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NOISE ASSESSMENT

Clarke & Pulman

119 Garstang Road

Claughton on Brock PR3 0PH

Report Date:	14th September 2021
Ref:	20210914 9070 Claughton on Brock.docx
Local Authority Ref	21/00133/FULMAJ
Site Visit by:	M A Kenyon
Site Visit:	9th September 2021

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1.0 INTRODUCTION

On the instructions of M L Planning Consultancy Ltd, Martec Environmental Consultants Ltd carried out a noise assessment of a proposed development at Clarke & Pulman's premises at 119 Garstang Road, Claughton on Brock PR3 0PH [Local Authority Ref. 21/00133/FULMAJ]. It is understood that the local authority's Nick Clayton has requested an assessment in the following terms:

"Further information is needed from the applicant regarding the emissions of noise, from the proposed development.

A noise impact assessment is necessary with regard to the noise issues associated with the proposal e.g new car park and increased workshop capacity.

The noise impact assessment shall be carried out in accordance with the main procedural requirements of British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound. An assessment of the background (LA90,T) and residual (LAeq,T) noise shall be required to quantify the nature and levels of background noise at the nearest noise sensitive premises.

In addition to the above, the assessment shall include the highest evening and night-time LAmax of the proposed noise sources at the nearest noise-

sensitive premises.

Please note that any assessment shall be carried out for the most sensitive hours within the time period applied for."

Given that the new car park would be for employees, and behind other buildings, no assessment has been conducted of this source, similarly it is understood that the workshop would not operate at night or in the evening when LAmax predictions have been requested.

This report considers appropriate noise assessment criteria, measurements of the existing noise climate, predictions of the proposed operations at the site draws conclusions as to the acceptability of the proposals and makes recommendations for the fabric of the building.

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

2.0 SITE & OPERATION DESCRIPTION

Currently the proposed workshop building has not been constructed, so that this assessment is based on predictions of the impact. It is understood that the new building would contain similar operations to those currently undertaken on-site, i.e. the repair and maintenance of

agricultural vehicles and plant, along with pre delivery inspections of new and used vehicles being sold by Clarke and Pulman.

The site and location where the background noise measurements are were made in Beech Close are shown in Figures 1 and 2 towards the end of the report.

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."

4.0 MEASUREMENT PROCEDURE

The instruments below calibrated correctly before and after the measurements and had been laboratory calibrated on a two-year schedule except for the calibrator which is on a one-year schedule.

Model	Instrument	Serial No.	Lab Cal Certificate	Re-Calibration Due
H Svan 958A	4 channel Sound/Vib Analyser	69027	14014839-3	20/02/2022
Svan SV12	Preamp	7030	14014839-3	20/02/2022
B&K 4155	Microphone	1479113	14014839-3	20/02/2022
B&K 4231	Calibrator	2084928	00001202-1	31/03/2023

Table 1: Instrumentation Used on Site

For the measurements of background noise, the meter above, was mounted in a RION WS02 "all weather" windmuff and a pole at a height of 1.2m and located as shown in Figure 1 in free-field conditions [red text to left hand side].

5.0 MEASUREMENT RESULTS

5.1 Background Levels

The site was visited on Saturday 9th September 2021 at 8am when background noise levels were expected to be at their lowest, i.e. so that the "*…any assessment shall be carried out for the most sensitive hours within the time period applied for*"

The weather conditions were a temperature of around 15 degrees Centigrade, and a wind of Beaufort strength 1-2 with the direction difficult to discern. There was around 80% cloud cover. It is not considered that these conditions would have significantly affected the readings.

The free-field measurements were made at the location shown in Figure 1. The equipment was collected at 10:00hrs when background noise levels in the area had risen significantly.

Distant road traffic noise was the main background noise source during the monitoring, with the results shown in Table 2 below; the background levels for working hours [Mon-Fri 8am-6pm & Saturday am] have been statistically analysed as per Section 8.1.4 of BS4142 in Figure 2 below.

