

MIMWEP | Rhondda Cynon Taff
Council

RCT Schools

Plant Noise Emission Limits for
Pontyclun Primary School

RH0201-ARP-XX-XX-RP-Y-00031

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Full measurement results

1 Introduction

Building services noise emission limits have been set for Pontyclun Primary School following the requirements of the local authority for the planning application. This report summarises the baseline noise climate for the site determined from a site-specific noise survey and the methodology for setting building services noise emission limits.

2 Standards

The site noise survey and building services noise emission limits follow the following British Standards:

1. BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound
2. BS7445:2003 Description and measurement of environmental noise

3 Baseline noise survey

An environmental baseline noise survey was undertaken to determine the existing noise climate and character of noise, with attended measurements taken on 27 September 2021 and unattended measurements taken between 27 September and 29 September 2021. The survey consisted of 30-minute attended measurements at two positions and longer-term unattended noise logging for each site. A summary of the results for each site is provided in Section 3.5.

3.1 Application site and context

The site features an existing, operational primary school with three main buildings. Proposals are for a new school development to replace two of the existing school buildings.

The site boundary and current building layout (the existing Pontyclun Primary School) and overlay of the proposed new building are shown in Figure 1.



Figure 1: Site boundary and baseline noise measurement locations at the Pontyclun Primary School site

The dominant source of background noise is road traffic on the A4222 to the North West of the site.

3.2 Measurement locations

Figure 1 shows the measurement locations for the baseline noise survey.

Measurement locations 1 and 2 were chosen to be representative of the noise exposure of the proposed new school building and to characterise the noise from the dominant source, road traffic from the A4222 (Cowbridge Road).

Measurement location L was chosen to be representative of the existing noise environment at the nearest noise sensitive receptors.

The unattended measurements were used to calculate the existing background sound level for the purpose of this assessment. For completion we include all measurement locations in our report.

3.3 Instrumentation

The sound level meters (SLMs), microphones and sound pressure level calibrators used by Arup are Class 1 instruments, conforming to BS EN 61672-1:2013. All Arup instrumentation is calibrated annually and has full traceable calibration to national and international standards, which are undertaken by an accredited calibration laboratory. Calibration certificates can be provided upon request.

The SLM was checked for correct calibration before and after each series of measurements. No significant fluctuation in level was noted throughout each survey period.

All the SLMs and other related noise monitoring instrumentation used to undertake the survey is described in Table 1 below.

Description	Serial Number	Item Type
B&K 4189 Microphone	3004621	Microphone
B&K ZC-0032 Preamp	23264	Microphone
B&K 4231 Calibrator	2022703	Sound level meter
B&K 2250	3008744	Sound level meter
RION NL-52	00231671	Sound level meter
Rion NH-25 Preamplifier	21615	Microphone
microphone RION UC-59	04716	Microphone
rion NC-74	34336008	Calibrator

Table 1: Measurement instrumentation

3.4 Measurement methodology

At each location, the L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} metric parameters were measured and recorded. All broadband measurements were A-weighted and used a fast time constant (0.125s).

At each measurement location, the SLM was mounted on a tripod with the microphone set between 1.2m to 1.5m above local ground level. All measurements were taken under acoustically free-field conditions. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

Attended measurements of 5 minutes duration for a total duration of 30 minutes were made at locations 1 and 2. Unattended measurements of 5 minutes duration were made at location L. In each case, the time period was appropriate to provide a good representation of the typical noise climate at each measurement location.

3.5 Measurement results

Table 2 summarises the baseline noise levels measured at the Pontyclun site (locations shown in Figure 1) for each measurement location. A logarithmic average of the individual measurements during each time period is used for L_{Aeq} , an arithmetic average for L_{AFmax} and a modal average for L_{A90} which is typical of the background.

Measurement position	Daytime noise levels (0700-2300)			Night time (2300-0700) typical background noise level, dB_{LA90}
	Ambient (average) $dB_{LAeq,T}$	Background (typical) dB_{LA90}	Maximum (average) dB_{LAFmax}	
1	59	54	72	-
2	55	52	63	-
Logger	60	54	63	40

Table 2: Summary of average baseline noise measurements at the Pontyclun site

A summary of the measurement results is provided in the Appendix for reference.

A time history of the noise measurements recorded by the logger is provided in Figure 2.

