Vantage Business Park EA Permit Application

Noise Impact Assessment

784-B042236

Airbag Disposal (UK) Ltd

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report presents the finding of a noise assessment undertaken on behalf of Airbags UK Ltd on Vantage Business Park, Tinsley, Sheffield, S9 1BG. The facility at Vantage business park is currently in operation. However, Airbags UK is looking to vary the current environmental permit to allow for expansion for sorting and treatment of waste. As this expansion would introduce new noise sources into the operations, the cumulative noise from the site has been assessed to determine the noise impact at local sensitive receptors.

On-site measurements of the site operations and baseline measurements at nearby sensitive receptors have been undertaken, this assessment has been produced to incorporate the most up-to-date operational information about of the site and the surrounding area. Predictions of operational noise at existing receptors have been made using CADNA noise modelling software which incorporates ISO 9613 methodology calculations. The assessment of noise levels at nearby residential receptors has been undertaken in accordance with the guidance within BS 4142:2014+A1:2019.

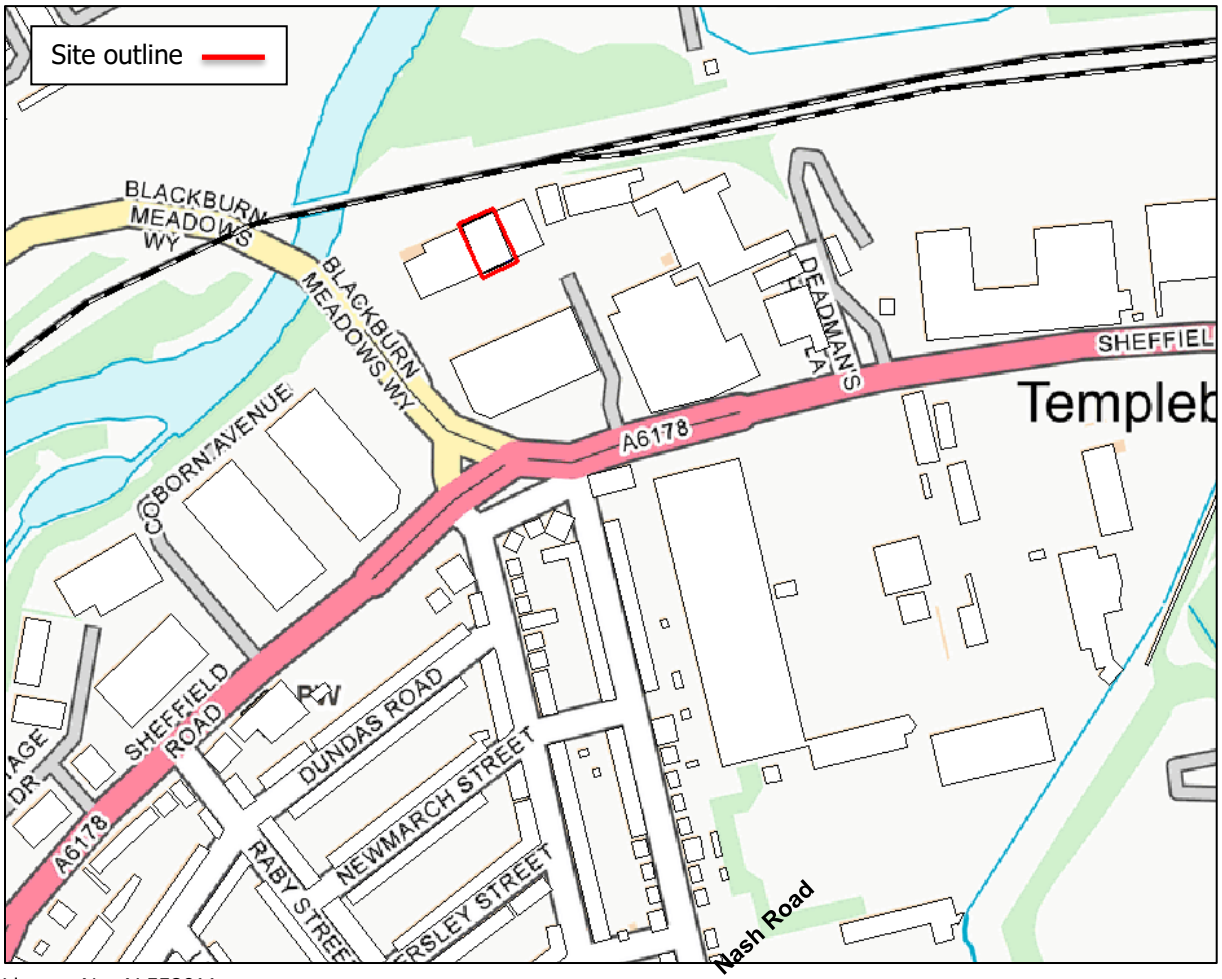
The assessment has also been undertaken in accordance with the *Noise and Vibration Management: Environmental Permits* guidance, published by the Environment Agency in July 2021. In addition, reference is also given to guidance within the Noise Policy Statement for England.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and Report Conditions are presented in Appendix B.

1.2 SITE LOCATION

The site is located on Unit 9 Vantage Business Park, Sheffield within an existing industrial development. The site is predominantly surrounded by a mix of commercial and industrial units, with some residential close by to the south. The nearest residential receptors are an approximate distance of 150 metres. The approximate OS reference for the site is SK 40249 91503. The location of the site is illustrated on Figure 1.1 below.

Figure 1.1 Site Outline



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1.3 ACOUSTIC CONSULTANTS QUALIFICATIONS AND PROFESSIONAL MEMBERSHIP

The lead project Acoustic Consultant is Joe Rutt. The report has been checked by Ashley Shepherd and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised below.

Table 1.1 Consultants Qualifications and Professional Membership

Name	Role	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Joe Rutt	Environmental Scientist	BSc 2021	Jul 2021	Nov 2021	-
Ashley Shepherd	Principal Consultant	BSc 2013	Feb 2014	Feb 2014	Nov 2017
Nigel Mann	Director	BSc 1997 MSc 1999	Nov 1998	Nov 2001	Jul 2005

2.0 ASSESSMENT CRITERIA

2.1 OPERATIONAL NOISE – BS 4142:2014 ASSESSMENT CRITERIA

BS 4142:2014+A1:2019 sets down the following guidelines for assessing the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes, based upon difference between the measured background noise level and the rating level of the source under consideration. In particular, the standard states:

"a) Typically, the greater the 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."