Date & End time	LAmax,F	LAmin	Laeq,15min	L01	L10	L50	L90
11/09/2021 08:15:00	76.0	35.6	52.5	63.3	55.7	43.6	37.8
11/09/2021 08:30:00	73.4	35.2	52.8	64.5	55.6	42.4	38.5
11/09/2021 08:45:00	68.6	36.1	53.1	63.0	57.9	46.2	39.8
11/09/2021 09:00:00	86.9	37.1	54.9	62.5	56.3	45.4	39.8
11/09/2021 09:15:00	69.0	36.4	51.8	61.7	55.5	45.8	40.1
11/09/2021 09:30:00	66.5	37.9	52.1	61.3	56.4	47.5	41.2
11/09/2021 09:45:00	66.7	39.9	53.2	62.4	57.4	48.7	42.5
11/09/2021 10:00:00	71.5	40.1	55.5	65.8	58.9	51.5	43.6

Table 2: Free-Field Background Noise Levels

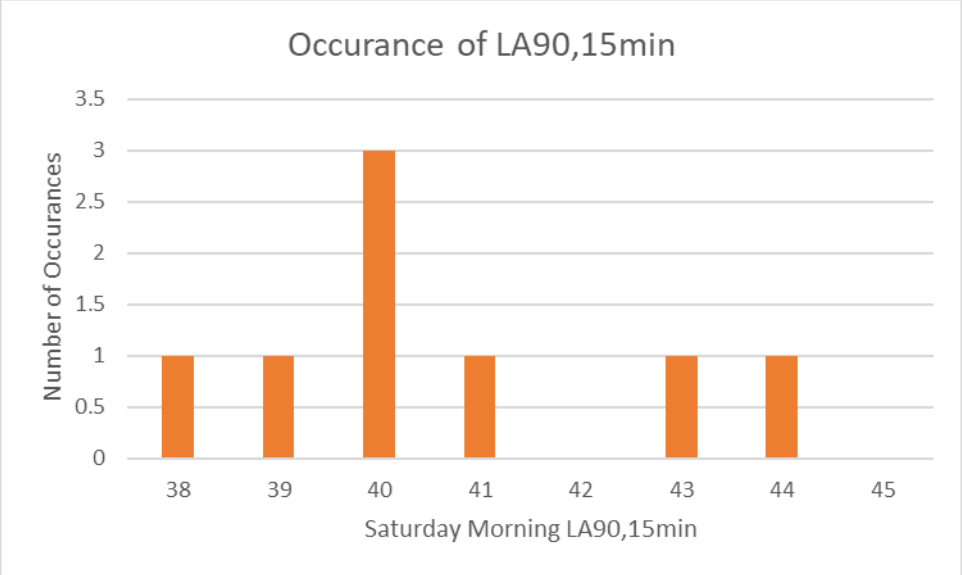


Figure 0: Statistical Analysis of Background Levels

5.3 Source Noise Levels

The following results were obtained at similar service/repair facilities using appropriate instrumentation; the results have been combined with typical tool usage to produce a predicted level for a typical day as shown in Table 3 below:

Metric	Octave Band Centre Frequency [Hz]					LAeq	Typical
	125	250	500	1k	2k		min/day
Compressor	69.7	66	68.5	67.9	62.7	71.1	60
Ingersol Rand Nut Runner	59.3	58.2	62.2	67.8	72.8	75.1	60
9in Makita Elec Grinder	58.0	66.1	70.7	74.9	80.6	82.8	60
Mig Welding MIG Star 330-C	59.1	55.0	56.3	62.1	65.0	67.8	120
Hammer on Chassis	55.8	57.1	67.8	73.1	76.4	79.1	8
4.5in Makita Elec Gridner	62.4	54.3	61.8	70.5	76.3	78.3	60
Daily Average	**62.5**	**60.8**	**64.7**	**68.3**	**73.3**	**75.6**	**368**

Table 3: Reverberant Sound Levels inside Repair/Service Facility [dB LAeq]

Given the size and type of facility, it is considered likely that there will be some periods of the day when no significant noise is generated; similarly, the levels of noise during any one hour, when work is being carried out in the building, would be very variable and dependent very much on work demands.

