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**Berendsen Hospitality Limited
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NOISE AT WORK ASSESSMENT

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1.0 INTRODUCTION

Having regard for the protection of their employees' hearing, Berendsen Hospitality Limited requested Martec Environmental Consultants Ltd carry out an assessment of their employees' noise exposure at their laundry facility at 77, George Street, Caversham, Reading.

The purpose of the survey was to identify whether production staff were likely to be exposed to noise levels in excess of the various exposure action values detailed in the Regulations (see below), and to facilitate the company's compliance with its other duties under these Regulations and The Health & Safety at Work etc. Act 1974.

2.0 THE REGULATIONS

The Control of Noise at Work Regulations 2005 (the Noise Regulations) came into force on 6th April 2006 and replaced The Noise at Work Regulations 1989, which have been in force since 1990. The main differences from the 1989 Regulations are:

- the two action values for daily noise exposure have been reduced by 5 dB to 85 dBA and 80 dBA [daily exposure L_{Ep,d}]
- there are now two action values for peak noise at 135 dBC and 137dBC;
- there are new exposure limit values of 87dBA (daily exposure) and 140 dBC (peak noise) which take account of the wearing of hearing

protection and which must not be exceeded;

- there is a specific requirement to provide health surveillance where there is a risk to health

The following is a brief outline of the current regulations in relation to noise assessments. They are not the only duties or obligations that employers and employees have under the regulations and the reader is recommended to consult the Guides to The Control of Noise at Work Regulations 2005 (L108) produced by the Health and Safety Executive (HSE).

Employers' and Employees' duties depend on the levels of noise exposure termed "Exposure Limits and Action Values" in the Regulations, (similar in concept to the Action Levels used in the 1989 Regulations).

2.1 Definitions

2.1.1 Exposure Limit Values and Action Values

2.1.2 Lower Exposure Action Values

The lower exposure action values are -

- (a) A daily or weekly personal noise exposure, of 80dBA
- (b) A peak sound pressure level of 135dBC

2.1.3 Upper Exposure Action Values

The upper exposure action values are -

- (a) A daily or weekly personal noise exposure of 85dBA
- (b) A peak sound pressure level of 137dBC.

2.1.4 Exposure Limit Values

The exposure limit values are -

- (a) A daily or weekly personal noise exposure of 87dBA
- (b) A peak sound pressure of 140dBC

It should be noted that these values take hearing protection into account

2.1.5 Personal Noise Exposure

A person's personal noise exposure depends upon both noise level and length of exposure. Noise levels may vary from minute to minute, but the daily noise dose is a measure of the total sound energy to which a worker has been exposed, as a result of working in the varying noise levels. Calculation of an individual's *daily personal noise exposure* [$L_{EP,d}$] is based on an equivalent exposure of 8 hours.

In situations where noise exposure varies markedly from day to day, the Regulations allow an employer to use *weekly personal noise exposure* [$L_{EP,w}$] in place of daily personal noise exposure.

2.1.6 Peak Levels

Peak levels are absolute levels and *do not* depend on length of exposure. High peak sound pressure levels present a risk to hearing from immediate and permanent hearing loss

APPENDIX 1 explains the acoustic terms more fully.

2.2 Duties Arising from the Assessment

When employees are liable to be exposed to noise at or above a *lower* exposure action value, employers must make a 'suitable and sufficient assessment' of the risk from noise to the health and safety of those employees. An assessment will be suitable and sufficient if it:

- a) has been drawn up by someone who is competent to carry out the task
- b) is based on advice and information from competent sources
- c) identifies where there may be a risk from noise and who is likely to be affected
- d) contains a reliable estimate of your employees' noise exposures and a comparison of exposure with the exposure action values and limit values
- e) identifies the measures necessary to eliminate risks and exposures or reduce them to as low a level as is reasonably practicable
- f) identifies those employees who need to be provided with health surveillance and whether any employees are at particular risk

The employer should also prepare an action plan, together with a realistic time scale for achieving these controls. Finally, the risk assessment shall be reviewed when there is reason to suspect that it is no longer valid. For example, there may have been a significant change in the work to which the assessment relates, new noisy machinery installed, altered work patterns and so on.