In addition to noise levels the significance of the impact depends on the individuals affected and to the acoustic features present which may be assessed subjectively or objectively as appropriate. Section 9 of BS 4142:2014 recommends that correction factors be applied to the specific noise level if the noise contains certain acoustic features such as:

- tonality;
- impulsivity;
- other sound characteristics which are readily distinctive; and
- intermittency.

2.2 NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS

Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration.

The Environment Agency, Scottish Environment Protection Agency (SEPA), Natural Resources Wales and Northern Ireland Environment Agency have produced a guidance to help holders and potential holders of permits to apply for, vary, and comply with their permits. When we use the term 'environment agencies' in the guidance we mean these 4 organisations.

The guidance covers:

- how the environment agencies will assess noise from certain industrial processes

- what the law says you must do to manage noise and vibration
- advice on how to manage noise – in particular, how to carry out a noise impact assessment and what operators should include in a noise management plan

Once the need for a Noise Impact Assessment has been identified the assessment process should follow these four steps:

- Desktop Risk Assessment
- Off-Site Monitoring Survey
- Source Assessment
- Best Available Techniques (BAT) or appropriate measures justification

The desktop risk assessment has already been undertaken and the need for further assessment of noise has been identified. Therefore, the contents of this report will highlight the work undertaken to address steps 2 to 4 required for the Noise Impact Assessment. This report has been structured with reference to the guidance contained herein.

3.0 ASSESSMENT METHODOLOGY

3.1 SITE OPERATING TIMES

It is understood that the Vantage Business Park facility will operate between:

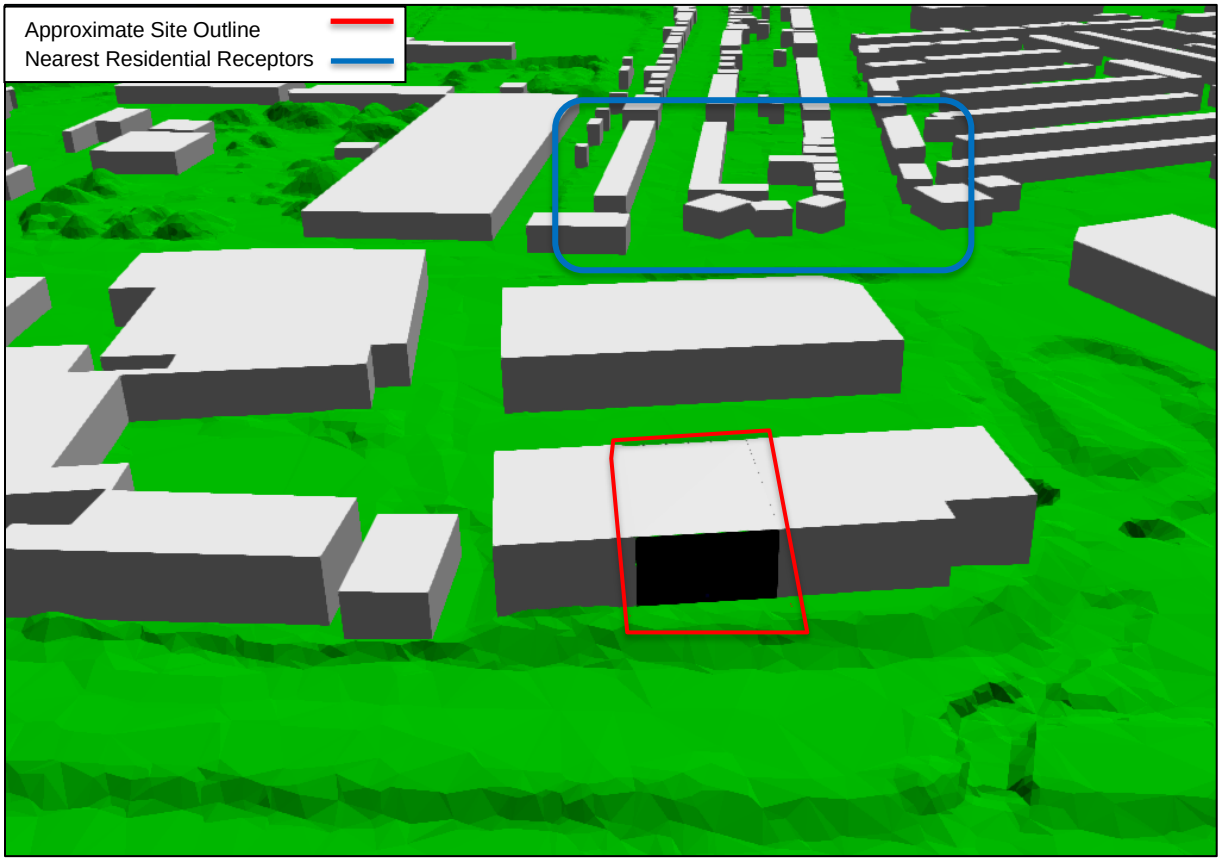
- 08:00 – 16:30 Monday to Thursday; and
- 08:00 – 14:00 Fridays

It is understood that no operations will occur during the weekends or public holidays. Therefore, the assessment will focus on the potential impact within these times only.

3.2 NOISE MODELLING METHODOLOGY

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict L_{Aeq} (Specific Level) noise levels both horizontally and vertically. CADNA noise modelling software has been used as shown in Figure 3.1. The figure shows the proposed development and the surrounding area. This model is based on ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically.

Figure 3.1 CADNA Noise Model



3.3 MODEL INPUT DATA

The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels	Ordnance Survey	Defra – 1m Digital Terrain Model (DTM) - Lidar Data
Building heights – around site	Tt Observations	8 m height for two storey residential properties. Other height properties reviewed using Google Street View and amended as required
Receptor positions	Tt	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties and 3m for each addition floor of the building.
Order of Reflections	Environment Agency	Max number of Reflections: 3