The bottom line in Table 3 represents the average noise level over the course of a working day.

6.0 ASSESSMENT

6.1 Background Noise Levels

From Table 2, the average LA90 reading for early Saturday morning was 40 LA90 as was the clear modal value from Figure 0 accordingly, this figure of 40 LA90 has been used to represent background levels during the most sensitive operating hours.

6.2 Predicted Noise Levels

The internal reverberant levels in Table 3 can be used with SoundPLANv4.1 to predict likely noise levels close to the proposed dwelling.

Please note and inform Martec if any of the following assumptions are incorrect:

1. The windows and doors of the workshop would be closed during noise generating activities.
2. There are no definite occupants of the units at this stage, so the assessment has been performed on the basis of typical occupancy as outlined in Section 5.3 above.
3. We were not able to establish the acoustic performance of the currently proposed roller shutter doors so a performance has been specified below, which the whichever units are selected will have to meet.
4. The roof and walls would be clad with Kingspan KS1000RW panels or similar and approved.
5. Any roof lights would have the same performance as the roof panels or similar and approved.
6. Any ventilation or extraction systems are designed and installed so as to achieve a level which does not contribute to the predicted noise level, which would be by means of appropriate attenuators and/or

siting.

7. Operations and hence noise generation takes place during the normal working week, i.e., 8am to 6pm Monday to Friday and 8am to midday on Saturday.

The sound power level emitted per unit area of the front [north] facade has been predicted as shown in Table 4; similar predictions have been undertaken for the front and rear facades [not shown here]. These figures have then been used with a computer model built using SoundPLANv4.1.

Buliding Breakout Calcs					Octave Band Centre Frequency [Hz]				
Version 3.3					125	250	500	1k	2k
©2017 Martec Environmental Consultants Ltd				Internal Reverberant Spectrum (dBLin)	62.5	60.8	64.6	68.2	73.2
"Noise & Noise Control 2nd Ed" Sn 8.22 Method				Adjustment to a Given Level if required					
				Adjusted Internal Spectrum	62.5	60.8	64.6	68.2	73.2
Element	Addntnl	Dimension		Area					
Southern Wall	Attntn	Lrgr	Smlr	If Diff	Element Sound Reduction Index [SRI]				
Kingspan KS1000RW Manufacturer's data	0.0	50.0	8.0	246.0	18	20	24	20	29
Near Wall									
None					0	0	0	0	0
Windows									
None					0	0	0	0	0
Rooflights									
None					0	0	0	0	0
Doorway									
Roller Shutter Door	0.0			154.0	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					
				Ave Transmission Coefficient	94.0	18.9	7.4	7.4	7.2
				Ave SRI	10.3	17.2	21.3	21.3	21.4
				Cd					
				L'w [SWL per unit area]	49.2	40.6	40.3	43.9	48.8

Table 4: Sound Power Level per unit area [dB/m^2]

Using SoundPLAN, the noise levels at nearby properties have been

predicted in Figure 2 towards the rear of the report and the noise contours are shown in Figure 3.

As this is a daytime noise source, the predictions have been conducted for the ground floor, except for the small block of three story flats in Beech Close, where the predictions have been undertaken for each level.

It can be seen that the most affected location are the new properties currently under construction just south of the proposed new workshop; here the highest level would be 31 LAeq façade which is equivalent to 28 LAeq free-field.

6.3 **Character Correction**

It will be recalled that the estimated background noise level at the nearest property is 40 dB LA90, i.e. background noise would be more than 10dB louder than the source noise levels [28 LAeq free-field see above]; therefore, it is considered that the noise would be unlikely to be perceived as either tonal or impulsive.

However, as a precautionary measure if we assume that the operational noise is just perceptible as tonal, impulsive, and intermittent and apply the appropriate corrections.

