background measurements were made during the absence of any site activity at all and therefore discounts the sound levels of the previous activity of the Site.
- 5.24 The highest contributing sound level predicted at the nearest noise sensitive residential receptor is attributable to the manoeuvring and idling of HGV’s accessing site and using the weighbridge. Section 2.9 describes the maximum anticipated lorry movements at site during a working day. A total of 30 movements during a 10 hour shift. The corresponding predicted sound level at the nearest residential receptor will be 46 dB  $L_{Aeq, 1hr}$  for a reasonably assumed level of HGV activity at Site. This can be compared against a measured residual level, representative of the nearest residential property attributable largely to current road traffic, in the absence of the proposals, of 69 dB  $L_{Aeq, 10hrs}$  and 67 dB  $L_{Aeq, 6hrs}$  for weekday and Saturday morning respectively. The character and the absolute sound level of limited lorry movements on Site is not going to be incongruous with the current sound climate that is dominated by traffic passing by on a busy road at speeds of up to 40 miles per hour.
- 5.25 Table 6 illustrates that the numerical BS4142:2014 assessment indicates a “low impact”. This is further supported when accounting for the aforementioned context of the Site. **Therefore the BS4142 assessment demonstrates that when considering the predicted sound levels at the nearest residential noise sensitive receptor, when considering the cumulative sound levels of all**

**plant, machinery and HGV movements at Site over a 1 hour assessment period, there will be no observed adverse effect.**

## OTHER POINTS OF CONSIDERATION

- 5.26 In addition to the nearest noise sensitive residential receptor there are nearby industrial and commercial receptors to the proposed development site. AMC Car Sales office and forecourt are located to the south of the Site. When considering the internal sound levels of the waste transfer station, once the sound reduction of the building and distance attenuation are accounted for, the predicted levels at the forecourt will be in accordance with the upper limits deemed acceptable for residential amenity recommended in BS8233:2014 i.e. below 55 dB<sub>LAeq,T</sub>. This is further demonstrated in the noise contour map provided in Appendix F, Figure 2.
- 5.27 The boundary of the proposed soil and hard-core area to the north of the Site is with Unit 2 North End Industrial Estate and is illustrated in Appendix C, Figure C3. The boundary line is currently exposed, however it is the proposed intention to shield this area with concrete blocks that will demark the site boundary and storage bays. The intended blocks are illustrated in the photograph Appendix C, Figure C6. The blocks are essentially placed into position and they will be a minimum height of 2m. When considering the power screen and shovel loader in operation and then consider a distance of 15m a screening attenuation of 10 dBA for the blocks and a daily time correction of 3 hours operation during a 10 hour shift, again a sound level of below that acceptable for residential amenity is met at the front of Unit 2. In addition Unit 2 has no windows or doors to the northern façade which faces the intended soil and hard-core area.
- 5.28 During consultation, the County Council asked that consideration be placed upon any requirement to evaluate the immediate and long term noise impact of any changes in traffic flow due to the Site's operations. It is recognised that the scoping of traffic generation for each site is important in collaboration with estimating noise impacts. The thresholds provided within The Department for Transport Guidance [10] clearly state that no such assessment is required beyond certain thresholds. The guidance suggests that developments which generate less than 30 two way vehicle movements in any hour or 10 HGVs a day may not require a formal Transport Assessment. For B2 General Industrial schemes this is limited to sites of gross floor area of less than 2,500m<sup>2</sup>.
- 5.29 For the proposed scheme there is neither a requirement for transport assessment nor is it apparent that one been produced by the applicant. In the case that road traffic generation will not be significant due to the limited size of development then associated noise impacts can be considered as negligible.
- 5.30 The County Council have requested that consideration is given to the potential noise impact of having the shutter doors open. As stated the larger shutter will only be open to accommodate access for the 40 tonne skips. During this operation all activities within the waste transfer building will cease. The smaller shutter will be routinely closed during operations. There will on very brief occasion be instances when this door is open for a maximum of 30 seconds to allow access. When considering lorry movements it is reasonable to assume that the shutter could potentially be open

for a maximum of 5 minutes in any 1 hour. When the shutter is open the attenuation afforded by the building is compromised so calculations can be used from Appendix F, Figure F1 with the sound reduction of the building removed. This would lead to predicted sound levels at the nearest noise sensitive receptor of slightly above the measured background level. For this reason, it is imperative that the routine closing of the shutter during operations is observed and incorporated in to the noise management plan detailed in Section 6.

