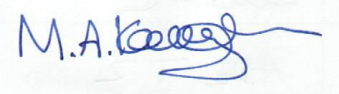
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NOISE ASSESSMENT
Proposed Extension
Reeves Tyre Centre, Spalding Road
Gosberton PE11 4HL

Report Date:	9th April 2024
Ref:	20240409 9563.Gosberton BS4142.docx
Site Visit by:	M A Kenyon
Site Visit:	2nd April 2024

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CONTENTS

1.0	INTRODUCTION	3
2.0	BACKGROUND TO ASSESSMENT	3
3.0	NOISE CRITERIA	6
4.0	MEASUREMENT PROCEDURE	10
5.0	MEASUREMENT RESULTS	11
6.0	PREDICTIONS	14
7.0	CONCLUSIONS	22
APPENDIX 1		24
APPENDIX 2		25
APPENDIX 3		26
APPENDIX 4		27

1.0 INTRODUCTION

On the instructions of Tulip Design, Martec Environmental Consultants Ltd carried out a noise assessment of a proposed extension at Reeves Tyre Centre, Spalding Road, Gosberton PE11 4HL.

This report considers appropriate assessment criteria, measurements of the existing noise climate, and predictions of the proposed operations on site based on a proposed building design and draws conclusions as to the acceptability of the proposals.

Acoustic terminology is explained at Appendix 1 of this report, the author's qualifications and experience are described in Appendix 2 and detailed measurement results appear at Appendix 3.

2.0 BACKGROUND TO ASSESSMENT

The situation is complex, in that there is the existing noise impact of the business, to which any impact of the extension would be added, also planning permission has recently been granted for a new residential development on the immediately adjacent site. The local authority reference for the, yet to be constructed, residential development is H08-0597-23 and it is understood that the consent was subject to any conditions covering the impact of noise on the new residents.

Figure 1 below is an extract from one of the drawings for the residential application, to which the location of the proposed extension, and the background monitoring location has been added.

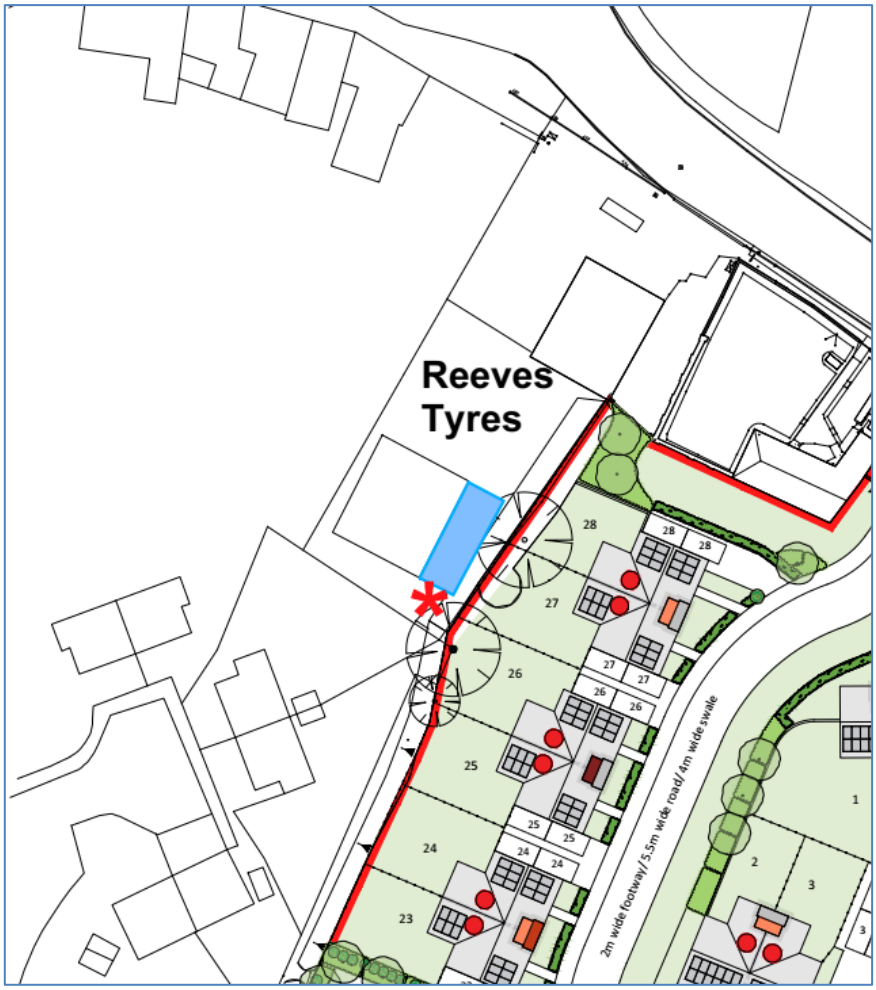


Figure 1: Proposed Residential Development Site Plan/Background Monitoring Position [RED *]/ Proposed Extension [Blue Box] from RDC Drawing 1308-8_PL_SP01

It is understood that the local authority's Planning Officer requested a noise assessment in the following terms:

"I have recently received consultee comments in relation to this proposal requesting the submission of an appropriate acoustic assessment, to be provided for the new MOT bay, that demonstrates suitable protect the amenity of nearby residents."