In general, terms the responsibilities/controls required at the various exposure action values and limit values are as follows:

A If employees are exposed to noise levels at or above the **lower exposure action value (not taking account of hearing protection)**:

- suitable hearing protectors must be made available
- information and training must be provided
- health surveillance should be provided where there is a risk to health

B If employees are exposed to noise levels at or above the **upper exposure action value (not taking account of hearing protection)**:

- a programme of technical and/or organisational measures intended to reduce exposure to noise must be established and implemented (these measures **cannot** include hearing protection)
- marking, delimiting and restriction of access to areas is required; i.e. designation of Hearing Protection Zones
- the provision and use of hearing protectors is mandatory
- health surveillance must be provided
- information and training must be provided

C Employers must not permit an employee to be exposed above the **exposure limit values (NB taking into account hearing protection)**.

If these values are exceeded:

- immediate action to reduce exposure is required
- the reasons for over exposure must be addressed by reviewing the programme of control measures; i.e. technical and organisational

controls

- the adequacy of any hearing protection supplied and the systems in place to ensure that noise-control measures and hearing protection are fully and properly used and maintained

2.3 Controlling Noise

The Regulations place a duty on employers

- A) to take action to eliminate risks from noise exposure completely wherever it is reasonably practicable to do so
- B) if it is not reasonably practicable to eliminate risks completely, then to reduce them to as low a level as is reasonably practicable
- C) to introduce a formal programme of measures to reduce noise exposure whenever an employees' exposure to noise is likely to exceed the upper exposure values (these measures cannot include hearing protection which is addressed separately in section 2.4)
- D) not to expose anyone above the exposure limit values

The Regulations give priority to the control of noise by technical or organisational means as opposed to providing personal hearing protection because:

- noise control is usually the most cost effective solution for the longer term
- control of noise at source protects a greater number of people in the surrounding working environment
- personal hearing protectors only protect the individual wearer and do

not always give the protection expected

The methods of controlling noise should be considered in the following order:

- Can risks be eliminated by doing work in a different way, eliminating or minimising noise exposure?
- Can the work, process or machine be modified to reduce noise emissions?
- Is it possible to replace the tools and equipment used with lower noise alternatives?
- Can the workplace and workflow be arranged to separate people from the noise?
- Can the noise reaching people be reduced by controlling it on its path from the source?

Further guidance is contained within the HSE's Guidance L108, 'Controlling Noise at Work, The Control of Noise Regulations 2005'-Part 3.

2.4 Hearing Protectors

Personal hearing protection should only be used:

- if there is a need to provide additional protection beyond what has already been achieved through noise control measures
- as an interim measure while those controls are being developed

The **duty** to provide hearing protectors depends on the exposure levels

(see sections 2.2A and 2.2B).

If noise levels are at or above the upper exposure action value, suitable hearing protection shall be worn by workers. It is a duty of management to ensure that issued protection is worn.

In addition, all areas where workers are likely to be exposed to noise above the upper exposure action value shall be demarcated a '**Hearing Protection Zone**'. Hearing protection zones may be fixed locations or mobile and can be permanent or temporary depending on the nature of the activities and the source of noise. Items of machinery or work areas may be designated. Suitable signs must be displayed at the entrances to the zones and employers shall enforce the wearing of hearing protection as far as is reasonably practicable. In certain situations, where boundaries and zones cannot be marked alternative arrangements must be made to make sure people know when protectors should be worn e.g. by designating particular tasks. It is a duty under the regulations for employees to wear hearing protection in designated areas, even if they are only passing through and do not work all the time in noisy areas. This includes members of management.

2.5 Health Surveillance

The Regulations require employers to provide health surveillance where the risk assessment indicates a risk to workers' health, i.e. a risk from exposure to noise *without* taking account of noise reduction provided by

hearing protection.

There is strong evidence to show that regular exposure above the upper exposure action values can pose a risk to health. Health surveillance should therefore be provided to workers regularly exposed above the upper exposure action values. When exposure is between the lower and upper exposure action values, or when an employee is occasionally exposed above the upper exposure action values, then health surveillance should be provided if an individual is particularly sensitive to noise.

The results of the health surveillance allow employers to check whether their hearing protection programme is effective and has prevented hearing damage.