- 5.31 Potential skip delivery noise is another consideration. For this reason attended measurements were made when a skip was loaded and unloaded from an 18 tonne lorry. The overall LAeq was akin to a typical lorry movement of 73 dB. The recorded LMax values for loading was 79 dB and for unloading 83 dB. These values were recorded at 6m. The peak levels were extremely short lived and not repetitive just singular in nature. A lot of emphasis must be placed on the conduct of the staff carrying out this operation in a steady and controlled manner. Staff training is an integral part of the proposed noise management plan. In addition sleeves are intended for all the chains to the skip lorries to further mitigate potential noise disturbance.
- 5.32 Other erroneous potentially disturbing noises can be mitigated through staff training and the maintenance of a considerate working culture. These are all intentions incorporated in the management plan. Simple measures such as placing metal waste in to empty skips rather than throwing it in can add up to make overall perceived differences.
- 5.33 The sound of the main shutter door in operation was recorded. The whole process to open and close fully took 30 seconds and produced a sound level of 65 dB LAeq. The predicted corresponding sound level at the nearest residential property due to this operation will be well below the recorded background level so it would be fully appropriate to open the shutter from 07:00 onwards.
- 5.34 40 yard skips are to be stored to the eastern boundary as these are not moved first thing in the morning and will only be moved later from late morning onwards. The location of the large skips will attenuate a small amount of sound from the main yard. There are minimal 40 yard skip movements in any typical working day, with the lorry visiting a maximum of 4 times in a 10 hour shift.
- 5.35 The importance of a comprehensive noise management plan is evident due to the nature of the activities and section 6 below details the intended measures which demonstrate best noise control practice.

## 6. NOISE MANAGEMENT PLAN

6.1 The below table lists a series of noise management measures to be implemented at site. Consideration has been given to Horizontal Guidance Note IPPC H3 (Part 2) [11] in the formulation of the Plan.

Item Number	Noise Management Action
1	Site opening 06:30 to 07:00. Lorries not to start or leave site before 07:00. Trommel operations not to start before 08:00. Site to close by 17:30 Monday to Friday and 13:00 Saturday. No operations, at any time other than those specified, including Sunday or Bank holidays.
2	All skip lorries to be loaded the day before so that no skip loading is necessary before the lorries leave in the morning.
3	All shutters to be routinely closed whilst operations take place within the main waste transfer building.
4	All internal waste operations to cease when the larger shutter door is opened to facilitate the 38 tonne lorries.
5	The front yard to be maintained in good flat condition.
6	All new plant or machinery to be sourced with regard to noise output. The County Council Planning Authority to be notified of any new plant or machinery.
7	All plant and machinery to be serviced and maintained as per the manufacturer's specifications.
8	All new and existing staff to be made aware of the noise management plan and to be briefed on the importance of noise control. Measures to include the handling of waste, loading of skips, revving of engines etc. A culture of consideration to neighbouring residents to be maintained. All staff training to be logged.
9	All the skip lorries chains to be fitted with sleeves to minimise metal clattering.
10	All Greenacre vehicles to be fitted with "white noise" reversing alarms
11	The telescopic handler JCB-535 to be fitted with a waste clamp and the bucket removed.
12	The power screen will be orientated so the quietest end is facing towards residential properties.
13	A complaints procedure to be put in place and any complaints logged for inspection by the LPA if required.
14	Vehicles and machinery not to be left idling when not in operation or being unloaded.
15	Staff not to play vehicle radios or portable stereos so that they are audible beyond the boundary of the site.
16	Concrete blocks to be placed at a height of at least 2m to the boundary of Unit 2 North Industrial Estate.

**Table 5 – List of noise management practices to be adopted at the proposed development site.**

6.2 The applicant is willing to have the above management plan agreed by way of a planning condition, if it was felt as an appropriate measure to formalise the management practices on the Site and also ensure best practice in terms of noise control.