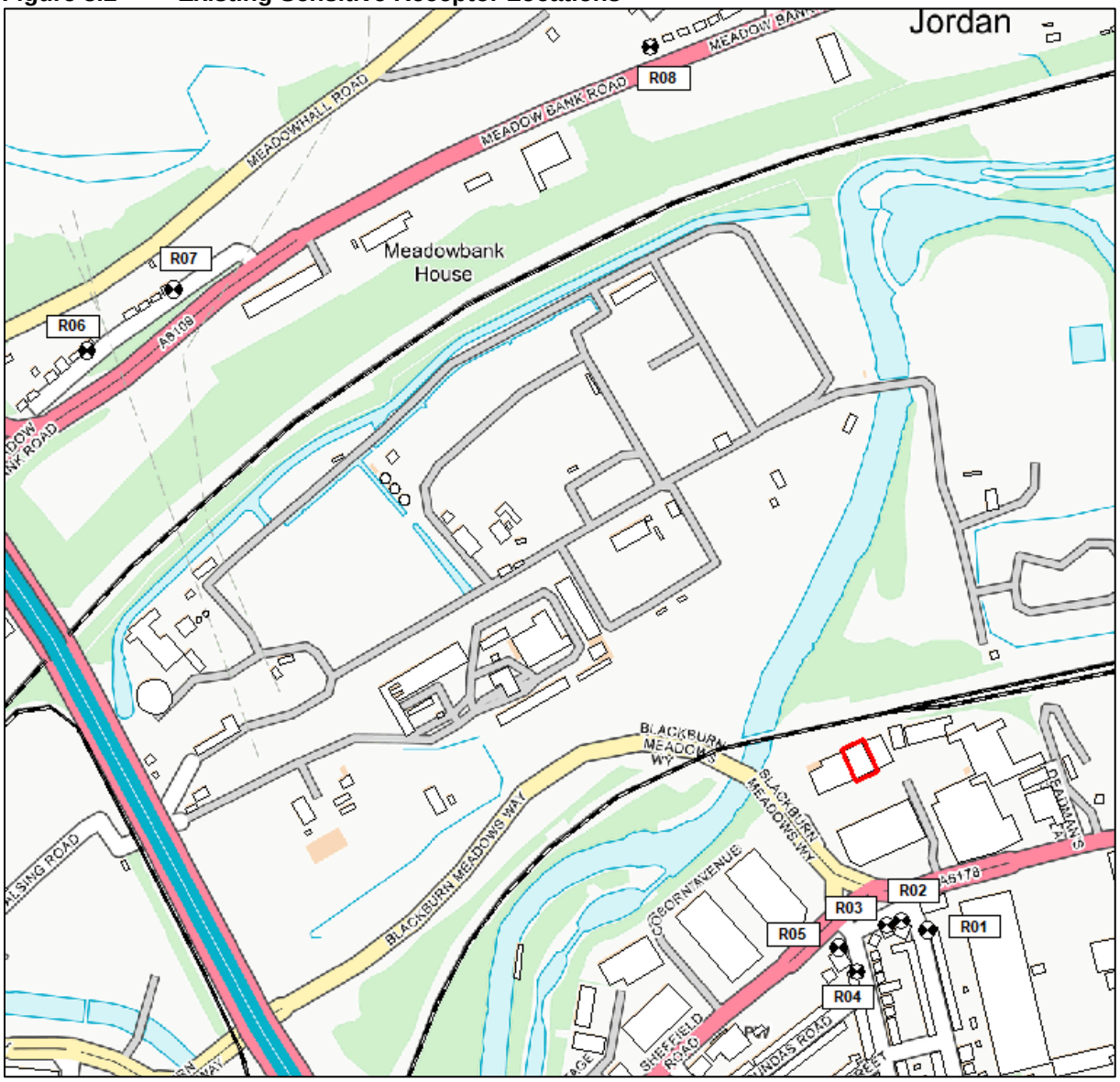
3.4 RECEPTOR LOCATIONS

Table 3.2 presents the receptor locations that have been selected to represent the residential properties that have potential to be impacted, due to their proximity from the Vantage Park facility. The locations of the receptors are illustrated in Figure 3.2 below.

Table 3.2 Existing Receptor Locations

Ref.	Description	Distance from Redline Boundary (m)	Height of Receptor (m)
R01	5 Ferrars Road	170	1.5 / 4.0
R02	446 Sheffield Road	155	1.5 / 4.0
R03	442 Sheffield Road	150	1.5 / 4.0
R04	12 St Lawrence Road	200	1.5 / 4.0
R05	Fox & Duck Hotel, Sheffield Road	170	1.5 / 4.0
R06	470 Meadow Bank Road	890	1.5 / 4.0
R07	430 Meadow Bank Road	840	1.5 / 4.0
R08	282 Meadow Bank Road	760	1.5 / 4.0

Figure 3.2 Existing Sensitive Receptor Locations



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3.5 SOURCE DATA

Due to the nature of operations on the site, the source measurements used in this assessment have been modelled as breakout from existing façades of the facility. No operations occur external to the building, however one HGV delivery per hour for the daytime has been included. Positions Source 1 & Source 2 in the following section provides the L_{Aeq} value used as breakout from each façade of the facility.

This cumulative breakout value considers noise sources from the shredder, granulator, conveyor belt, overhead magnet, eddy current separator and hopper. This is considered representative of the noise

emitted from internal operations as a cumulative reverberant level. The breakout has been modelled under the assumption that the roller shutter door is always open to present a worst case assessment.

Source measurement 3 was also taken externally for the detonation chamber vent facing to the north whilst it was in use. This has been modelled as a vertical area source assuming the operation for the whole hour which is unlikely to be the case. Appendix C shows the location of the noise breakout from the roller shutter door and detonation chamber vent.

Table 3.3 below shows the existing source data for the breakout of internal reverberation calculation taken from the louder S1 monitoring point considering the dimensions of the industrial unit. Direct breakout from the detonation chamber monitored at position S3 is also included.

Table 3.3 Existing Source Noise Data

Existing Noise Source	Octave band centre frequency (Hz)								Sound Pressure Level (SPL) dBA
	63	125	250	500	1000	2000	4000	8000	
Detonation Chamber Breakout (S3)	57.0	50.2	59.0	53.5	49.7	51.0	51.6	44.4	63.6
Existing Internal Reverberation (S1)	66.2	65.4	65.5	66.5	66.8	68.8	69.5	64.5	73.8

Table 3.4 below provides noise source data that has been taken from previous waster transfer station or BS 5228 where appropriate.

Table 3.4 Proposed Source Noise Data

Proposed Noise Source	No. of Source	Source	Sound Power Level (SWL) dBA
Baler	2	BS 5228 Annex C.8.1	114
Shredder	1	Previous Tetra Tech Measurement	105
Conveyor Belt	1	Previous Tetra Tech Measurement	102

Forklift Noise Data

Noise from the use of a Forklift Truck within the service yards has been based upon observations and measurements of operations at an existing builder's merchant facility with external storage. Point sources have been included for general forklift movements around the yard adjacent where forklift movements are expected to take place. The source noise levels used are as follows:

Specific Noise Level

1 x 15 minute at L_p 63.5 dB at 3 m distance (forklift manoeuvring)

Daytime $L_{Aeq(60\ mins)} = 10\log(1/60)(15\ mins \times 10^{0.1 \times 63.5dB})$

$= 57.5$ dB at 3 m distance

Night-time $L_{Aeq(15\ mins)}$ = 10log(1/15)(15 mins x $10^{0.1x63.5dB}$)

= 63.5 dB at 3 m distance

Night-time L_{Amax} = 76.0 dB at 10m distance

These sources have been included with the existing internal reverberant noise to provide a new predicted internal noise source shown in Table 3.5. This value has been used as predicted breakout from the proposed new works in the unit. It is assumed that the roller shutter door is open at all times therefore no transmission loss is included.