2.6 Information Instruction and Training

Where employees are likely to be exposed at or above any of the exposure action values, they must be provided with adequate information, instruction and training on:

- the likely noise exposure and the risk to hearing that noise creates
- what you, as an employer, are doing to control risks and exposures
- where and how ear protectors can be obtained
- how to report defects in hearing protectors and noise control equipment
- the employee's duties under the Regulations
- what health surveillance employees will be provided with and how

you are going to provide it

- what symptoms they should look out for in relation to hearing damage

These are the main issues only which must be covered, but this list is not exhaustive. The information, instruction and training must be updated to take account of significant changes in the type of work carried out or the working methods used by the employer.

3.0 DESCRIPTION OF THE WORKPLACE

Berendsen Hospitality operates a laundry service for hotels and serviced apartments etc. The laundry serves a wide geographical area. Generally, staff are at their workstations for 7 hours 45 minutes per day with breaks totalling 45 minutes, i.e. 8.5 hour shifts.

The site comprises of an office area for administrative activities and laundry area where items are washed, dried, pressed and folded, then packed ready for dispatch. There is an engineering workshop on site but that has not been included as part of this survey.

The purpose of this assessment was to review the levels of noise for associated activities; and establish the typical daily levels of personal exposure for staff working in each area.

4.0 MEASUREMENT PROCEDURE

Staff noise exposure was established through sample measurements made using a sound level meter, which was held in the same sound field as the employees worked. If the operator was present, the meter was held approximately 150mm from the operators' ear exposed to the highest level of noise. Measurements were taken over a sufficient period of time to allow a steady L_{Aeq} to be established.

The instrumentation used:

- Svan 977 Integrating Sound Level Meter, Class 1 Group BS EN 61672-1:2003, Serial Number 36870
- Microphone: ACO 7052H Serial Number 61121
- Preamplifier: Svan Serial Number 47576
- Calibrator Class 1L: Cirrus CR:511E Serial Number 039816

The sound level meter calibrated correctly before and after measurements.

The sound level meter had been laboratory calibrated within the preceding two years.

5.0 RESULTS OF NOISE SURVEY

The measurements were made on 20th July 2017. The results of the survey are given in Table 1 below.

Area	Location	LAeq	LApeak	LCEq	Notes
Offices	Engineering Office	47.7	73.5	62	
Offices	Accounts Office	52.9	75.9	63.9	
Offices	General Managers Office	43.4	73.4	61.1	
Offices	Compliance Managers Office	44.5	77.1	63.1	
Offices	Customer Services Office	55.3	78.5	66.9	
Offices	Meeting Room	52.8	71.6	66.9	
Sorting	Attendant moving logistics cages in yard	82.8	108.6	83	
Sorting	Feed sorting belt	63.8	92.6	69.4	
Sorting	Move plastic handling trolleys	66.4	93.4	71.1	
Sorting	Op. 1 - sorter	76	108.3	78.3	
Sorting	Op. 2 - sorter	73.8	106.3	75.9	
Washing	CBW Controls 1 "E6"	82.6	99.7	89.9	Usually unattended
Washing	CBW Controls 2	83.9	102.7	90.6	Usually unattended
Washing	CBW Walkthrough area (between CBW and Dryers)	85.5	101.9	91.6	
Washing	Walkthrough CBW area opposite side to dryers	77.1	95.3	84	
Washing	WE & TD area - manual folding bench Op. 1	75.8	94.2	83	2 x washing machines operating in the area
Washing	WE & TD area - manual folding bench Op. 1	70.6	83.8	80.3	2 x washing machines operating in the area
Folders	Calender 1 - Take off Op.	77.1	102.7	82	
Folders	Calender 1 - Feed Op. 1	76.8	100.5	81.9	
Folders	Calender 1 - Feed Op. 2	76.4	103.3	84.5	
Folders	Calender 1 - Feed Op. 3	76.5	98.6	84.6	
Folders	Calender 2 - Take Off	75.4	110.7	83.2	
Folders	Calender 2 - Feed 1	77.8	101.9	85.7	
Folders	Calender 2 - Feed 2	78.1	104.5	86.2	
Folders	Calender 3 - Feed Op. 1	82.7	107.9	90.7	
Folders	Calender 3 - Feed Op. 2	81.8	104.8	89.2	
Folders	Calender 3 - Feed Op. 3	81.8	103.8	89.5	
Folders	Calender 3 - Feed Op. 4	81.3	108.6	88.6	
Folders	Calender 3 - Feed Op. 5	81	109	89.3	
Folders	Calender 3 - Feed Op. 6	80.6	101.8	88	
Folders	Calender 3 - Take off 1	79.1	106.2	83.1	
Folders	Calender 3 - Take off 2	79	104.3	83.6	
Folders	Towel folder 1 - feed op.	77.6	103.6	82	
Folders	Towel folders take-off Op.	76.3	100.1	81.3	
Folders	Towel folder 2 - feed op.	79.1	100.3	84.1	
Goods Out	Shadow Op.	71.6	102.5	77.1	Picking and loading plastic handling equipment
Goods Out	Take off and load shrink-wrap machine	75	103.8	79.7	
Goods Out	Shrink Wrap machine - take off position	72.2	91.2	85.8	
Good Out	Shadow Op. labelling handling equipment	66.7	94.6	74.7	
Dispatch Yard	Plastic container onto tailift	70.7	100.3	76.7	
Dispatch Yard	Full logistics cage onto tailift	74.5	104.9	76.6	
Rest Area	Canteen - optimum use (lunch)	61.2	87.9	71.4	
Offices	Office next to canteen	47.7	74.7	64.2	
Workshop	Area only - walkway at entrance from canteen area	72.8	88.5	82.7	
Workshop	Area only - walkway adjacent gap to dryers	77	103.7	84.2	
Offices	Engineering Office	57.2	76.5	68.9	