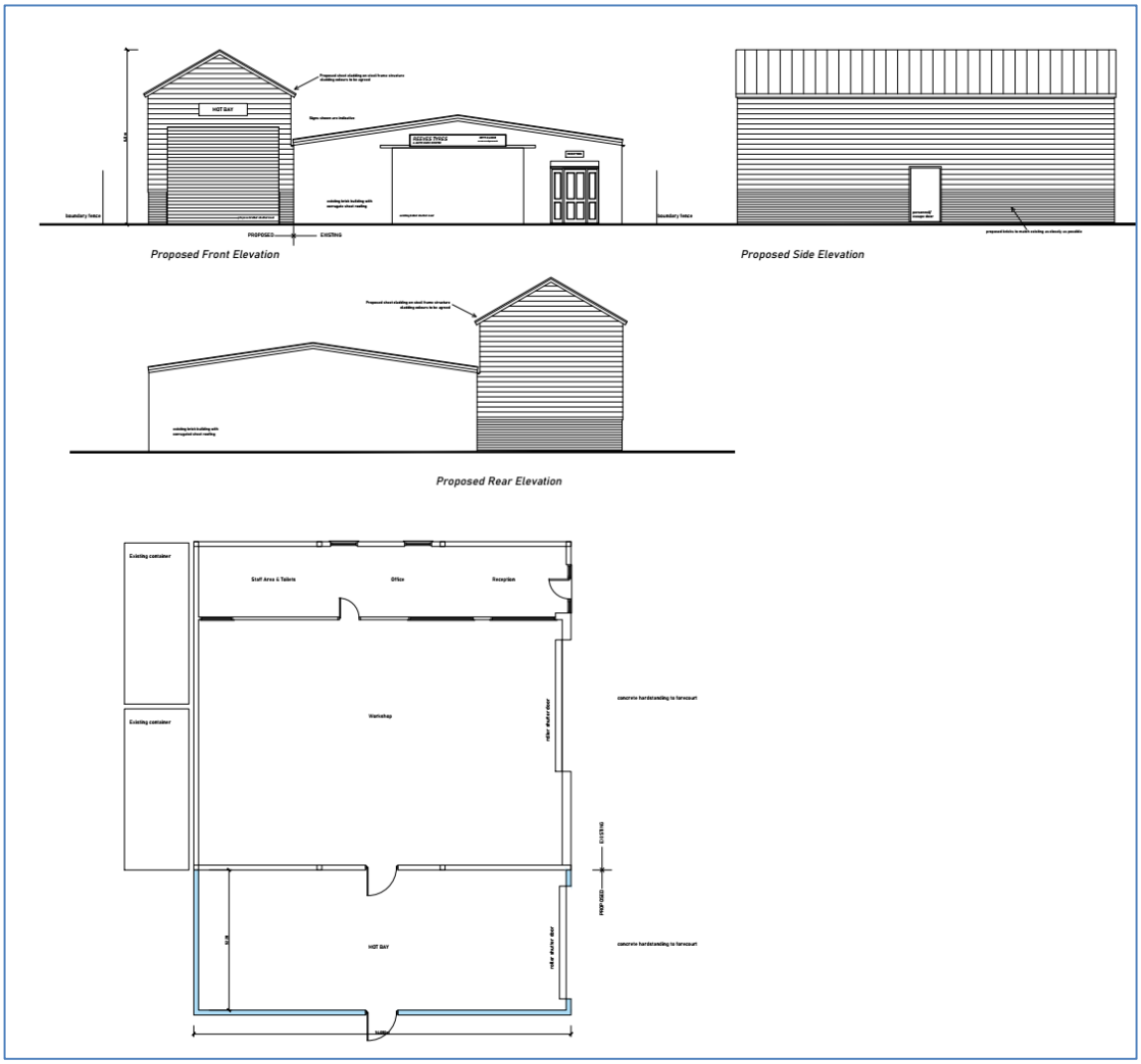


Figure 2: Proposed Building Plan from Tulip Design Drawing H08-1112-23Reeve Planning 01

3.0 NOISE CRITERIA

3.1 BS4142:2014+A1:2019 - Method for Rating and Assessing Industrial and Commercial Sound

BS4142:2014 states, "*Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood…This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature".*

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

A correction for character is made if ***"a tone, impulse or other characteristic occurs".*** For tonality, a correction of between +2dB and 6dB is considered acceptable and for impulsivity between 3 and 9dB. See table

below.