## 7. CONCLUSIONS

- 7.1 A planning application was submitted to East Sussex County Council (Reference: LW/767/CM) for the *“Proposed Change of Use of an Industrial Unit to a Waste Transfer Station at New Road Industrial Estate, Newhaven BN9 0HE”*.
- 7.2 The County Council raised concerns that the proposals could significantly change the local acoustic environment. It was recommended that a noise assessment should be conducted with reference to guidance provided in *“Planning Noise Advice Document: Sussex”*.
- 7.3 Section 2.2.1 of the Planning Advice Document stipulates that *“The starting point for designing any industrial/ commercial development should be to minimise noise “as far as reasonably practicable. The rating level of the plant/process, when measured in accordance with BS4142:2014, should, where practicable, be no greater than the existing background levels.”*
- 7.4 This noise assessment provides calculated and computer modelled predictions of the sound output of the site in full operation at the nearest noise sensitive receptor, in accordance with propagation calculations specified in BS5228-1:2009+1:2014. An assessment has then been conducted in accordance with BS4142:2014.
- 7.5 The BS4142 assessment, of the nearest residential position, indicates that any impact of the cumulative sound level of all the site operations considered over a 1 hour assessment period will be *“low”*. When assessing the context of the site, it is further exemplified that any impact will be low and the indication is that there will be no observed adverse effect when considering National Planning Practice Guidance.
- 7.6 Predicted sound levels at commercial and industrial locations neighbouring the proposed site have been determined as being appropriate for the area when considering relevant guidance. Sound levels at these areas will be below upper limits deemed appropriate for residential amenity so more than fitting for an industrial area.
- 7.7 It is recognised that local guidance advocates that industrial development should minimise noise as far as reasonably practicable. For this reason a noise management plan has been provided that can be formally agreed through a planning condition. It is considered that this measure ensures best practice and is an effective mitigation tool against potentially disturbing erroneous noises.
- 7.8 In conclusion, this noise assessment demonstrates that the proposed development site is suitable for the planned waste transfer operations when considering the noise impact on the local vicinity. Any potential noise impact will be low and sound levels will be in accordance with local and national policy and guidelines. The assessment indicates that the proposals will not give rise to noise levels that lead to a detriment of the local amenity. As such, noise considerations should not deter the granting of planning permission.

## 8. REFERENCES

- [1] Planning Noise Advice Document: Sussex (July 2015).
- [2] BS 4142 (2014) Methods for Rating and Assessing industrial and Commercial Sound.
- [3] BS 5228-1:2009+A1 (2014). Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise.
- [4] Department for Environment, Food and Rural Affairs (DEFRA) (2010). Noise Policy Statement for England (NPSE).
- [5] Department of Communities and Local Government (2012). National Planning Policy Framework.
- [6] Department of Communities and Local Government (2014). Revised: National Planning Practice Guidance – Noise.
- [7] BS 7445–2: (1991) Description and Measurement of Environmental Noise – Part 2: Guide to the Acquisition of Data Pertinent to Land Use.
- [8] Watson and Downey (2008). The Little Red Book of Acoustics: A Practical Guide. Blue Tree Acoustics.
- [9] BS8233 (2014). Guidance on Sound Insulation and Noise Reduction for Buildings.
- [10] The Department of Transport (2007). Guidance on Transport Assessment. Stationery Office
- [11] Horizontal Guidance Note for Noise H3 – Part 2 (2002). Noise Assessment and Control. Integrated Pollution Prevention and Control.

## Appendix A: Glossary of Acoustic Terms

- 'A' weighting dB(A):** Filtering of the sound frequencies designed to reflect the response of the human ear to noise. The human ear is more sensitive to noise at frequencies in the middle-high end of the audible range than to either very high or very low frequencies. Noise measurements are often A-weighted (using an electronic filter) to compensate for the sensitivity of the ear.
- Attenuation:** Noise reduction, measured in decibels.
- Calibration:** A check of the function of a sound level meter by comparing the meter reading with a known sound pressure level.
- Decibel:** The unit of sound level and noise exposure measurement. The range of audible sound pressures is approximately 0 dB to 140 dB.
- Equivalent continuous sound pressure level (LAeq,T):** A measure of the average A-weighted sound pressure level during a period of time, in dB(A). It is a notional steady sound level which would cause the same A-weighted sound energy to be received as that due to the fluctuating sound level over a given period of time (T).
- Frequency (Hz):** The pitch of the sound, measured in Hertz.
- Frequency analysis:** Analysis of a sound into its frequency components.
- Hz:** Hertz, the unit of frequency.
- Noise spectrum:** A noise represented by its frequency components.
- Octave-bands:** A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit. The width of the octave-bands increases at higher frequencies.
- Octave-band centre frequency:** The frequency at the centre of an octave band.
- Pa:** Pascal, unit of measurement of sound pressure.
- Sound level meter (SLM):** Instrument for measuring various noise parameters.
- Sound pressure level (SPL):** The basic measure of sound, expressed in decibels, usually measured with an appropriate frequency weighting (e.g. the A-weighted SPL in dB(A)).
- Sound power level (Lw):** The sound energy radiated per unit time by a sound source measured in watts (W). Sound power can have weightings applied (e.g. A-weighted) and is not influenced by environmental or physical factors such as weather conditions or distance.