Table 1

See also location plan (below)

Peak level

The upper and limit peak values were not exceeded during any measurement samples in any of the areas on site.

5.1 L_{EP,d} Assessment

The L_{EP,d} of the staff has been calculated as follows, based on information supplied by the client regarding working hours and work patterns:

2 x 8.5 hour shifts with 45 minutes for breaks (465 minutes). Breaks taken away from sources of noise – low levels in canteen not included in calculations.

L_{EP,d} level to nearest whole decibel.

Also, see Appendix 2 for a noise map of the laundry.

Personal exposure has been calculated by using the range of levels recorded for each activity / workstation which included “shadowing” more mobile operators for a period of time through their activities and also using levels measured throughout the area at fixed working positions (most are fixed). See also the location plan with noise levels below.

Table 2 – LEP'd Assessment

Group	Activity	Noise level Leq (dBA)	Exposure Time (Minutes)	LEP,d, (dBA), LEX 8 h
Offices	Administration	57 ¹	405	67
	Laundry visits	86 ²	60	
Sorting	All	64-76 ³	465	64-76
Washing Area	See discussion	See below	See below	See below
Folding	Calender 1 & 2 - All	75-78	465	75-78
Folding	Calender 3 – Feed All	81-83	465	81-83
Folding	Calender 3 – Take Off All	79	465	79
Goods in / out	Goods in / out including shrink wrap – All	67-75	465	67-75
Dispatch (Yard)	Logistics containers onto tailift	71-75	465	71-75

Significant levels were recorded around the washing area which is usually left unattended. High levels also recorded when empty metal logistics cages are moved – see discussion below.

6.0 DISCUSSION OF RESULTS

6.1 Calender Folders

For Calender 3 feed attendants, personal daily personal *exposure is likely to exceed the lower exposure action value - 80dBA (L_{EP,d})*. Daily Personal exposure was calculated at between 81-83dBA.

Suitable hearing protection should be made available for those who wish to use it – this provision could be extended to all Calender operatives as

¹ Highest office level

² Highest laundry level (CBW washing area)

³ See also notes regarding metal logistics cages below.

daily exposure levels at other positions may be just below the lower EAV in some circumstances.

The Calender 3 machine appears to “rumble” – possibly due to vibration?

6.2 Washing Area

This area is usually left unattended, but there are significant levels around the controls and between the CBW and dryers (83-86dBA). In case of prolonged visits (6 hours+), the area could be designated as a hearing protection zone with suitable signage at strategic locations (access points) as discussed on site, to assist with managing noise exposure overall on site - some instruction should be provided.