Table 3.5 Reverberant Level Calculation Inputs

Plant Unit	Sound Pressure Level
Approx. Building Volume	7812.0 m^3
Building Surface Area	2550.0 m^2
Absorption Coefficient (α) of Surfaces	0.25
Reverberation Time	2 Seconds
Room Constant	827.9
Reverberation Sound Pressure Level	**91.6 dB**

Additionally, a single HGV delivery has been included during the 1 hour daytime measurement period to account for any deliveries that may occur for the new operations. As no traffic/waste transfer data was provided at this stage, this was considered a reasonable assumption based upon the size of the unit.

HGV Unloading Event Noise Data

2 minutes at L_p 67.5 dB at 3 m distance (vehicle arriving and manoeuvring)
30 minutes at L_p 76.8 dB at 3 m distance (vehicle unloading)
1 minute at L_p 67.5 dB at 3 m distance (vehicle leaving)
27 Minutes of quiet with engine off

Daytime $L_{Aeq\ (1hour)}$ = 10log(1/60)(2 mins x $10^{0.1x67.5dB}$+30 mins x $10^{0.1x76.8dB}$+ 1mins x $10^{0.1x67.5dB}$)

= 73.8 dB at 3 m distance

2 minutes at L_p 67.5 dB at 3 m distance (vehicle arriving and manoeuvring)
13 minutes at L_p 76.8 dB at 3 m distance (vehicle unloading)

HGV Movement Noise Data

The following calculations have been used to represent a single HGV arriving/existing along the access road. This has included as a line source in the model for the daytime measurement period of 1 hour between 07:00 – 23:00.

1 x 10 seconds at L_p 67.5 dB at 3m distance (Single HGV vehicle arriving and leaving)

Daytime $L_{Aeq\ (1hour)}$ = 10log(1/60)(10 seconds x $10^{0.1x67.5dB}$)

= 41.9 dB at 3 m distance

4.0 BASELINE NOISE SURVEY

4.1 NOISE SURVEY METHODOLOGY

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser (WYG31)	s/n	710471
Rion NL-52	Environmental Noise Analyser (WYG32)	s/n	810558
Rion NL-52	Environmental Noise Analyser (WYG33)	s/n	810559
Rion NC-75	Sound Calibrator	s/n	35270131

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of +0.1 dB dB was observed on meter s/n: 710471. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

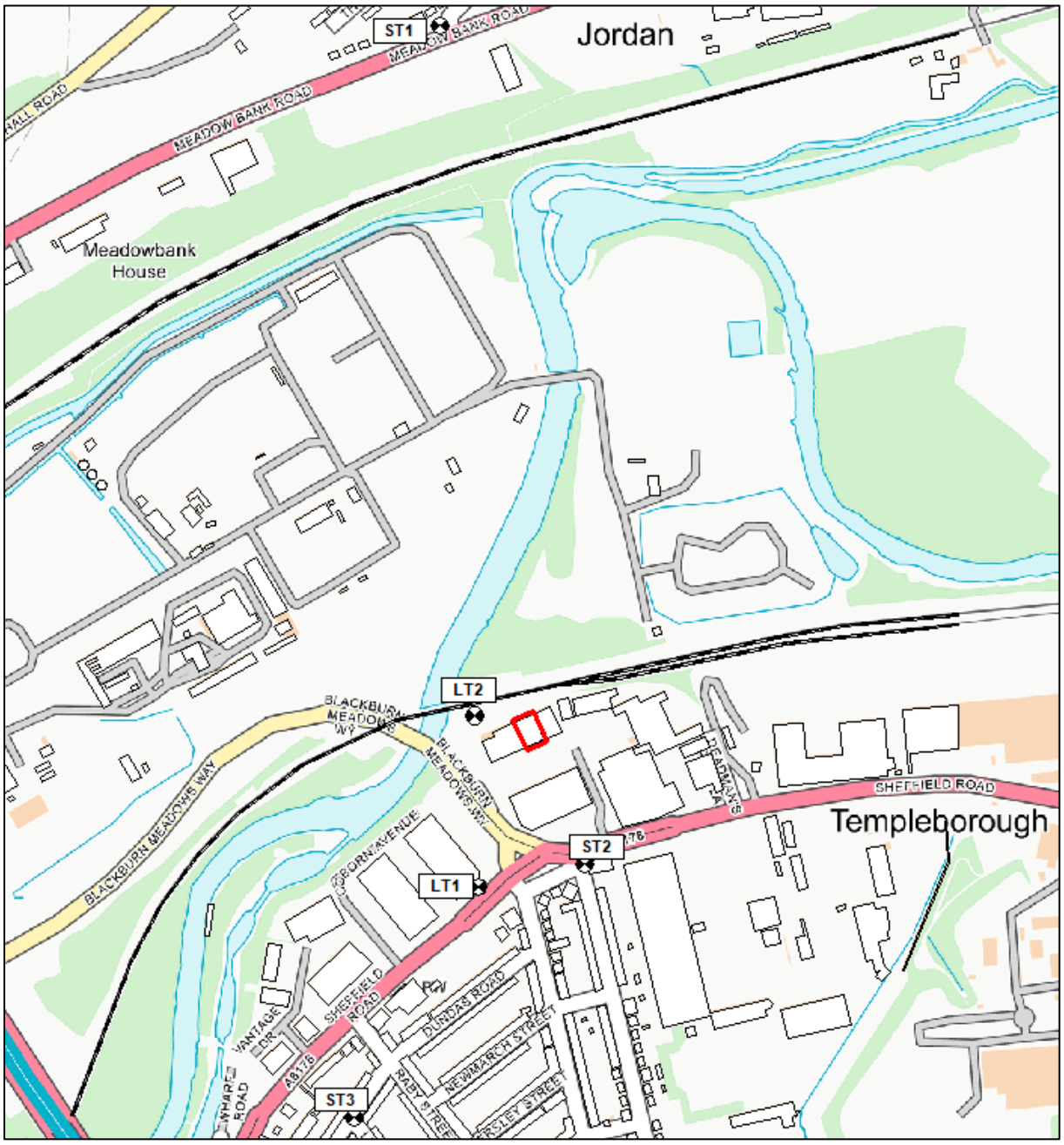
A baseline monitoring survey was undertaken at five locations (as specified in the following table and shown in Table 4.1) from Tuesday 4th October 2022 to Thursday 20th October 2022. Attended short term measurements were undertaken at three locations during day, evening and night-time periods with two additional locations being measured unattended over a 356-hour period (LT1) and 388-hour period (LT2). The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being clear and dry. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant south-westerly wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	Amongst roadside vegetation on Sheffield Rd, adjacent to 'ICD Europe' boundary. South-west of site.
LT2	Amongst vegetation just outside of the industrial site boundary, North-west of site.
ST1	Roadside on the western corner of South St and Meadow Bank Rd.
ST2	Roadside on the eastern corner of Ferras Rd and Sheffield Rd
ST3	Roadside on Dundas Rd, outside no.58.