Appendix B Site Plan



**Figure B1 – Site plan illustrating the proposed site boundary in red. The location of the nearest noise sensitive receptors and the intended locations for waste operations are highlighted.**



Unattended Measurement Position 1

## Appendix C Site Photographs



**Figure C1 – Photograph of the main waste transfer station building, illustrating the main access door temporarily open.**



**Figure C2 – Photograph inside the main transfer station building, illustrating the block walls and the sound integrity of the doors and roof.**



**Figure C3 – Photograph illustrating the site boundary with Unit 2 North Industrial Estate**



**Figure C4– Photograph illustrating the unattended measurement position in relation to the nearest noise sensitive residential receptor at 1 New Road.**

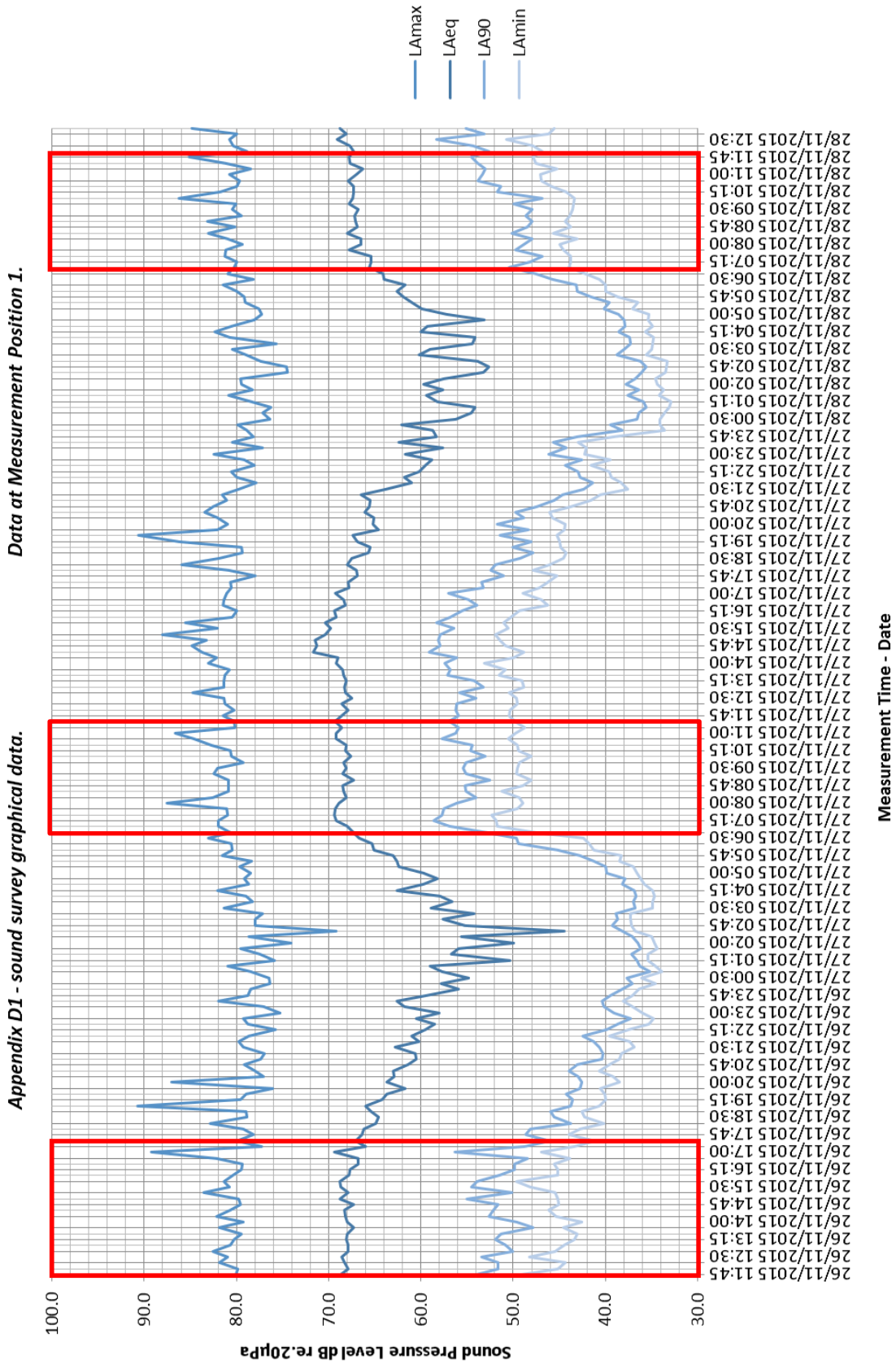


**Figure C5 – Photograph illustrating a measurement position at the existing Greenacre site. The trommel, 2 tonne excavator, 5 tonne excavator are in simultaneous operation.**



**Figure C6– Photograph illustrating the concrete bunding blocks currently in use at the existing site which are to be utilised at the proposed site's northern boundary.**

## Appendix D Sound Survey Data



Record	Operation	Measurement Position	Total dBA Lp
1	Trommel, 2T Excavator, Skip lorry	Inside existing WTS building	88
2	Trommel, 2T & 5T Excavator	Inside existing WTS building	86
3	JCB-535 telescopic handler loading skip	10m, inside existing WTS building	82
4	JCB-535 loading skip	10m from existing open door	69
5	JCB-535 loading skip	10m from existing open door	69
6	JCB loading skip	10m from existing open door	72
7	40 Yrd skip lorry unloading	10m from existing open door	76
8	38 tonne lorry idling	7m away, outside	70
9	Grab lorry idling	5m away, outside	73
10	Grab lorry & JCB-535	10m from existing open door	75
11	18 tonne lorry dropping skip	6m away, outside	75
12	18 tonne lorry loading skip	6m away outside	73
13	JCB-416 Excavator	At new site 10m away, outside	68
14	Electric shutter open/closed	At new site, 2.5m away	64
15	Trommel, 2T & 5T Excavators, JCB-535 loading skip, lorry idling	At open door existing WTS, 2m from lorry	82
16	Trommel, 2T & 5T Excavators, JCB-535 all in operation	At open door existing WTS	77
17	Trommel, 2T & 5T Excavators, JCB-535 all in operation	At open door existing WTS	75

**Figure D2– Table detailing the attended sound measurements recorded as part of the environmental sound survey.**

## Appendix E

## Manufacturer's Sound Data for the Power Screen

**POWERTRACK NOISE RECORDINGS**

(Fitted with Deutz BF4L 2012 C engine)