6.3 Metal Logistics Cages

Significant levels of noise are produced when empty metal logistics cages are moved in the yard – 83dBA. It is understood that the use of this type of carrier is minimal – mostly plastic carriers. Unlikely to be problematic unless the quantity and use increases.

7.0 CONCLUSIONS

7.1 Action Values

The measurements above indicate the following for similarly exposed groups, see Table 3:

Table 3

Area	Results
Offices	Personal exposure not likely to meet the LOWER exposure action value
Sorting	Personal exposure not likely to meet the LOWER exposure action value
Washing Area	Personal exposure may meet the UPPER exposure action value for prolonged attendance only
Folding Calender 1 & 2	Personal exposure not likely to meet the LOWER exposure action value
Folding Calender 3 Feed	Personal exposure likely to meet the LOWER exposure action value
Folding Calender 3 – Take Off	Personal exposure not likely to meet the LOWER exposure action value
Goods in / out	Personal exposure not likely to meet the LOWER exposure action value
Dispatch (Yard)	Personal exposure not likely to meet the LOWER exposure action value

7.1.1 Operatives Exposed Above the Lower Exposure Action Value

Please see section 2 for the duties arising from this, but, generally speaking, a risk assessment together with an action plan must be prepared, hearing protection must be made available and advice given.

7.1.2 Operatives exposed Above the Upper Exposure Action Value

Please see section 2 for the duties arising from this, but, generally speaking, a risk assessment together with an action plan must be prepared, measures to reduce noise exposure must be established and implemented. Hearing Protection Zones must be designated as necessary and the provision of hearing protectors in these areas is mandatory and information training must be given.

7.2 Peak Sound Levels

Peak levels were not exceeded during the survey.

7.3 Exposure Limit Values

Exposure Limit Values i.e. the daily or weekly personal noise exposure of 87dBA are not likely to be breached.

7.4 Noise Control

The following guidance is intended as general advice:

Hearing protection should only be used if there is a need to provide additional protection beyond what has already been achieved through noise control measures or whilst controls are being developed; therefore, the employer has a duty to look at noise control as a first option. Some guidance on this matter is also given in section 2.3.

There were no noise control issues noted but some general information regarding this is provided below (please note that the information provided is general information and does not constitute detailed advice).

1. Damping – Adding material to reduce noise.
2. Machine design – Changing the total or partial design of a machine, component or process; reducing air turbulence noise; avoiding impacts.
3. Enclosure – Placing a sound-proof cover over the source of noise – gaps in enclosures should be reduced as much as possible to prevent noise ‘breakout’.
4. Screens and Barriers – Placing an obstacle between the noise source and affected operatives, e.g. between a noisy machine and workstation. Must be of suitable height and length.
5. Silencers – In pipes and ducts; air exhausts and jets.
6. Methodology – could an alternative work method be used?

- 7. Job rotation - rotate staff between workstations to reduce personal exposure e.g. washing machine staff (Power Trans).
- 8. Increasing distance between 'noisy' equipment and operator.

Further guidance is contained within the HSE's Guidance L108, 'Controlling Noise at Work, The Control of Noise Regulations 2005' - Part 3, or in your industry guides.

7.5 Hearing Protection

The lower exposure action value (EAV) is likely to be met or exceeded at times and therefore hearing protection must be made available (Calender 3). If the Washing Area is to be designated as a hearing protection zone then hearing protection must be worn by anyone entering the area for any duration. As illustrated below, EAR banded caps with an SNR of 23 would be suitable on site.

Suitable Hearing Protection

Date:	28/7/2017	
Meas. Position:	CBW	
Protector Details:	EAR Caps	
Protector SNR	23	
C Weighted Sound Level	92	
	Calculated	Real World
	Level	+4dB
Results:	69.0 dB	73.0 dB

Hearing Protection

The table below (Table 4) should be used to ensure that hearing protection does not over or under protect. The SNR value can usually be found on the packaging or the supplier should be able to provide such information.

Hearing protection must always be worn correctly to ensure suitable protection.

For safety reasons over protection must be avoided; over protection may be defined as protectors that reduce the level at the ear to below 70dB. It is always useful to trial hearing protection and to consult with staff.