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

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

Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant, then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the

residual acoustic environment, a penalty of 3 dB can be applied."

The final figure, including any character correction is known as the Rating level.

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

"NOTE 1

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

NOTE 2

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

It would be usual to assess noise impact in external amenity spaces which are generally rear gardens.

3.2 Local Authority

Recently the local authority granted planning permission for a similar development also in Gosberton [H08-1220-22]; namely the "*Erection of 3 manufacturing units and part change of use from agricultural land to light industrial (change of use to accommodate Units 2 & 3).*" Consent was granted subject to the following noise condition:

"5. Noise from fixed plant and machinery shall not exceed a level of 5 dB(A) above the background noise level when measured as a L(A)eq15min at any residential boundary not within the applicant's ownership."

This appears to be the local authority's interpretation of the national guidance in Section 3.1 above, and we have assumed that the same condition would apply to the current application.

4.0 MEASUREMENT PROCEDURE

The instruments below calibrated correctly before and after the measurements and had been laboratory calibrated on a two-year schedule.

Model	Instrument	Serial No.	Lab Cal Certificate	Re-Calibration Due
A - Svan 957	Sound Level Meter	12308	1501102-1	13/11/2025
Svan SV12L	Preamp	13471	1501102-1	13/11/2025
GRAS 40AE Mic	Microphone	75146	1501102-1	13/11/2025
E Svan 957	Sound Level Meter	23202	1504880-3	20/03/2025
Svan SV12L	Preamp	33542	1504880-3	20/03/2025
MTG MK255	Microphone	15795	1504880-3	20/03/2025
B&K 4231	Calibrator	2084928	1504880-1	20/03/2025

Table 1: Instrumentation Used on Site

For the measurements of background noise, meter A above, was mounted in a RION WS02 "all weather" windmuff at the position shown in Figure 1 some 3m above local ground height [on top of an oil tank] to ensure free field conditions.

Meter E in Table 1 was fitted with a standard windmuff and handheld to be slowly swept through the reverberant sound field inside the existing premises in order to obtain a source noise level.

5.0 MEASUREMENT RESULTS

5.1 Background Noise Levels

The site was visited on the early afternoon of Tuesday 2nd April 2024 when the equipment was installed to make background noise measurements, which was then removed later that day.

There is a weather station in Gosberton that reports its results on Wunderground.com [ISPALD57] and Figure 3 below covers the monitoring period, when it can be seen that winds were light and from the southeast with no rain.

Road traffic was the main background noise source on installation and collection; the detailed results are as shown in Appendix 3. There is no indication that existing nearby industrial/commercial or construction operations were significantly contributing to background noise levels during the survey.