The noise logger was located next to one of the neighbouring residential receptors and the measurements were dominated by distant road traffic. Children playing during outside play in the daytime resulted in peaks in the measured noise levels as seen clearly in Figure 2. This is representative of the existing noise environment and the measurements therefore provide a basis on which to calculate the BS4142^[1] background sound level.

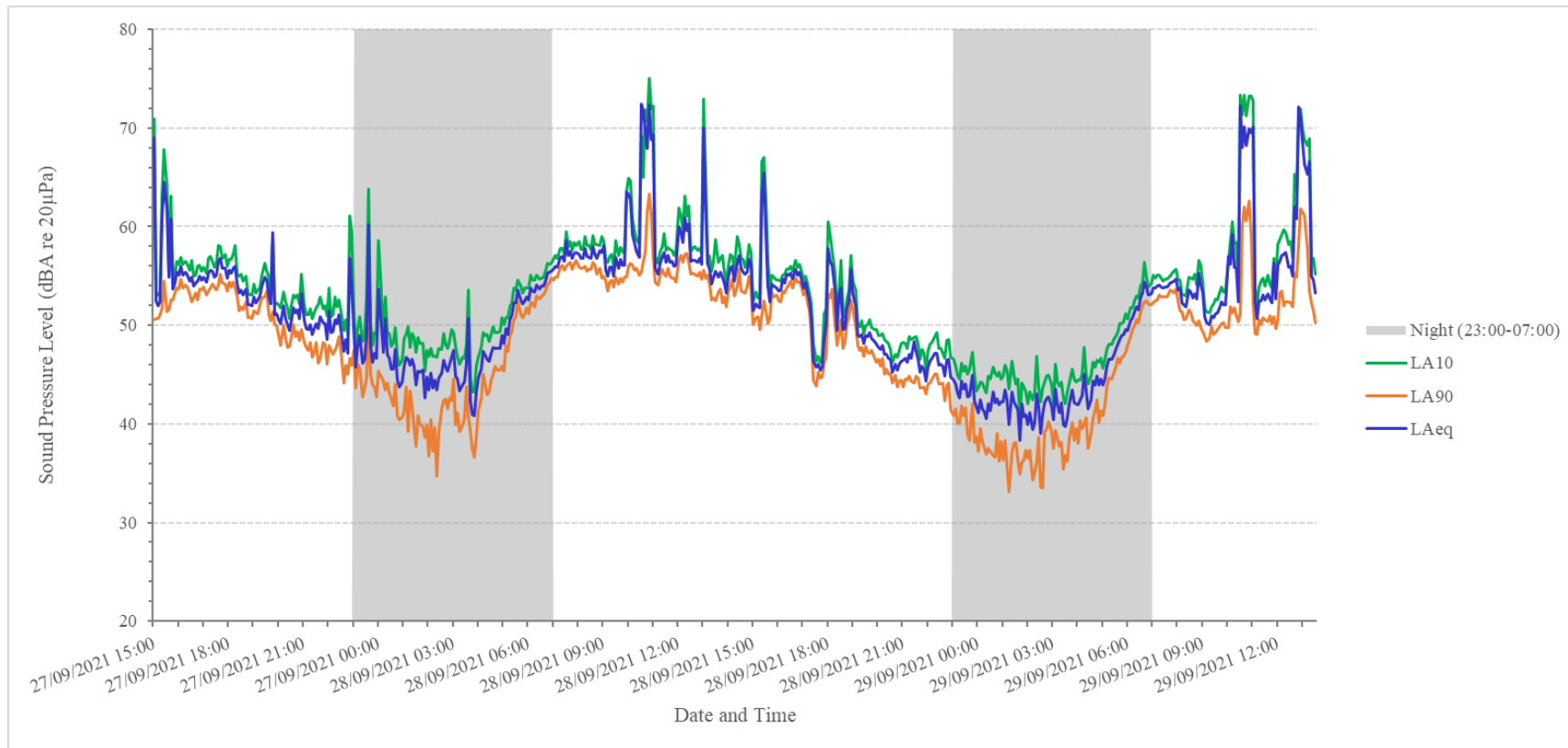


Figure 2: Time history for the unattended measurement at location L

4 Noise emission limits at nearby receptors

4.1 Local planning authority requirements

Building services noise emission limits have been set according to BS4142^[1].