Table 4 indication of protector factors

A-weighted noise level (dB)	Select a protector with SNR of
85-90	20 or less
90-95	20-30
95-100	25-35
100-105	30 or more

Employees are more likely to wear protection if a range is provided. Whichever type of hearing protection is provided it is important to

ensure that it is in good condition, of the correct size and is worn properly.

7.6 Health Surveillance

Guidance on this is given in section 2.5, but as a minimum health surveillance should be provided to workers regularly exposed above the upper exposure action value (not likely here in the washing area). Other staff (as applies here) must be risk assessed and surveillance provided as necessary.

The guidance recommends that an initial assessment is carried out, then annually for two years and biennially after that.

8.0 FOR INFORMATION ONLY - FUTURE ACTIONS

8.1 Reassessment

The Regulations require that your risk assessment must be reviewed where the circumstances have changed. For example, if any new working practices or new instrumentation and machinery are introduced. Afonwen Services may need to repeat the noise assessment in order to ascertain the new noise exposure levels and update their risk assessment accordingly.

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

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 **dBA**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dBA; i.e. 50 dBA sounds twice as loud as 40 dBA. The least discernible difference is 2 dBA. Thus, most people cannot distinguish between, say 30 and 31 dBA.

A doubling in sound energy, hence damage, occurs when the noise level increases by only 3 dBA. It can be seen that noises which are very much more damaging do not necessary sound very much louder.

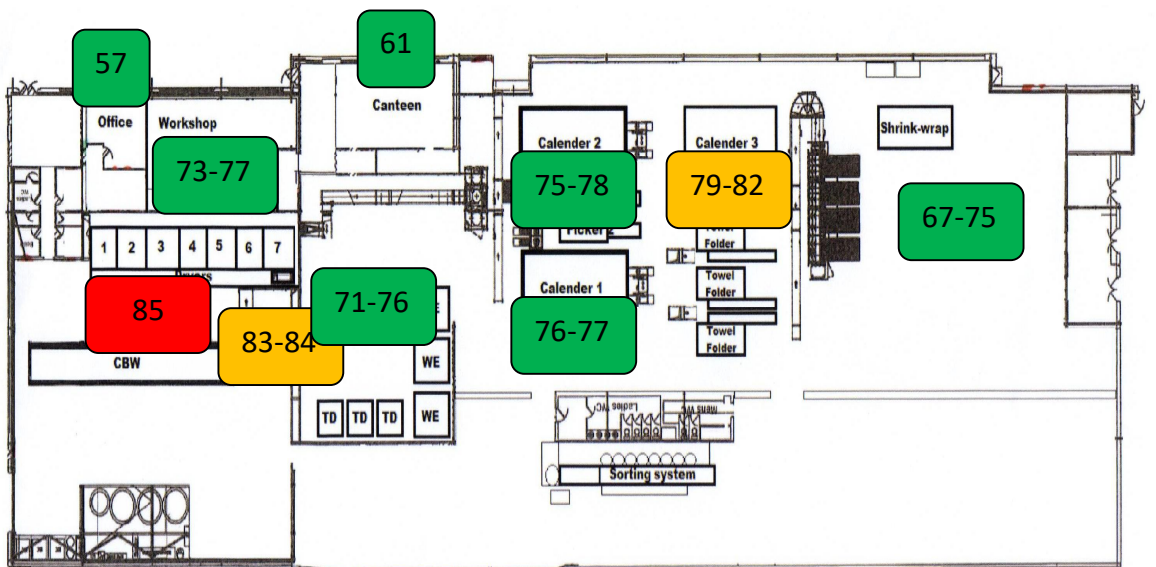
The equivalent continuous level, or Leq, is the constant level of noise which would contain the same amount of acoustic energy as a noise which varies over time.

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

Source of noise	dBA	Nature of Noise
Quiet bedroom at night	30	Very Quiet
Quiet office	40	
Rural background noise	45	
Normal conversational level	60	
Threshold of gunfire noise annoyance	63	
Busy restaurant	65	
Typewriter @ 1m	73	
Inside suburban electric train	76	
Car accelerating @ 6m	77	
Alarm clock ringing @ .5m	80	
Hand clap @ 1m	80	
HGV accelerating @ 6m	92	Very Loud

APPENDIX 2

Noise Plan



Levels - dBA