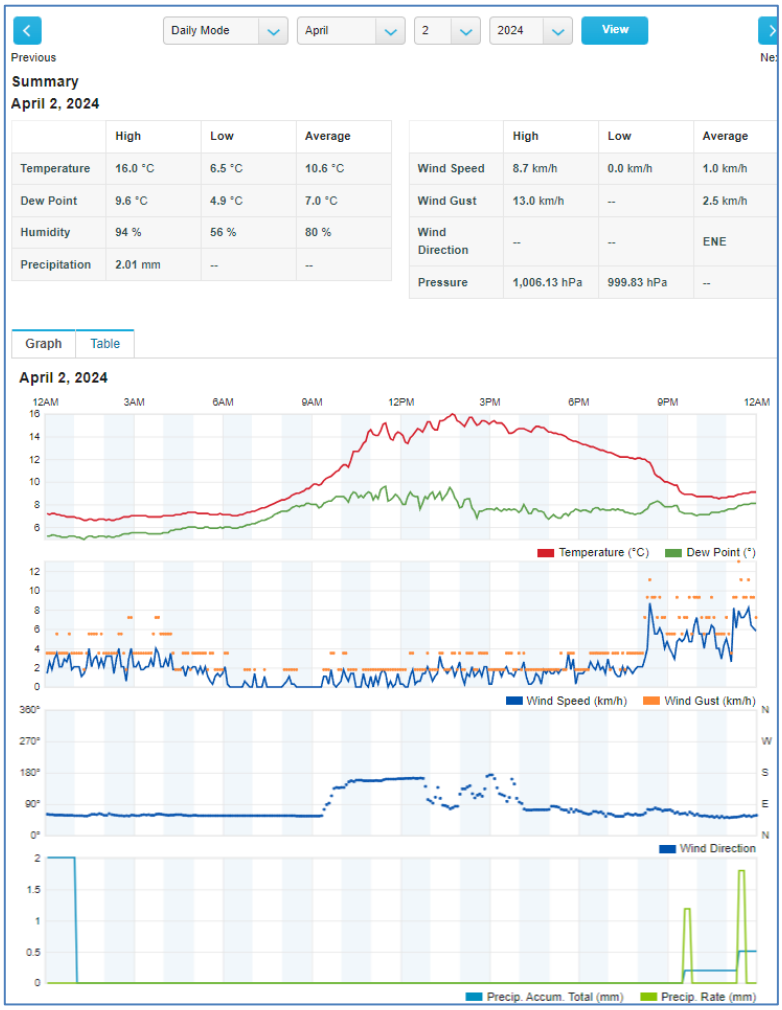


Figure 3: Weather Details During Monitoring

The arithmetic average of the results was 42 LA90; given the mode also at 42 LA90 in Figure 4 below it seems reasonable to assume a figure of 42LA90 [free-field] as being the representative background noise level based on the measurements.

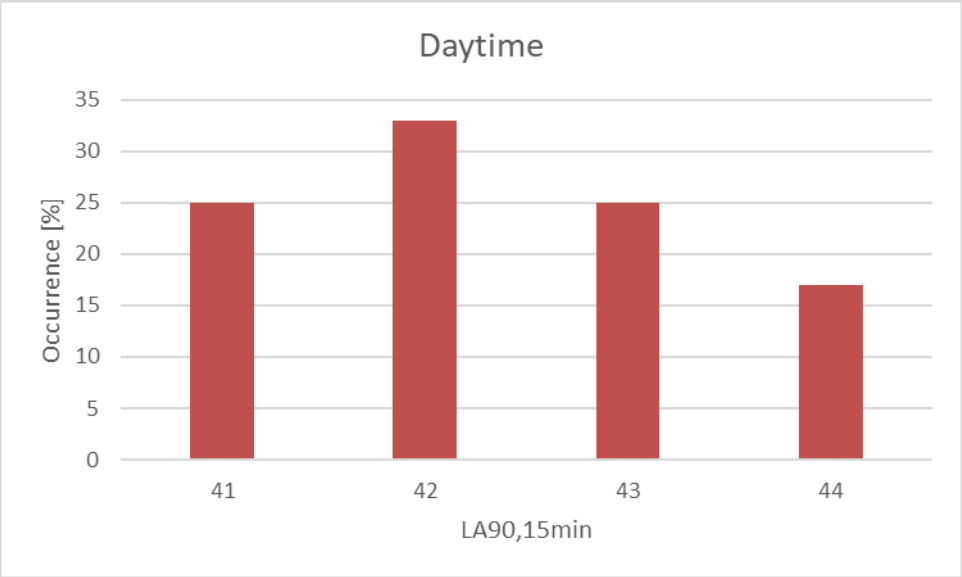


Figure 4: Background noise distribution [LA90,15m free field]

5.2 Source Noise

The extension has not yet been constructed but it is understood that eventually similar noise levels would be created in the extension as in the existing building. Accordingly, on the same day as the background noise measurements, measurements were also made of the 'typical' reverberant sound pressure level inside the existing building, which included the following noise sources:

1. Impact Gun
2. Compressor
3. Battery powered impact wrench [wheel nuts]
4. Tyre deflation, removal and reinflation

5. Angle grinder
6. Hydraulic lift
7. Engine idling & vehicle movement
8. Radio for approx. half of period.

The results were as shown in Table 2 below:

Duration	Lmax	Lmin	Leq	L1	L10	L50	L90	Octave Band Centre Frequency				
								125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz
00:33:39	95.2	39.9	71.9	83.4	73	59.3	49.1	63.9	66.2	65.2	64	66.3

Table 2: 'Typical' Reverberant Sound Pressure Level [dB]

6.0 PREDICTIONS

The final design of the buildings and construction materials have also not been determined at this stage. Therefore, it has been necessary to predict the noise impact on the basis of the following assumptions:

1. The buildings have been assumed to be constructed as shown in Figure 2 above.
2. Roller Shutter Doors have been assumed to be of no particular acoustic quality and to be kept closed during noise generating activities.
3. The profile metal sheeting used for the walls and roof has been assumed to be of no particular acoustic quality.
4. Any roof lights would have the same performance as the roof

panels or similar and approved. Alternatively, the unit would not be fitted with rooflights.

