



27 LLYS WALSH,

RHYL, LL18 4FR

www.redfansolutions.co.uk

info@redfansolutions.co.uk

Reference:	Saltbox Business Park (Unit 9)
Site Address :	RMG Saltbox Business Park, Bogner Regis, Sussex
For:	MCS Group
Client Address:	Haywood Road, Warwick, CV34 5AH
Report no:	22-217
Date of Report:	08/08/2022
Author:	Andrew Hunt
Scope of Work:	Acoustic report of external plant equipment to comply with planning conditions.

This report has been prepared by REDFANSolutions with all reasonable expertise, care and diligence. The survey and report have been undertaken in accordance with accepted acoustic consultancy principles, it takes account of the services and terms and conditions agreed verbally and in writing between REDFANSolutions and our client. Any information provided by third parties and referenced is considered to have undergone suitably thorough third-party checks to ensure accuracy. We can accept no liability for errors with third- party data. This report is confidential to our client and therefore REDFANSolutions accepts no responsibility whatsoever to third parties unless formally agreed in writing by REDFANSolutions. Any such party relies upon the report at their own risk.

2. Contents

1. Cover Page
2. Contents
3. Executive Summary
4. Test Criteria & Methodology
5. Conclusion

Appendices

1. Common environmental acoustic indices

3. Executive Summary

3.1 REDFAN Solutions were instructed to undertake a Noise Impact Assessment of new plant equipment installed at Unit 9 RMG Saltbox Business Park, Bognor Regis, Sussex.

3.2 The Noise Impact Assessment has been undertaken in line with the guidance contained in British Standard 4142:2014 and 7445:2003.

3.4 The Baseline Noise Survey was carried out by Sharps Redmore and the results included in the report named R2-6.12.18- Saltbox 2 (overall Scheme) Bognor Regis-18183341-MPC.

3.5 The levels for compliance must be no louder than typical background noise (L_{A90}). The Baseline Noise Survey results from R2-6.12.18- Saltbox 2 (overall Scheme) Bognor Regis-18183341-MPC are indicated below.

Table 3.2: Long Term Survey Results- Southern Boundary: Rowan Caravan Park MP2

Measurement Period	Measured Free-Field Noise Level, dB			
	$L_{Aeq,T}$	$L_{A10,15m}$ (range)	$L_{A90,15m}$ (range)	L_{Amax} (typical)
Daytime	56 dB	48-71 dB	35-58 dB Typical 53dB	66 dB
Night Time (2300-0700)	52 dB	30-72 dB	25-56 dB Typical 39dB	63 dB

3.6 Using Institute of Acoustic recognised calculations, all items evaluated in this report meet required criteria.

4. Test Criteria & Methodology

4.1 BS 4142:204 “Method for rating and assessing industrial and commercial sound”

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- a) sound from industrial and manufacturing processes.
- b) sound from fixed installations which comprise mechanical and electrical plant and equipment.
- c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

4.2 The significance of sound impact is to be determined according to the following summary process:

- Determine the background sound levels, in terms of the index LA90, at the receptor locations of interest.
- Determine the specific sound level of the source being assessed, in terms of its LAeqT level (T = 1 hour for day or 15 minutes for night), at the receptor location of interest.
- Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent, or other characteristics which attract attention.
- Compare the rating sound level with the background sound level; the greater the difference between the two, the higher the likelihood of adverse impact.
- A difference (rating – background) of around +10 dB is an indication of significant adverse impact, depending on the context; a difference of +5 dB is an indication of an adverse impact, depending on the context. 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 upon context.

4.3 BS 4142:2014 introduced the concept of ‘context’ to the process of identifying noise impact. Section 11 of BS 4142 explains “The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs (our emphasis). 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” (our emphasis).

4.4 There are many context points to consider when undertaking an assessment of sound impact including:

- The absolute level of sound;
- The character and level of the specific sound in the context of the existing noise climate; for example, is the sound to occur in a location already characterised by similar activities as those proposed?
- The sensitivity of the receptors;
- The time and duration that the specific sound is to occur;
- The conclusions of assessments undertaken using alternative assessment methods, for example, WHO guideline noise values or change in noise level;

4.5 It is therefore entirely possible that whilst the numerical outcome of a BS 4142:2014 assessment is indicative of adverse or significant adverse impact, when the proposal is considered in context the significance of the impact is reduced to an acceptable level.

Changes in noise level

4.6 The Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment' provides guidance on the sensitivity of receptors to changes in noise levels. Changes in noise levels of less than 3dB are not perceptible under normal conditions and changes of 10dB are equivalent to a doubling of loudness. This guidance has been accepted by Inspectors, at Inquiry, to encompass changes in noise levels in the index LAeq,T.

4.7 The following table summarises the response to changes in noise level (known as the Semantic Scale).

Table 1: Change in noise level – response and impact

Change in noise level LAeqT dB	Response	Impact
<3	Imperceptible	None
3 - 5	Perceptible	Slight
6 - 10	Up to a doubling	Significant
11 – 15	More than a doubling	Substantial
> 15	-	Severe

4.8 BS 7445:2003 “Description and measurement of environmental noise”

Part 1 of BS 7445 establishes guidelines to quantities and procedures for environmental noise measurements. Guidance provided on instrumentation and calibration, measurement positions, meteorological effects and information to be recorded.