Figure 4.1 Monitoring Locations



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4.2 NOISE SURVEY RESULTS

The dominant noise sources found in the area include road traffic noise from Meadow Bank Road, Dundas Road, Raby Street and Sheffield Road/A6178 and South Street.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the

measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	10/10/2022 14:36	14	0-1	NW	3	Road traffic noise on Meadow Bank Road and South Street.
Day ST2	10/10/2022 14:05	14	1-2	NW	3	Road traffic noise on Sheffield Road and Ferrars Road. Many HGVs/lorries/cars/vans passing.
Day ST3	10/10/2022 13:39	14	0-1	NW	3	Road traffic noise on Raby Street and Dundas Road. Distant traffic noise from A6178. Distant aeroplane noise.
Evening ST1	10/10/2022 21:43	8	0-1	SW	5	Road traffic noise on Meadow Bank Road. Infrequent traffic noise on South Street.
Evening ST2	10/10/2022 22:31	8	0-1	SW	5	Road traffic noise on Sheffield Road. Infrequent traffic noise on Ferrars Road.
Evening ST3	10/10/2022 22:08	8	0-1	SW	5	Road traffic noise on Raby Street and Dundas Road. Distant traffic noise from A6178.
Night ST1	10/10/2022 23:47	8	0-1	SW	5	Road traffic noise on Meadow Bank Road. Audible industrial noise from 'Blackburn Meadows Power Station'.
Night ST2	10/10/2022 23:02	8	0-1	SW	5	Road traffic noise on Sheffield Road. Infrequent traffic noise on Ferrars Road.
Night ST3	10/10/2022 23:23	8	0-1	SW	5	Infrequent road traffic noise on Dundas Road and Raby Street.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	220 Hours	04/10/2022 - 19/10/2022 11:10 - 07:25	LT1	69.7	100.1	44.9	72.9	60.0
Weekday Night-time 23:00 – 07:00	88 Hours	04/10/2022 - 19/10/2022 23:00 - 07:00		65.7	95.8	41.5	67.7	48.0
Weekend Daytime 07:00 - 23:00	32 Hours	08/10/2022 - 09/10/2022 & 15/10/2022 - 16/10/2022 07:00 - 23:00		68.2	96.9	45.3	71.0	56.0

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekend Night-time 23:00 – 07:00	16 Hours	08/10/2022 - 09/10/2022 & 15/10/2022 - 16/10/2022 23:00 - 07:00		64.1	93.2	42.2	64.5	48.0
Weekday Daytime 07:00 - 23:00	244 Hours	04/10/2022 - 20/10/2022 11:36 - 15:46	LT2	55.0	94.7	41.4	55.4	52.0
Weekday Night-time 23:00 – 07:00	96 Hours	04/10/2022 - 20/10/2022 23:00 - 07:00		50.9	80.6	39.6	50.2	46.0
Weekend Daytime 07:00 - 23:00	32 Hours	08/10/2022 - 09/10/2022 & 15/10/2022 - 16/10/2022 07:00 - 23:00		52.6	85.1	40.4	53.5	48.0
Weekend Night-time 23:00 – 07:00	16 Hours	08/10/2022 - 09/10/2022 & 15/10/2022 - 16/10/2022 23:00 - 07:00		50.4	80.9	40.6	49.6	46.0
Daytime 07:00 - 19:00	15 Mins	10/10/2022 14:36:02	ST1	70.1	83.0	51.0	73.3	59.4
	15 Mins	10/10/2022 14:05:09	ST2	69.1	81.6	55.8	72.3	60.6
	15 Mins	10/10/2022 13:39:04	ST3	58.0	72.5	53.9	59.3	56.1
Evening 19:00 - 23:00	15 Mins	10/10/2022 21:43:47	ST1	65.6	80.0	44.2	70.3	49.5
	15 Mins	10/10/2022 22:31:07	ST2	62.1	77.5	46.1	66.1	49.3
	15 Mins	10/10/2022 22:08:09	ST3	52.0	78.8	43.3	53.1	46.9
Night-time 23:00 - 07:00	15 Mins	10/10/2022 23:47:02	ST1	62.2	82.9	46.3	66.4	48.1
	15 Mins	10/10/2022 23:02:06	ST2	60.7	78.5	46.4	64.3	48.3
	15 Mins	10/10/2022 23:23:13	ST3	52.1	76.4	43.5	56.1	45.6

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

4.3 REPRESENTATIVE BACKGROUND NOISE LEVELS

Table 4.4 presents the representative background noise levels for each of the receptor positions and has been based upon the baseline noise survey data captured at the long-term positions of the baseline noise survey. The representative background noise levels will be used to inform the BS 4142 assessment in Section 5.2.2.

Table 4.4 Representative Background Noise Levels at Receptors

Receptor	Reference Measurement Location	Measurement Period	Representative Background Noise Level L_{A90} (dB)
R01	LT1	Daytime (07:00 – 23:00 hours)	56
R02			
R03			
R04			
R05			
R06	ST1		59
R07			
R08			

5.0 ASSESSMENT OF EFFECTS

5.1 OPERATIONAL NOISE ASSESSMENT

5.1.1 Operational Noise Assessment

The assessment compares the predicted noise levels from the Airbags UK facility with the representative background noise levels (L_{A90}) at the surrounding existing residential receptors. Table 5.1 & 5.2 presents the differences between the background noise level and noise rating level associated with the operation at the existing site and predictions for the proposed site inclusive of the new potential noise sources. Predicted noise propagation from the site is illustrated in Figure 5.1 at a height of 4 metres above ground.