5. Personnel access doors would have some acoustic qualities and again would be kept closed during noise generating activities.
6. All noise generation has been assumed to take place within buildings with openings closed.
7. A 3m high acoustic fence is constructed along the eastern boundary of the site as shown in Figure 6 and with a sample construction as shown in Appendix 4.
8. The operation of the Unit and hence noise generation would take place during the normal working week, i.e. 8:30am to 5:30pm Monday to Friday and 8:30am to 12:30pm on Saturday.
9. The predictions assume that the extension produces the measured 'typical level' at the same time as the existing units is producing the same noise level; however, the predictions assume that the doors to the existing unit are fully open as found during the measurements.
10. Should any cooling or ventilation be required for the extension that it should be designed to achieve noise levels no higher than 10dBA below background. Consequently, there would be no significant contribution to overall noise levels.

Using the above measured internal level [Table 2] it is possible to predict the sound power level emitted per unit area of the extension front facade

for use in SoundPLAN as shown in Table 3 below; similar predictions have been undertaken for the walls and roof [not shown here].

Buliding Breakout Calcs					Octave Band Centre Frequency [Hz]				
Version 3.6					125	250	500	1k	2k
©2017 Martec Environmental Consultants Ltd				Internal Reverberant Spectrum (dBLin)	63.9	66.2	65.2	64	66.3
"Noise & Noise Control 2nd Ed" Sn 8.22 Method				Adjustment to a Given Level if required					
				Adjusted Internal Spectrum	63.9	66.2	65.2	64.0	66.3
Element	Addntnl Attntn	Dimension Lrgr	Dimension Smlr	Area If Diff	Element Sound Reduction Index [SRI]				
Upper Wall: Kingspan KS1000RW Manufacturer's data	0.0	5.0	4.0	13.9	18	20	24	20	29
Lower Wall: BS8233 Brick & Block External Wall		1.0	1.0	2.0	40	44	45	51	56
Windows: None					0	0	0	0	0
Rooflights: None					0	0	0	0	0
Doorway: Roller Shutter Door	0.0	3.7	3.7	15.0	6.6	14.8	18.9	24.8	17.8
Roof: None	0.0				0	0	0	0	0
Vents: None					0	0	0	0	0

		Octave Band Centre Frequency [Hz]				
		125	250	500	1k	2k
Façade Total Area	30.9					
Ave Transmission Coefficient		113.3	20.6	8.0	6.1	8.6
Ave SRI		9.5	16.9	20.9	22.1	20.6
Cd	-3.0					
L'w [SWL per unit area]		51.4	46.3	41.3	38.9	42.7

Table 3: Sound Power Level per unit area [dB/m2]