- All equipment shall be calibrated and the configuration for calibration shall be in accordance with the manufacturer's instructions.
- A comprehensive recalibration at certain time intervals may be prescribed by authorities responsible for the use of measurement results.
- A field check shall be made by the user at least before and after each series of measurements, preferably including an acoustic check of the microphone.
- “Outdoor measurements near buildings”: these measurements shall be carried out at a place where the noise to which a receiver is exposed is of interest. If not otherwise specified, the preferred measurement positions are 1m to 2m from the façade and 1.2m to 1.5m above the ground.

4.9 External Plant Noise Technical Specification sound pressures for plant equipment installed will be calculated against the Baseline Noise Survey in report R2-6.12.18- Saltbox 2 (overall Scheme) Bognor Regis-18183341-MPC.

4.10 The nearest noise sensitive receptor is Rowan Park Caravan Site.

4.11 Rowan Park Caravan Site will be used as the distance from the nearest noise sensitive receptor when calculating the sound pressure. A calculation of each unit’s sound pressures will be produced and will then be logarithmically added together to produce a final sound pressure level at the nearest noise sensitive receptor taking into account barrier attenuation and any other factors.



Plant Equipment

4.12 There will be x3 Daikin RYYQ10U x1 RYYQ8U and x1 RXM42N9 installed at the plant area. The sound pressure of units used is marked below (the sound pressure level is measured at 1m)

-RYYQ10U and RYYQ8U have the dBA

Sound power level	Cooling	Nom.	dBA	78.0 (4)	79.1 (4)
Sound pressure level	Cooling	Nom.	dBA	57.0 (5)	
Refrigerant	Type				
	GWP				

-RXM42N9

Legend

dBA = A-weighted sound pressure level (A scale according to IEC).

A Scale

B Fan speed: High

Location of microphone

1m

Cooling	Total dB
A	B
dBA	48.0

Heating	Total dB
A	B
dBA	48.0

The sound pressure is the dBA that will be used in the calculation.

4.13 The calculation to determine the specific noise level at the nearest noise sensitive receiver.

$$L_2 = L_1 - 20 \times \log \left(\frac{r_2}{r_1} \right)$$

4.14 r_1 = the distance the recording was taken from the noise source

r_2 = the distance to the nearest noise sensitive receptor

L_1 = the sound pressure recorded

L_2 = the sound level that carries to the noise sensitive receptor

4.15 Equipment in the plant area will be logarithmically added together for a combined final level.

4.16 The formula for addition of sound.

Addition

$$L_T = 10 \log \left[10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \dots + 10^{\frac{L_n}{10}} \right] \text{ dB}$$

4.17 When all units are added together, they have a combined sound pressure of 63dB.

4.18 The units will be housed in an acoustic enclosure, 2500mm high Jacksons Fencing 'Jakoustic Highway' reflective acoustic barrier with 70mm capping rail.

Jakoustic® barrier certified laboratory results: Rating according to BS EN 1793-2:1998
 Category = B3 Laboratory sound reduction 28 dB Superficial mass 25kg/m²

4.19 Given the fences proximity to the plant equipment it can be assumed that the 28dB reduction is likely to be achieved. For this calculation a sound reduction of 23dB will be used to allow for discrepancies in environmental conditions from testing.

4.20 63dB – 28dB = 35dB

Rowan Caravan Park is 9m from the enclosure.

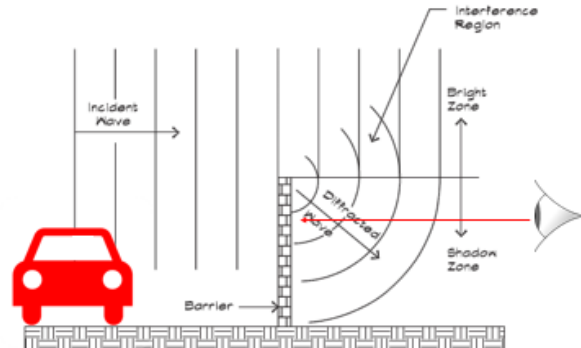
$$L_2 = 40\text{dB} - 20 \times \log \left(\frac{8.8}{1} \right) = 21 \text{ dB}$$

4.21 The 2500mm high Jacksons Fencing 'Jakoustic Highway' reflective acoustic barrier with 70mm capping rail will also be constructed along the south of the site shielding the whole site from Rowan Caravan Park

4.22 The units are also fully covered from the nearest noise sensitive receptor's view. The Institute of Acoustics use a field based "Rule of Thumb" to determine the impact of barriers on the diffraction of sound waves as the diagram below shows. If a barrier significantly cuts the line of sight from the point source a 10dB reduction can be calculated to the final results.