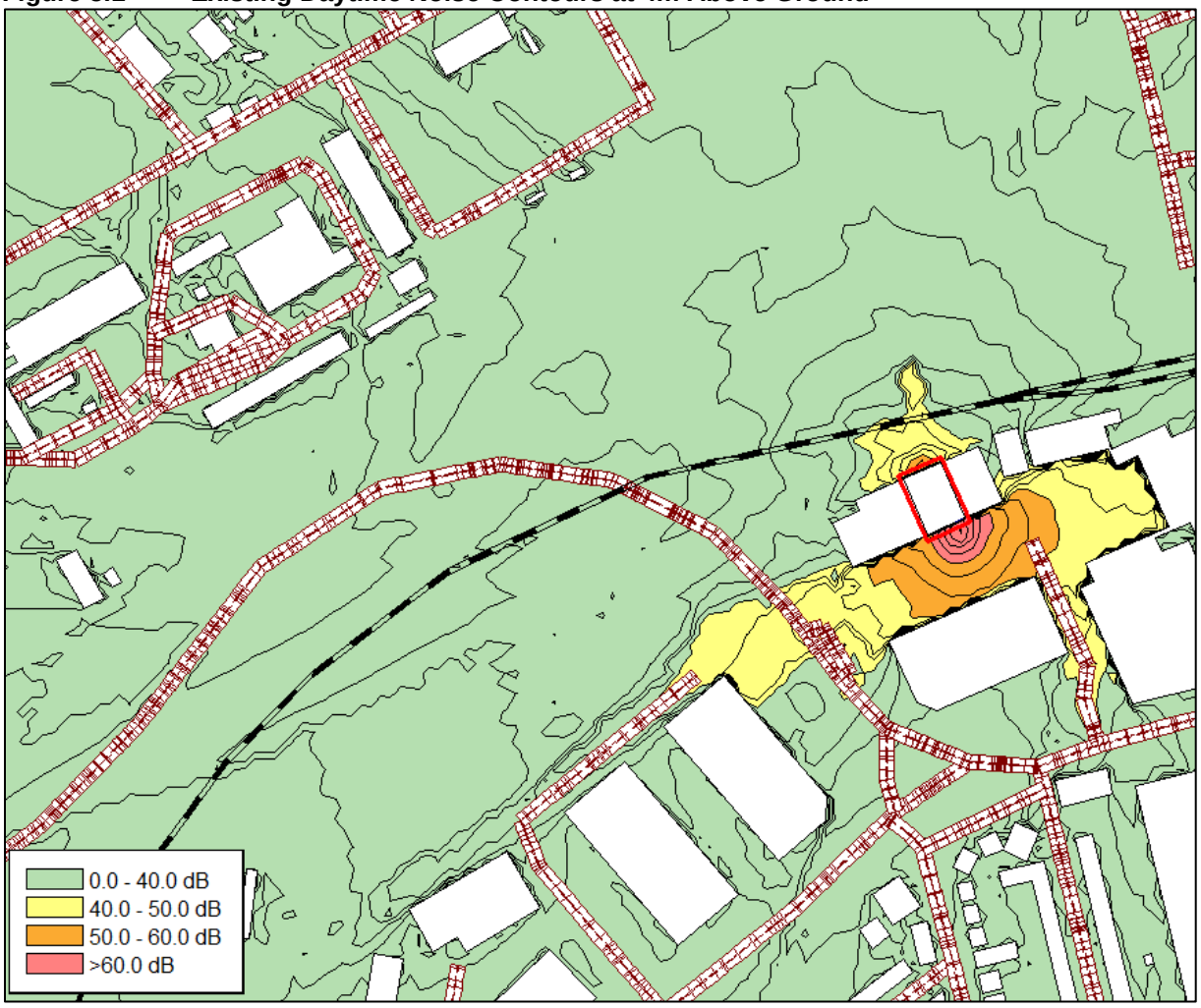
Impulsivity corrections (+6 dB) have been applied to the specific sound level to derive a rating level of plant, due to the nature of the activities on the site e.g. shredding and crushing of waste. This has again been chosen to present a robust assessment of operations of the site.

Table 5.2 Existing Operational Noise Assessment

Ref	Representative Background L_{A90}	Predicted Specific Noise Level ($L_{Aeq,Tr}$)	Noise Rating Level ($L_{A,Tr}$)	Difference between background and noise rating level
	Daytime (07:00 – 16:00)	Daytime	Daytime	Daytime
R01	56	24	30	-26
R02		30	36	-20
R03		26	32	-24
R04		25	31	-25
R05		28	34	-22
R06	59	15	21	-38
R07		15	21	-38
R08		19	25	-34

All values are sound pressure levels in dBA re: 2×10^{-5} Pa.

Figure 5.1 Existing Daytime Noise Contours at 4m Above Ground



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As shown in Table 5.1, existing noise rating levels are predicted to be contributing up to 20 dB below background noise levels. With reference to the operational noise criteria described in Section 2.1 of this report, a *Rating Level* of equal to background or below is an indication of a Low Impact and should not be considered significant.