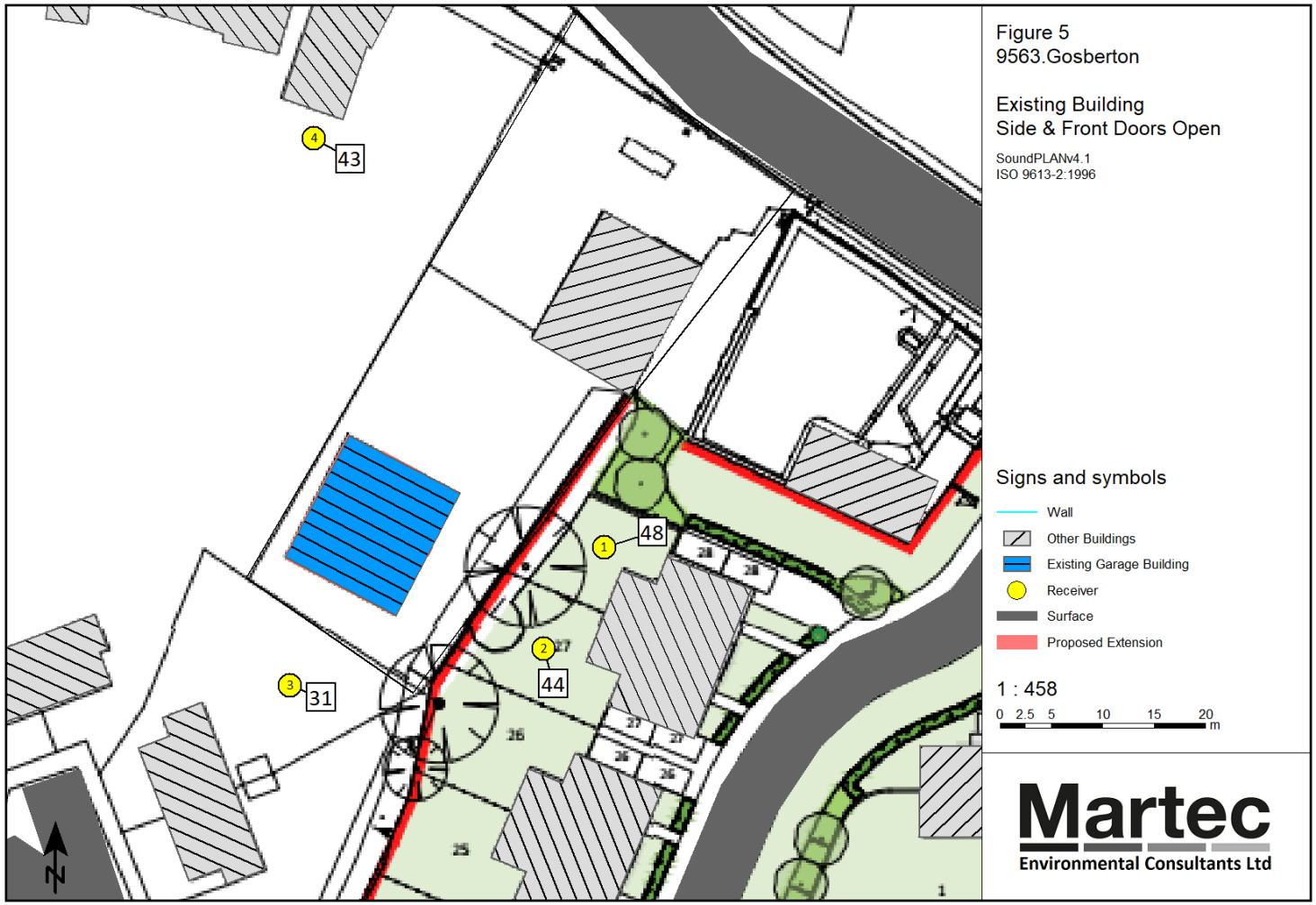
The predicted noise levels for the current situation are shown in Figure 5, where the highest predicted level of 48 LAeq would occur in the rear garden of the 'soon to be constructed' Plot 28. The highest level at an existing property is 43 LAeq at the rear of the dwellings to the north of the site.

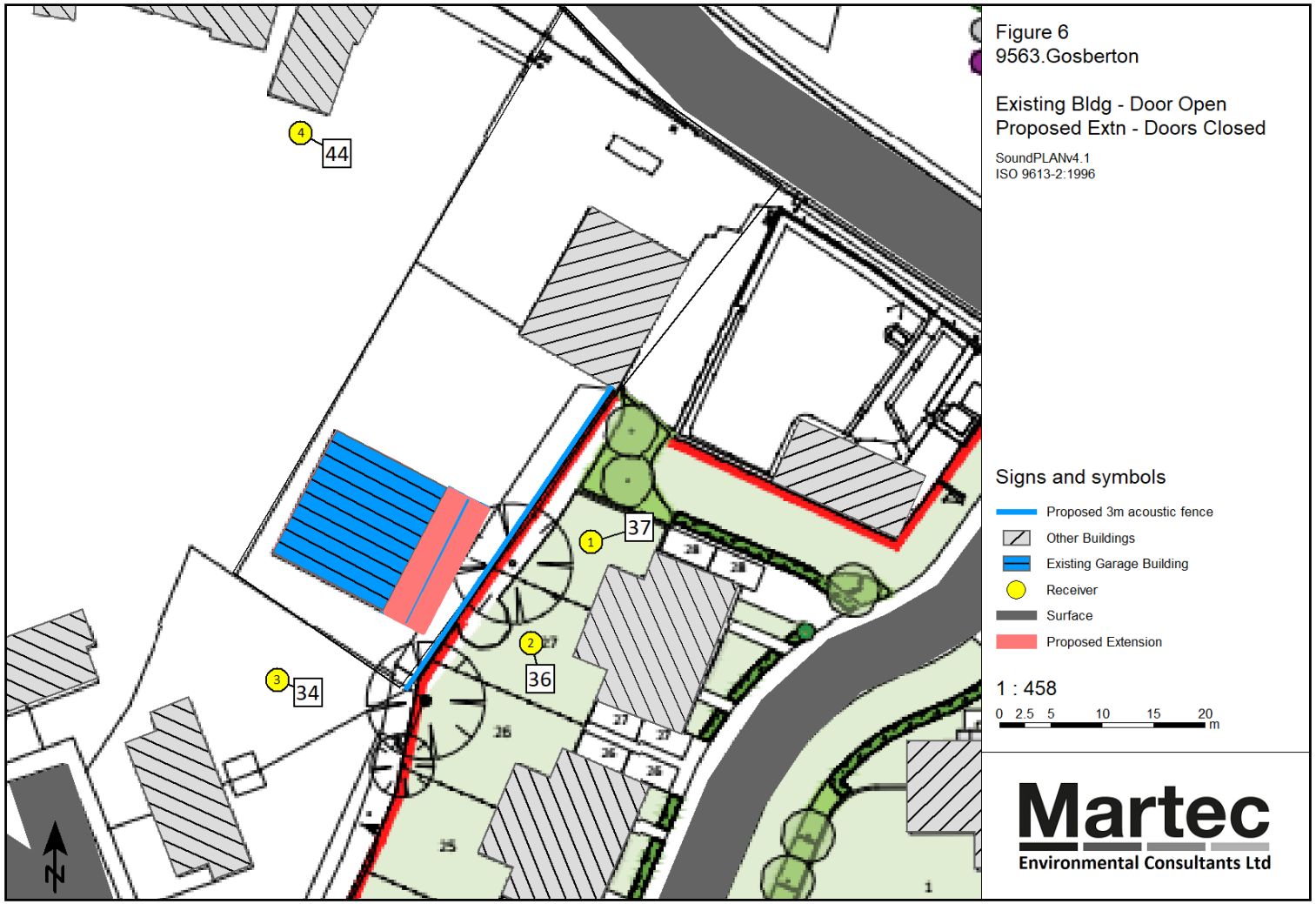
Predictions have then been undertaken of the combined impact of the existing garage and the proposed extension [see assumptions above], and the predicted impact at Plot 28 would fall to 37; whereas the impact at