BARRIERS - RULE OF THUMB

If it significantly cuts the line-of-sight then a **10 dB reduction** can be expected.



$$4.23 \quad 21\text{dB} - 10\text{dB} = 11\text{dB}$$

4.24 A Genesis 11 compressor for the workshop will also be installed, this will be 32m from the Caravan Park. The compressor will not be used in the evening therefore the daytime typical L90 will be used in comparison of compliance.

Control System	Integrator	
Noise Level	65	dB(A)
Temperature Min/Max	2 to 46	°C

$$L_2 = 65\text{dB} - 20 \times \log\left(\frac{32}{1}\right) = 30 \text{ dB}$$

$$30\text{dB} - 10\text{dB} = 20\text{dB}$$

Given the low levels of noise at the nearest noise receptors no acoustic features penalties have been applied to any plant equipment.

Noise From Valet Building and workshop

Wet and Dry Valet

4.25 The area is positioned to the southwest of the car park, doors opening to the building are facing directly away from the Caravan Park. RPS (Acoustics) has been commissioned by Waves to carry out an assessment of the noise generated by the typical operation of their car washing facilities B6927/NOISE/P1. The report shows that car wash facilities generate a noise level of between 77.1 and 80.1 dB(A) of sound pressure at source, depending on the combination of plant and equipment items in use when running at full capacity.

4.26 The Valet area will be in a enclosed building, the noise of the wash will be lost through the fabric of the building 25dB or better.

$$80\text{dB} - 25\text{dB} = 55\text{dB}$$

$$L_2 = 55\text{dB} - 20 \times \log\left(\frac{6}{1}\right) = 39 \text{ dB}$$

$$39\text{dB} - 10\text{dB} = 29\text{dB}$$

Workshop

4.27 In Report R2-6.12.18- Saltbox 2 (overall Scheme) Bognor Regis-18183341-MPC. (See below)

Operations within the workshop

- 4.26 The workshop is proposed to be located to the centre of the site. It is understood that workshop doors would be kept closed except for access at all times when the workshop is in operation. Sharps Redmore have an extensive database of measurements taken within similar workshop areas. Internal noise levels will vary around the workshop and across a working day, but are very unlikely to exceed 85 dB, $L_{Aeq,5 \text{ mins}}$ incident on the internal façade. (For most of the time, internal noise levels would be likely to be between 60 and 70 dB). For reference, 85 dB would be the level at which mandatory hearing protection would need to be worn for all working within the area. As a worst case, therefore, this has been taken to be the noise level which might occur internally.
- 4.27 Noise from the workshop would be reduced across the wall of the workshop itself (R_w of 25 dB or better). This represents the noisiest periods which might occur briefly within a busy workshop at levels representing mandatory hearing protection; for the majority of the time, workshop noise levels would be 15 to 25 dB lower than this. The level at the nearest noise sensitive property would be inaudible.

4.28 Although the report addresses the containment of noise within the workshop area, with the doors being open, a calculation of noise produced from the workshop can be anticipated at the nearest noise sensitive receptor.

4.29 The doors are 11m from the Caravan Park

4.30 An estimated 70db sound pressure will used as an average level $L_{eq} 1h$ (the calculation is conducted as a point source).

$$L_2 = 70\text{dB} - 20 \times \log\left(\frac{11}{1}\right) = 49 \text{ dB}$$

$$4.31 \quad 49\text{dB} - 10\text{dB} = 39\text{dB}$$

4.32 A correction of +9dB will be added for acoustic features giving a final calculation of 48dB.

4.33 Workshop and valet areas have been calculated against the daytime typical L_{90} background noise.

5. Conclusion

5.1 All measurements and noise levels calculated indicate that the levels of sound generated by the plant equipment and use of the workshop and valet area will not exceed the typical background levels for their operation at nearest noise sensitive receptors and will not have a negative impact.

Appendices

1. These are the main noise indices in use in the UK.

- **dB(A):** The human ear does not hear all frequencies with the same intensity. It is most sensitive to sounds in the 500Hz-8kHz range. Above and below this range the ear becomes progressively less sensitive. To compensate for this, sound level meters incorporate electronic filtering to correspond with the varying sensitivity of the ear. This filtering is called A-weighting and Sound Pressure Levels obtained with this weighting are referred to as A-weighted and signified as dB(A).
- **LA90:** The sound level (in dBA) exceeded for 90% of the time. This unit gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the “background noise level” of an area.
- **LAeq,T:** The equivalent continuous sound pressure level over a period of time, T; (in dBA) This unit may be described as “the notional steady noise level that would provide, over a period, the same energy as the varying noise in question”. In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as road traffic, aircraft and trains.
- **LA1:** The sound pressure level (in dBA) exceeded for 1% of the time. This unit can give an indication of a regular maximum noise level from such activities as dance music.
- **LAe:** The sound exposure level, (previously denoted SEL) is the noise level of an event, such as a train or aircraft event, normally expressed in a 1 second time period.
- **L_{Amin}:** The minimum sound pressure level (in dBA) measured over the time period.
- **L_{Amax}:** The maximum level of sound (in dBA), i.e. the peak level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.
- **L_{ArT} :** sound rating level, the a-weighted, leq sound level of an industrial noise during a specified time period, adjusted for tonal character and impulsiveness