All values in dB

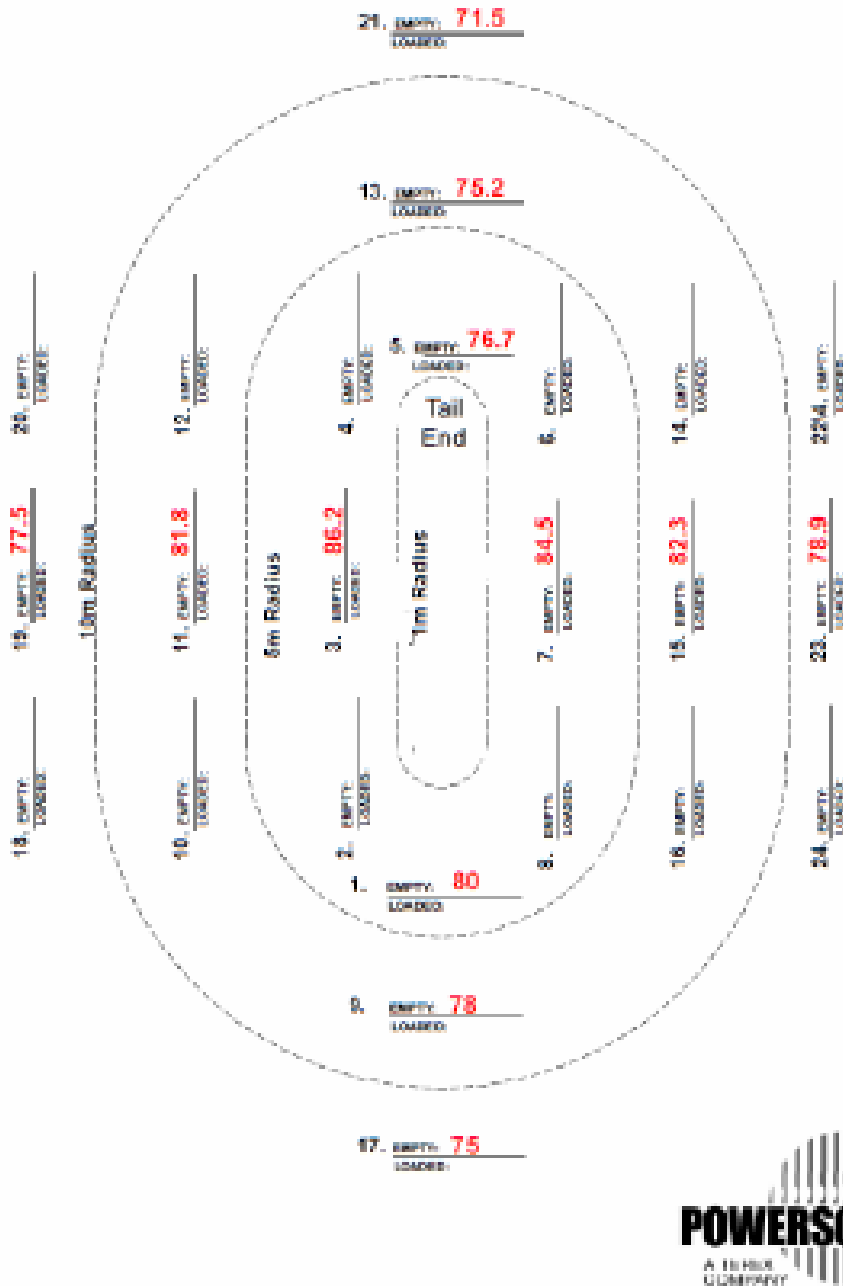


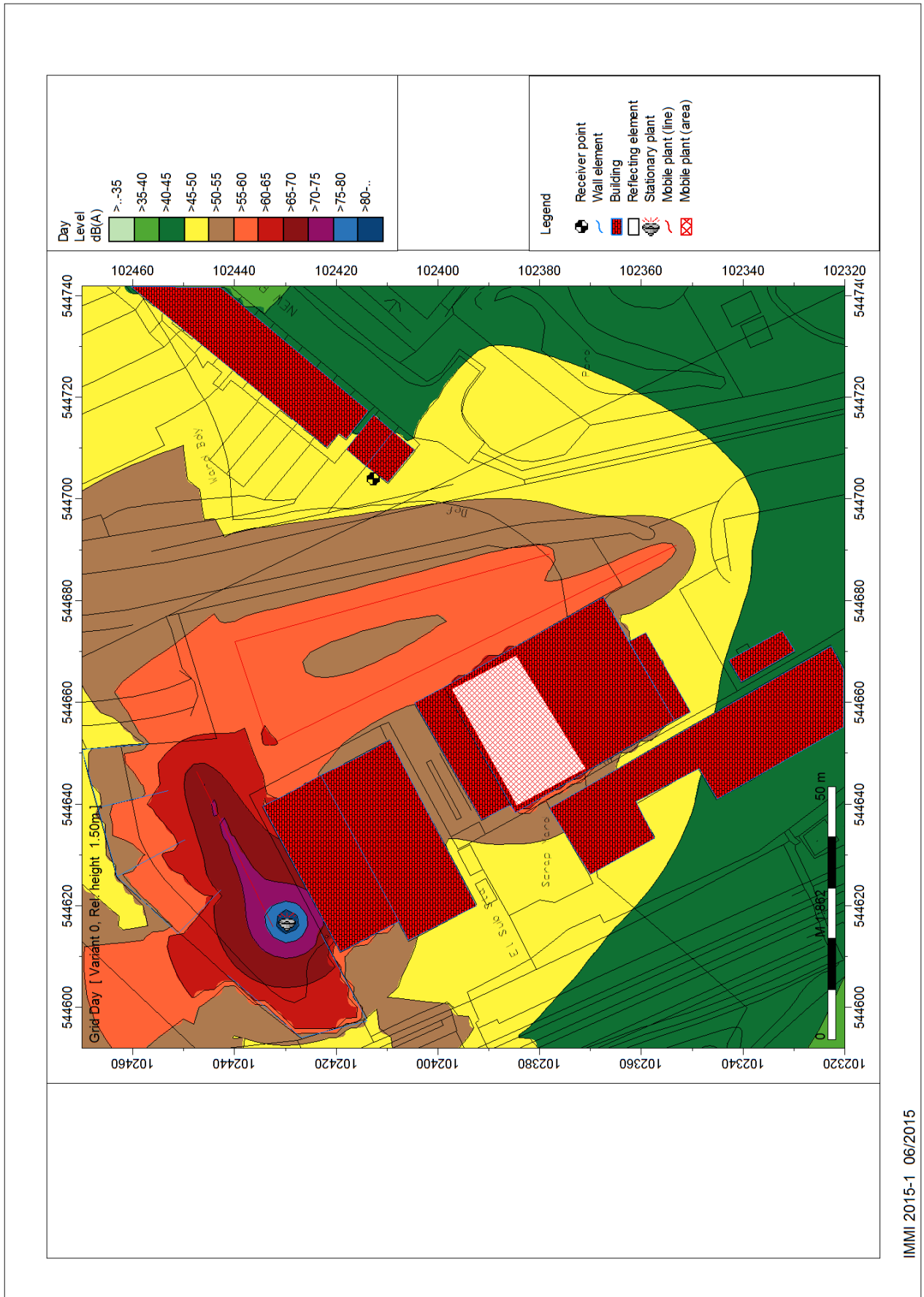
Figure E1– Manufacturer's sound pressure ( $L_p$ ) data for the power screen at distances of 1m 5m and 10m.