the properties to the north would increase slightly to 44 LAeq.

Analysing the results more closely indicates that the fall in noise levels at the 'new' Plot 28 is noise from the **existing** building being reduced by the proposed acoustic fence and the slight increase in levels at the properties to the north is a result of more noise from the **existing** building being reflected back by the fence towards this location. At both these locations it is noise from the **existing** building that is the dominant noise source.

As an example at the properties to the north the combined predicted noise level would be 44 LAeq, but the contribution from the extension would be only 26 LAeq. Similarly at the new plot 28 the combined level would be 37 LAeq, but the contribution from the extension would be only 31 LAeq


Figure 5
9563.Gosberton
Existing Building
Side & Front Doors Open
SoundPLANv4.1
ISO 9613-2:1996
Signs and symbols
Wall
Other Buildings
Existing Garage Building
Receiver
Surface
Proposed Extension
1 : 458
0 2.5 5 10 15 20 m
Martec
Environmental Consultants Ltd
43
48
44
31
N


4
44
1
37
2
36
3
34
N
Figure 6
9563.Gosberton
Existing Bldg - Door Open
Proposed Extn - Doors Closed
SoundPLANv4.1
ISO 9613-2:1996
Signs and symbols
Proposed 3m acoustic fence
Other Buildings
Existing Garage Building
Receiver
Surface
Proposed Extension
1 : 458
0 2.5 5 10 15 20
m
Martec
Environmental Consultants Ltd

6.2 Assessment of the Noise

If we use the predicted noise level for the properties to the north and perform an assessment as per the local authority's noise condition [Section 3.2 above], the results appear as at Table 6 below:

Condition	Level
Measured/Predicted Ambient Level	44.0
Residual Level	0
Specific Noise Level	44
Tonal Correction	0
Impulsive Character	0
Other Character	0
Intermittancy	0
Rating Level [Specific + Character Correction]	44
Background Noise Level LA90	42
Excess over Background	2
Less than Indication of Adverse Impact, depending on the context	

Table 4: BS4142 Assessment – Properties to the north

6.4 Discussion of assessment

It is a requirement of the standard that factors affecting the assessment [uncertainty] are discussed:

1. The above assessment is based on a variable noise source; however, it has been assumed that the garage and extension

together would operating simultaneously, all day, at the typical level, i.e. *the assessment is likely to over-estimate the impact* of this source.

2. The background noise measurements were made at a relatively quiet time of year [April] which would tend to underestimate typical noise levels; set against this they are based on a single location on a single occassion, but from an examination of the sources of background noise [distant road traffic] it seems unlikely that they would vary significantly around the site, unlike had the sources of background noise been localised.
3. The above assessment is based on the combined impact of both the existing building and the proposed extension this is considered to be an overestimate of the extension alone.
4. Overall, the assessment is considered sufficiently robust, and demonstrates that appropriate noise limits can be met by the proposed extension; however, as with all such assessments it cannot demonstrate that the limits will be met under any and all circumstances; for example, were doors to be left open or working to take place outside the building.