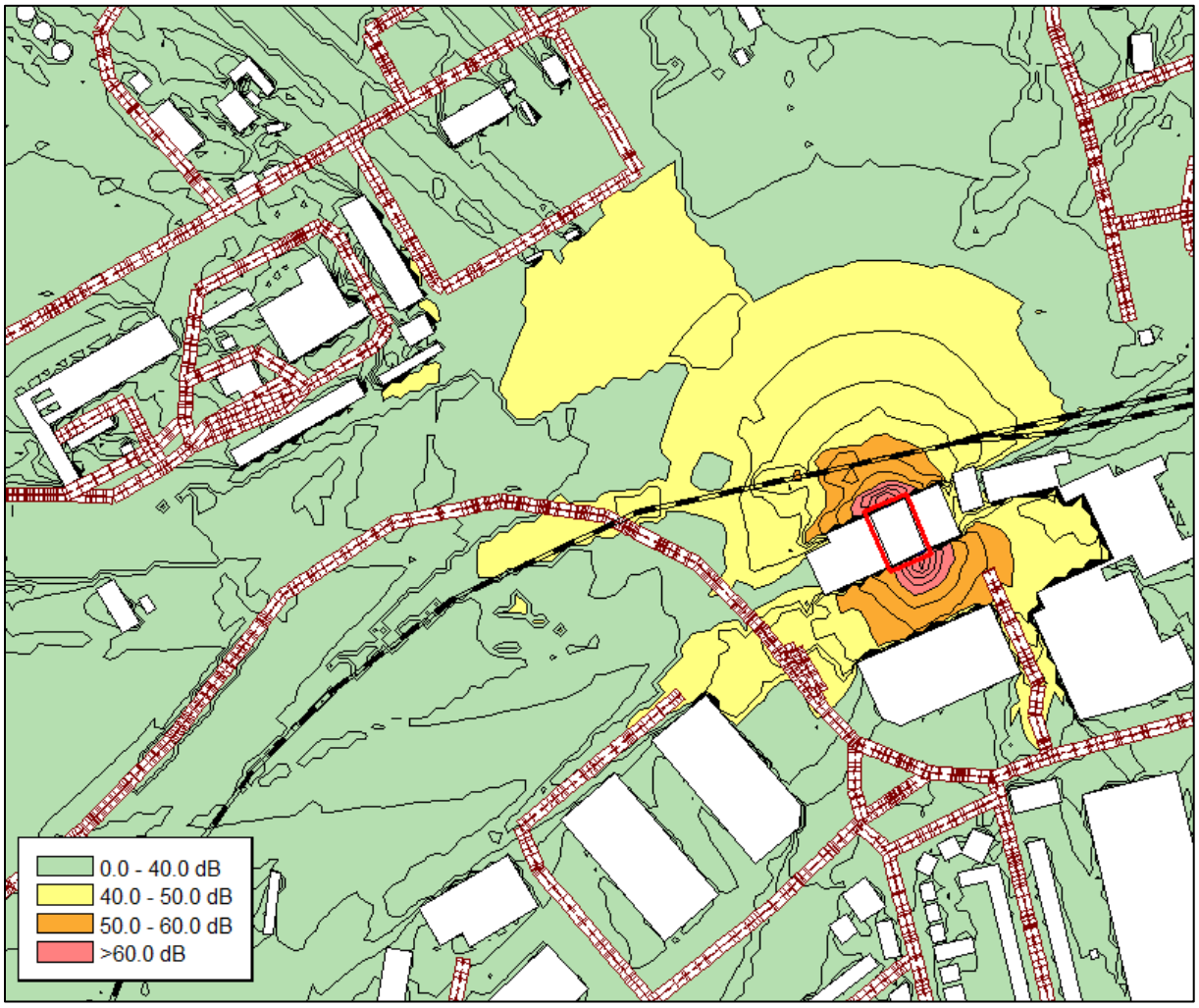
Table 5.2 Proposed Operational Noise Assessment

Ref	Representative Background L_{A90}	Predicted Specific Noise Level ($L_{Aeq,T}$)	Noise Rating Level ($L_{A,Tr}$)	Difference between background and noise rating level
	Daytime (07:00 – 16:00)	Daytime	Daytime	Daytime
R01	56	26	32	-24
R02		31	37	-19
R03		28	34	-22
R04		27	33	-23
R05		30	36	-20
R06	59	22	28	-31

Ref	Representative Background L_{A90}	Predicted Specific Noise Level ($L_{Aeq,T}$)	Noise Rating Level ($L_{A,Tr}$)	Difference between background and noise rating level
	Daytime (07:00 – 16:00)	Daytime	Daytime	Daytime
R07		23	29	-30
R08		24	30	-29

All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.

Figure 5.1 Proposed Daytime Noise Contours at 4m Above Ground



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As shown in Table 5.2, proposed noise rating levels are predicted to be contributing up to 19 dB below background noise levels. With reference to the operational noise criteria described in Section 2.1 of this report, a *Rating Level* of equal to background or below is an indication of a Low Impact and should not be considered significant.

6.0 CONCLUSIONS

This report presents the finding of a noise assessment undertaken on behalf of Airbags UK Ltd in relation to the extension of an environmental permit at the existing facility at Vantage Business Park, Tinsley, Sheffield, S9 1BG. The assessment is based on daytime operations and the background sound levels are representative of the site operating times.

Baseline measurements were undertaken at locations representative of nearby sensitive receptors to measure existing background noise levels. On-site measurements of the existing operations at the facility were also recorded to inform the noise propagation model and comparison to proposed operations.

Both existing and proposed assessments consider the breakout of the facility through the northern-facing vent and southern facing roller shutter door. Impulsivity corrections (+6 dB) have been applied to derive a rating level of plant, due to the nature of the activities on the site e.g. shredding and crushing of waste. No transmission loss was considered for these areas of breakout to assess a worst-case scenario.

The CadnaA noise propagation model has been informed using the on-site noise measurements undertaken at the UK Airbags facility. Using this measured L_{Aeq} levels from inside the facility an internal reverberant was calculated and used as breakout to replicate noise propagation from site.

Existing predicted rating level from the site operations is considered to be no greater than 20 dB below background noise levels at the Receptors, which is an indication of Low Impact.

Proposed predicted rating level from the site operations is considered to be no greater than 19 dB below background noise levels at the Receptors, this is also an indication of a Low Impact.

Therefore, an increase of 1 dB between the worst-case sensitive receptor in which the operations are 19 dB below the existing background level demonstrates that a low impact at closest residential receptors. This would demonstrate that no adverse effects to health and quality of life would occur from the proposed updated use of the site.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

An explanation of the specific acoustic terminology referred to within this report is provided below.

dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result, the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00 - 23:00}$.

L_{Amin} The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and

building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

An explanation of abbreviations used within this report is provided below.

CADNA – Computer Aided Noise Abatement
DMRB – Design Manual for Roads and Bridges
HGV – Heavy Goods Vehicle
UDP – Unitary Development Plan
UKAS – United Kingdom Accreditation Service