## Appendix F: BS 5228-1:2009-A1-2014 Model Calculations

The following calculations have been used to verify computational model predictions for the nearest noise sensitive dwellings to the development.

BS5228-1-A1-2014 Prediction of noise from stationary plant												
Plant type	L <sub>Aeq</sub> at 10m dB*	Distance m	Adjustments				Resultant L <sub>Aeq</sub> dB	Duration of activity h	Duration of activity as %age of 1h %	Correction to L <sub>Aeq,1h</sub> h	Activity L <sub>Aeq,1h</sub> dB	
			Distance dB	Screening dB**	Reflection dB***	Step						
1	2	3	4	5	6	7	8	9	10	11		
Trommel, 2T & 5T Excavator	86	60	-16	-26	0	44	0.4	40	-4	40		
JCB-535 telescopic handler	82	60	-16	-26	0	40	0.6	60	-2	38		
Power screen <i>Manufacturers data sheet</i>	72	90	-19	-10	0	42	0.3	30	-5	37		
JCB-416 Excavator	68	80	-18	-5	0	45	0.3	30	-5	40		
Lorry Movement	67	35	-11	0	0	56	0.1	10	-10	46		
*Activity L <sub>Aeq,T</sub> unless stated otherwise										Total sound level	49	
**Distance attenuation												
***Screening is a working approximation assuming partial sight (-5dB); no sight (-10dB) re. BS5228 F.2.2.2.1c, or unit working inside building (-20dB building loss, -6dB internal to external).												
****Reflections are included where the point of interest is a building facade re. BS5228 F.2.2.2.1c. For assessment in accordance with BS 4142, the free-field level is considered.												

Table F1 – BS 5228 standard calculation for nearest location of No.1 New Road.



IMMI 2015-1 06/2015

Figure F2 – Noise modelling contours to BS 5228 using IMMI 2015.

## Appendix G: Acousticians Qualifications and Status

### Paul Thomson BSc. (Hons) MSc. MIOA

Position Held: Acoustic Consultant.

Qualifications: BSc. (Hons) Environmental Studies.  
MSc. Environmental Change – Social and Physical Aspects.  
Institute of Acoustics Diploma in Acoustics and Noise Control.  
Certificate of Competence in Environmental Noise Measurement.

Affiliations: Corporate Member of the Institute of Acoustics.

Acoustics Experience: 7 years (Over 6 years working as an Environmental Health Practitioner).

Core Competences: Environmental acoustics, entertainment projects, statutory nuisance assessment and enforcement.

### Steve Skingle Bsc. (Hons) MAES MIOA

Position Held: Principal Acoustic Consultant.

Qualifications: BSc. (Hons) Acoustics.  
Institute of Acoustics Diploma in Acoustics and Noise Control.

Affiliations: Corporate Member of the Institute of Acoustics.  
Corporate Member of the Audio Engineering Society.

Acoustics Experience: 13 years.

Core Competences: Building acoustics, environmental acoustics, entertainment projects and electro acoustics.