6.4 Assessment of the Noise

If we use the highest predicted noise level from Figure 3 and perform an assessment, the results appear as shown in Table 5 below:

Condition	Level
Measured/Predicted Ambient Level	27.7
Residual Level	0
Specific Noise Level	28
Tonal Correction	+2
Impulsive Character	+4
Other Character	0
Intermittancy	+3
Rating Level [Specific + Character Correction]	37
Background Noise Level LA90	40
Excess over Background	-3
Indication of Low Impact, depending on the context	

Table 5: BS4142 Assessment – Nearby Dwellings

6.5 Discussion of assessment

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

1. BS.4142 assessments are based on using a single hour to represent the specific noise level [noise being investigated] compared with single figure to represent background noise levels; background noise levels often vary significantly and the standard outlines a

procedure to select the representative [not the worst case] figure to represent the background; unfortunately no guidance is given when the specific noise level varies very significantly; however, it must be assumed that a "representative" specific noise level should also be selected [i.e., not the worst case]; here there is likely to be a wide variation in hourly noise levels; consequently, the specific noise level has been predicted on the basis of the average noise level across a day when the tools are all used at their typical levels. Naturally there will be many working days and hours of working days when this approach will result in an overestimate of the impact and conversely some occasions when this would be an underestimate.

2. The assessment is based on our understanding of typical tool use in such facilities; however, it is worth noting that for the local authority's noise limit [as we understand it] noise from the building would have to increase by more than 7 dB, i.e. significantly more use of equipment that we have assumed. This seems unlikely.
3. As set out in Section 6.3 above, the character corrections applied to the noise are very conservatively selected.
4. Overall, the assessment is considered sufficiently robust, and demonstrates that appropriate noise limits can be met; however, as with all such assessment they 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

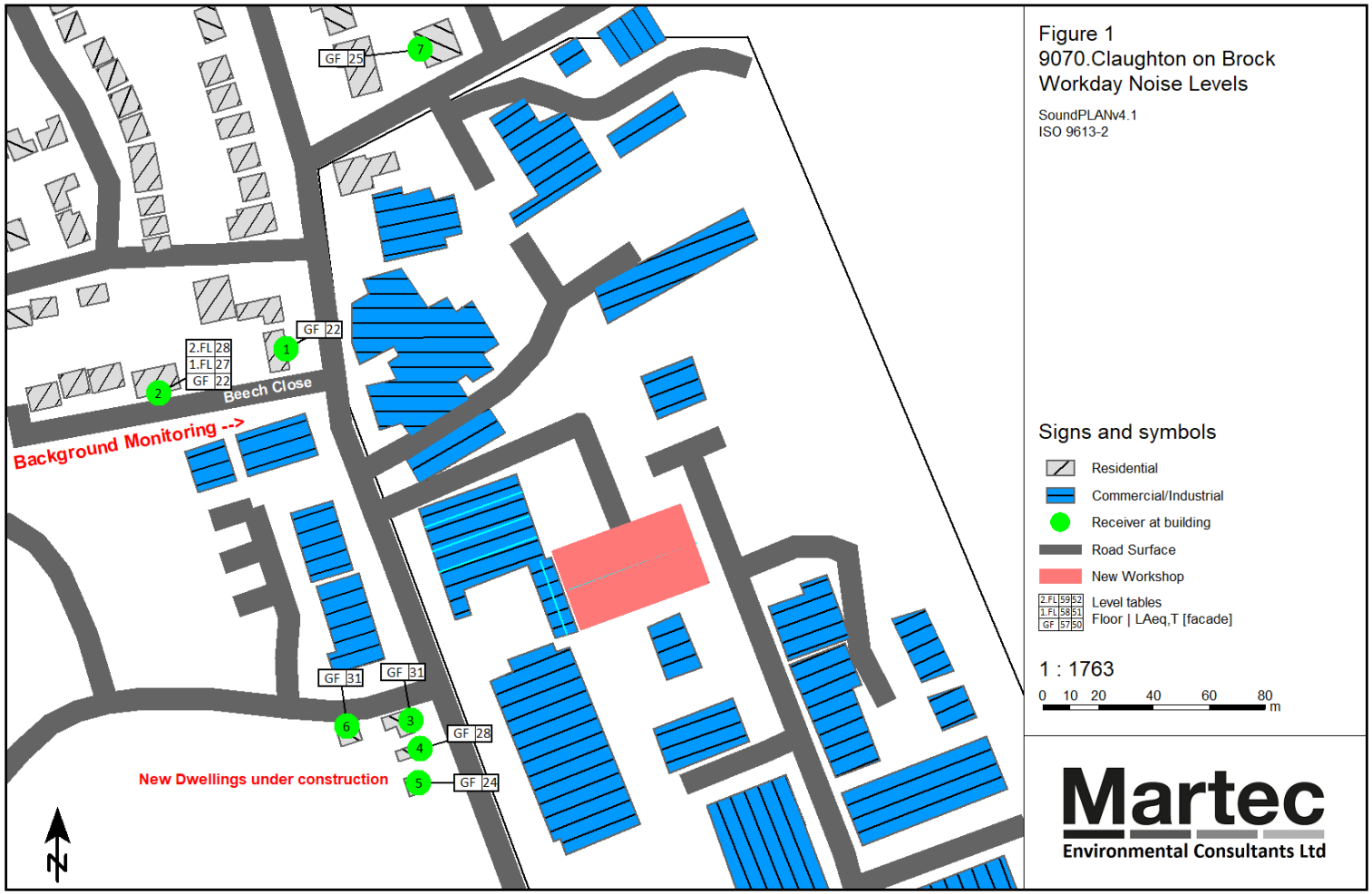
Based on the measurements, above assumptions and the available data, a BS4142 assessment indicates that industrial operations conducted inside the proposed building, would have a "Low adverse impact", which in turn demonstrates that the noise impact should not bar the grant of planning consent for the development.