7.0 CONCLUSIONS

Based on the measurements, the above assumptions and the available data, a BS4142 assessment indicates that garage operations conducted inside the proposed extension would NOT have a "significantly adverse impact" and the levels meet the local authority's previously applied criteria, which in turn indicates that consent can be granted for the development subject to suitably worded noise conditions.

The assumptions are set out in Section 6.1 above, most important of which are that the walls/roof and Roller Shutter Doors should have the following [Table 5 below] sound reduction indexes [attenuation], or similar and approved, that all doors are kept closed during noise generating activities and that a 3m acoustic fence should be erected in the position shown in Figure 6 constructed to the specification shown in Appendix 4.

Element	Example	Unit	Octave Band Centre Frequency [Hz]				
			125	250	500	1k	2k
Upper Wall	Kingspan KS1000RW Manufacturer's data	SRI	18	20	24	20	29
Lower Wall	BS8233 Brick & Block External Wall	SRI	40	44	45	51	56
Doorway	Roller Shutter Door	SRI	7	15	19	25	18
Roof	Kingspan KS1000RW Manufacturer's data	SRI	18	20	24	20	29
Access Door	Solid-core door, 40mm with perimeter and threshold seals	SRI	17	21	26	29	31
Windows	None	SRI	0	0	0	0	0
Rooflights	As Roofing	SRI	18	20	24	20	29

Table 5: Sound Reduction Index of Important Building Elements

REFERENCES

1. Section 8.22 of "Acoustics and Noise Control - 2nd Edition" - Smith, Peters & Owen - 1996.
2. BS.8233:2014 “Guidance on Sound Insulation and noise reduction for buildings.”
3. National Planning Policy Framework: http://www.communities.gov.uk/publications/planningandbuilding/nppf
4. BS.4142:2014+A1:2019 “Methods for Rating and Assessing Industrial and Commercial Sound”

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

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

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

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

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

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

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	25-30	Very Quiet
Quiet office	40-45	
Rural background noise	35-45	
Normal conversational level	55-65	
Busy restaurant	65-75	
Inside suburban electric train	70-80	
Hand clap @ 1m	75-85	
HGV accelerating @ 5m away	85-90	Very Loud

APPENDIX 2

QUALIFICATIONS AND EXPERIENCE OF M. A. KENYON

My full name is Melville Alexander Kenyon. I am the principal of the firm of Martec Environmental Consultants Ltd, a consultancy company that specialises in environmental noise assessment and control. I graduated in 1982 with a Bachelor's degree in Engineering and subsequently a Master's degree in Environmental Acoustics. I have been a corporate member of the professional body for noise and vibration specialists, the Institute of Acoustics, since 1988, and have sat on the British Standards Committee dealing with noise in buildings [BS.8233:1999].

I have lectured at Liverpool John Moores University on the Diploma of Acoustics course and at Manchester Metropolitan University on their Environmental Health degree course. I have been an MSc Dissertation Supervisor at The University of Manchester.

The firm of Martec Environmental Engineering was formed in the 1970's and joined The Association of Noise Consultants in 1996. It is now known as Martec Environmental Consultants Ltd.

Since its formation, Martec has advised many groups of both residents and developers about the problems of noise and vibration in the environment.

APPENDIX 3

Noise Measurements [dB free-field]

End date & time	Duration	LAmax,F	LAmin	LAeq	LA01	LA10	LA50	LA90
02/04/2024 12:18:14	00:15:00	79.6	36.7	51.6	61.1	52.7	48.2	44.3
02/04/2024 12:33:14	00:15:00	66.1	34.7	48.9	58.7	50.8	46.3	41.2
02/04/2024 12:48:14	00:15:00	69.1	34.4	49.1	58.5	51.3	46.7	40.7
02/04/2024 13:03:14	00:15:00	73.2	35.7	50.9	60.2	51.7	47	42
02/04/2024 13:18:14	00:15:00	60.2	34.9	47.4	54.4	49.9	46.1	41.5
02/04/2024 13:33:14	00:15:00	60.6	36.9	48.8	56.4	51.4	47.4	43.3
02/04/2024 13:48:14	00:15:00	64.7	36.7	51.4	59.8	55.5	48.4	43.7
02/04/2024 14:03:14	00:15:00	61.3	35.8	48.7	55.8	52	47.1	40.7
02/04/2024 14:18:14	00:15:00	62.3	35.6	48.1	57.2	50.9	46	41.8
02/04/2024 14:33:14	00:15:00	109.3	35.3	72.7	63.8	50.8	46.6	41.9
02/04/2024 14:48:14	00:15:00	62.4	38.3	48.7	57	51	47.3	43
02/04/2024 15:03:14	00:15:00	67.7	36.6	51.1	62.2	52.8	47.3	42.8

APPENDIX 4

Sample Acoustic Fencing Specification