APPENDIX B – REPORT CONDITIONS

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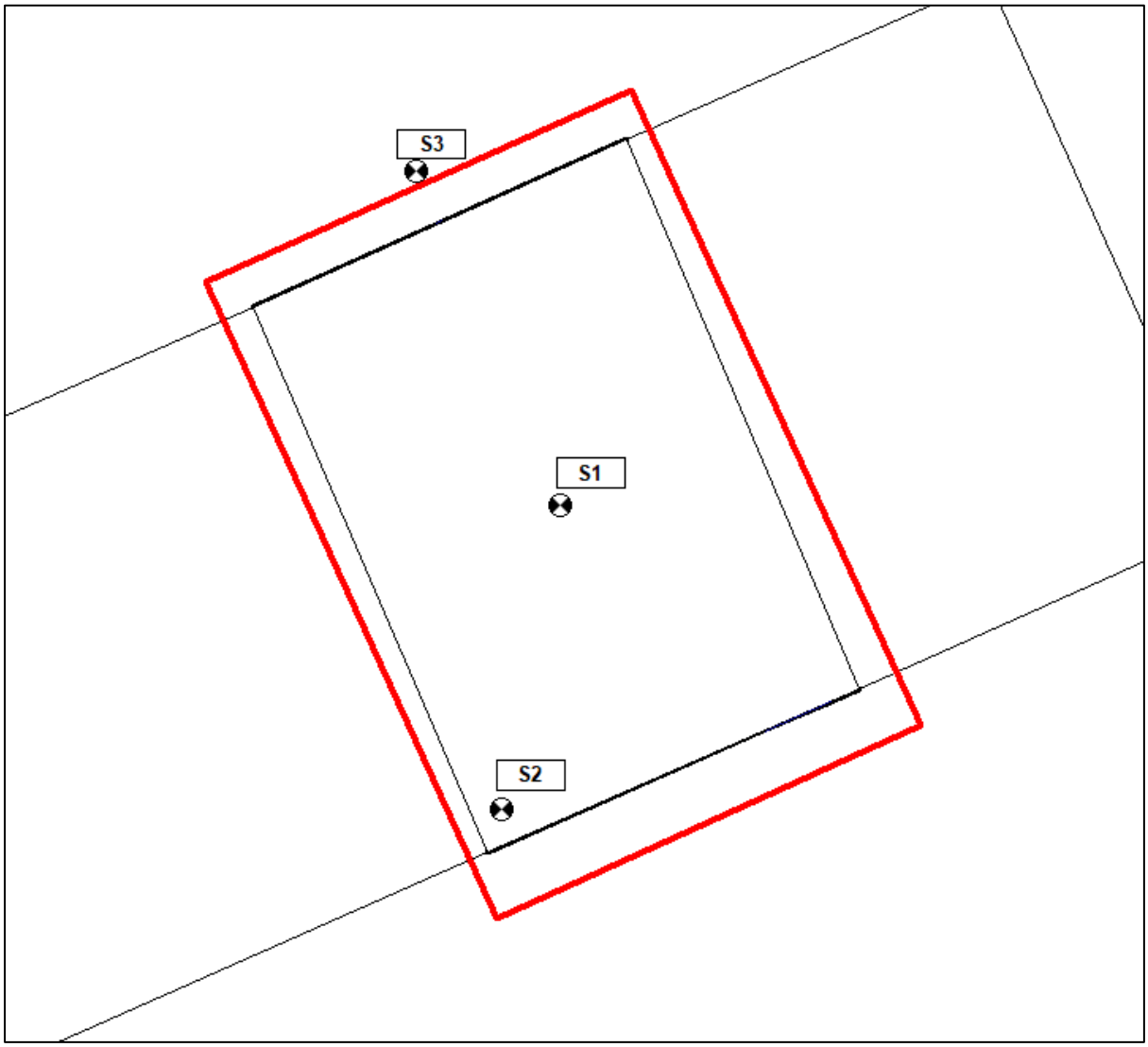
The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech Limited accept no liability for issues with performance arising from such factors.

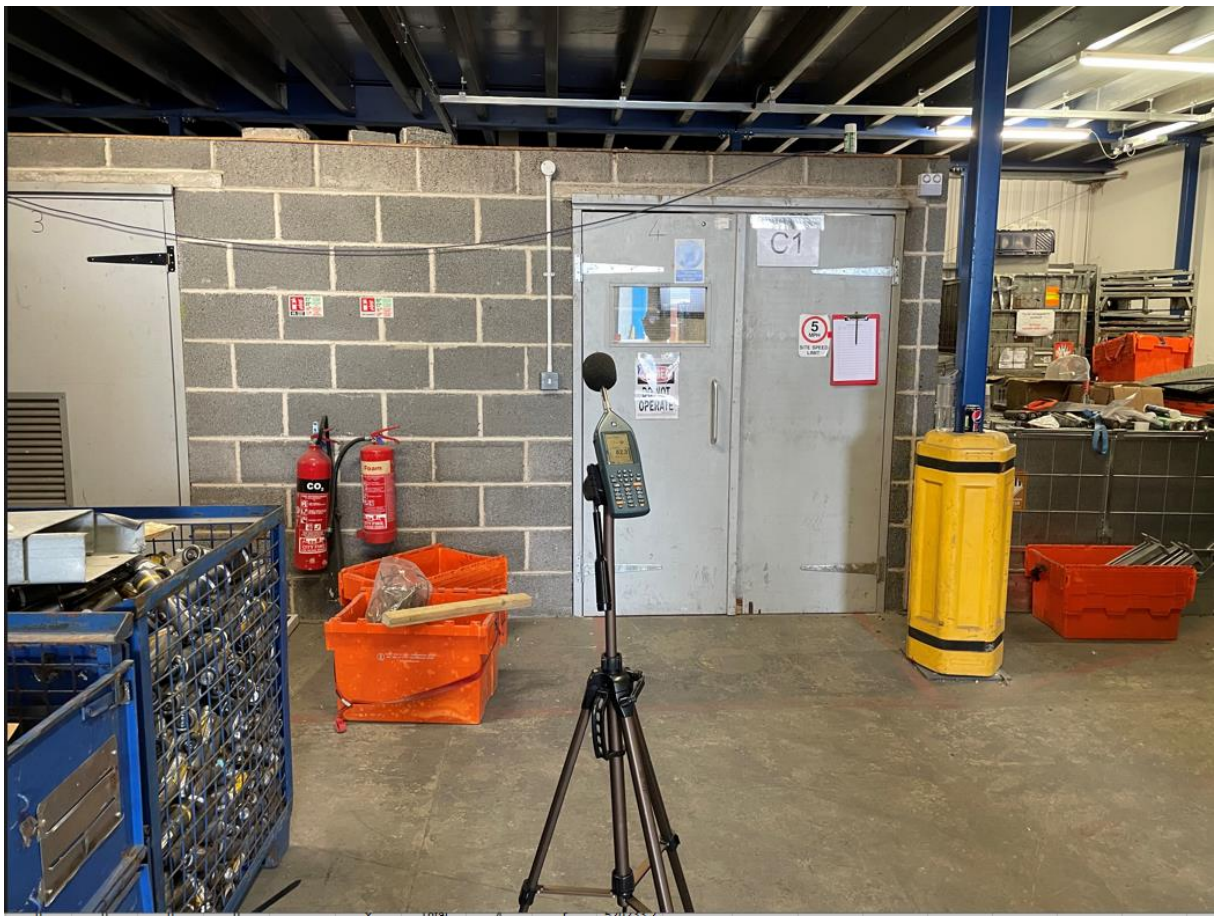
APPENDIX C – FIGURES

Figure C.1 Position of Source Noise Monitoring



APPENDIX D – SOURCE MONITORING LOCATION PHOTOS

S1 Position



S3 Position