The elements of the new building should have the following sound reduction indexes [attenuation], or similar and approved, as shown in Table 6:

Element	Example	Octave Band Centre Frequency [Hz]				
		125	250	500	1k	2k
Roof & Wall Panels	Kingspan KS1000RW Manufacturer's data	18	20	24	20	29
Rooflights [if any]	Unknown	18	20	24	20	29
Roller Shutter Doors	Unknown	7	15	19	25	18
Personel Access Doors	Solid core wood door, no seals around perimete	**19**	**22**	**26**	**24**	**23**

Table 6: Sound Reduction Index of Important Building Elements

In addition, any extract/ventilation system[s] should be designed so as not to exceed a level of 40 LAeq [free field] at the nearest properties.


GF 25
7
GF 22
1
2.FL 28
1.FL 27
GF 22
2
Beech Close
Background Monitoring -->
GF 31
GF 31
6
3
GF 28
4
New Dwellings under construction
5
GF 24
N
Figure 1
9070.Claughton on Brock
Workday Noise Levels
SoundPLANv4.1
ISO 9613-2
Signs and symbols
Residential
Commercial/Industrial
Receiver at building
Road Surface
New Workshop
2.FL 59 52
1.FL 58 51
GF 57 50
Level tables
Floor | LAeq,T [facade]
1 : 1763
0 10 20 40 60 80 m
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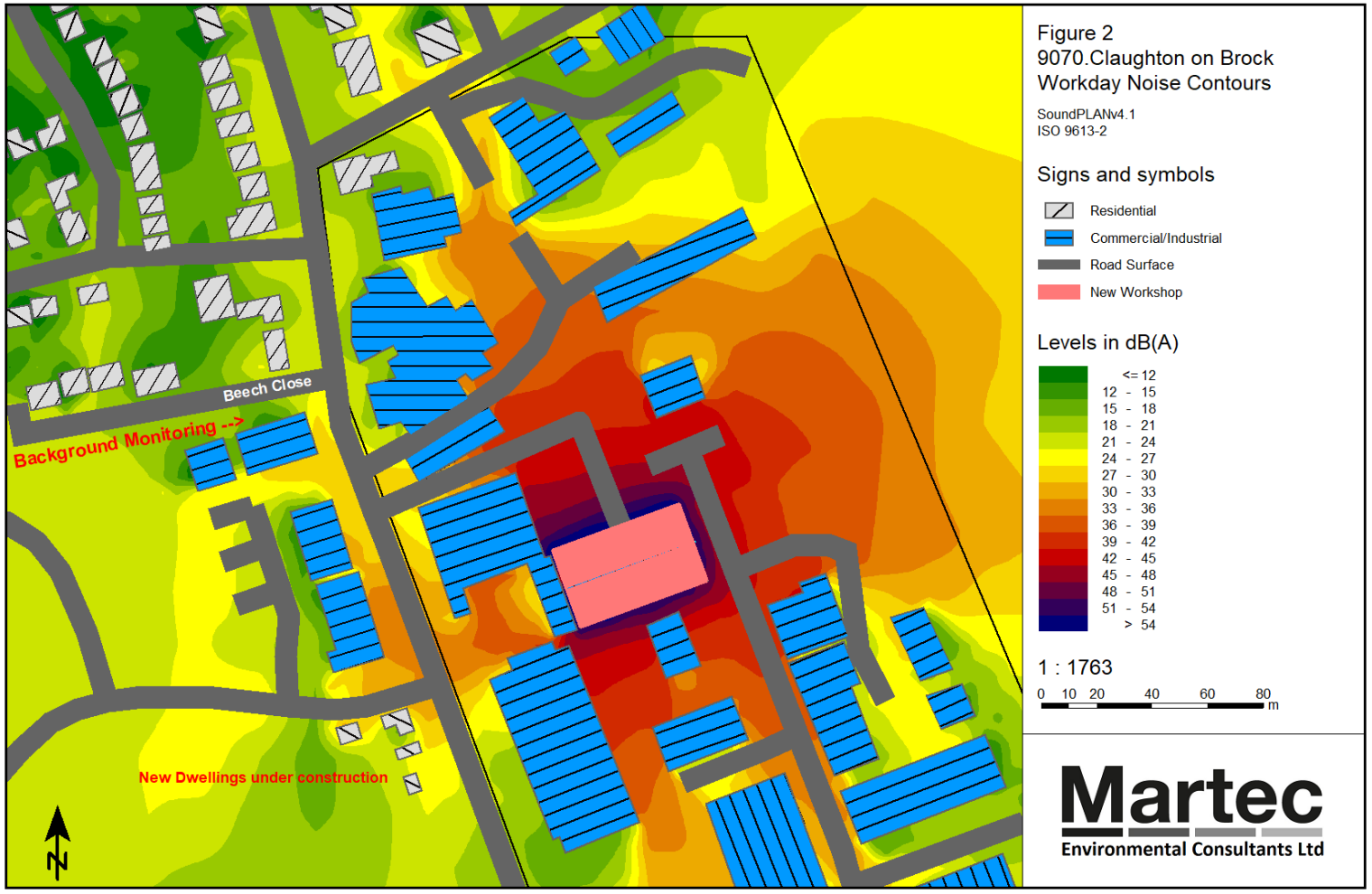
Beech Close
Background Monitoring -->
New Dwellings under construction
N
Figure 2
9070.Claughton on Brock
Workday Noise Contours
SoundPLANv4.1
ISO 9613-2
Signs and symbols
Residential
Commercial/Industrial
Road Surface
New Workshop
Levels in dB(A)
<= 12
12 - 15
15 - 18
18 - 21
21 - 24
24 - 27
27 - 30
30 - 33
33 - 36
36 - 39
39 - 42
42 - 45
45 - 48
48 - 51
51 - 54
> 54
1 : 1763
0 10 20 40 60 80
m
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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 “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.

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.