Rhondda Cynon Taff Council requires the BS4142^[1] rating level to be 5dB below the typical background noise level at the nearest and/or most exposed noise sensitive receptors. These are the residential properties around the site, on Heol-y-Felin, Cowbridge Road and Palalwyf Ave, as agreed with RCT Council.

The BS4142^[1] rating level is the specific sound level plus any character corrections for plant that exhibits any audible tones, impulsivity, or other nuisance characteristics.

4.2 Deriving the BS4142 background sound level

The background sound level for the daytime period is calculated based on statistical analysis of the noise monitoring results in general accordance with BS4142^[1].

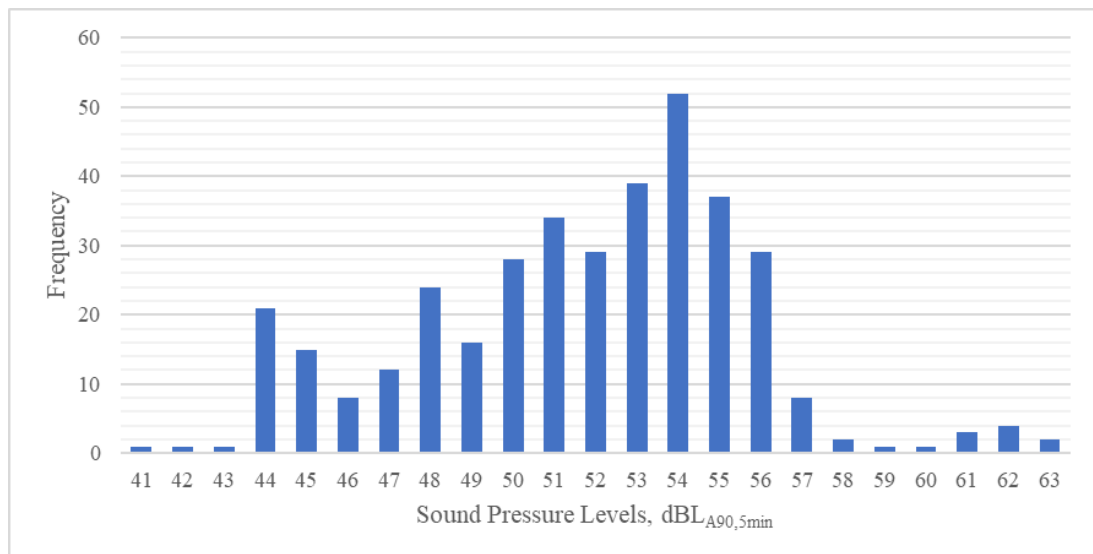


Figure 3: Distribution of daytime 5-minute L_{A90} noise levels at location L

The most commonly occurring (mode) background sound level in the daytime is 54 dB $L_{A90,5minutes}$, which is considered representative of the nearest noise sensitive receptors to the South. However, the typical background sound level at location 2 was slightly lower at 52 dB $L_{A90,5minutes}$. For a worst-case assessment, the lower figure will be used to establish daytime plant noise limits for all receptors. The mode background sound level at night is 40 dB $L_{A90,5minutes}$.

4.3 Noise emission limits

Table 3 lists the rating level limit for the proposed building services noise emissions to satisfy the planning requirements.

School	Nearest sensitive receptor / assessment location	Building services noise emission limit, $dB_{L_{Ar,Tr}}$ (normal operation)		Emergency plant noise limit $dB_{L_{Ar,Tr}}$ (all times)
		Day (0700-2300)	Night (2300-0700)	
Pontyclun	Residential properties on Heol-y-Felin and Palalwyf Ave	47	35	62

Table 3: Building services noise emission limits

By achieving the above noise limits, plant noise emissions to other nearby sensitive receptors which have a higher background noise level or are further away will also be at least 5dB below the prevailing background noise level.

4.4 Noise mitigation strategies

The main sources of building services noise emissions associated with the proposed development are:

- air source heat pumps in a compound at grade
- intake and discharge in the façade for MVHR units serving spaces in the development

At this stage, the design and selection of building services plant items has not been progressed in enough detail to inform either detailed noise prediction calculations or mitigation. Examples of potential noise control measures include:

- an acoustic louver around the air source heat pumps
- ducted attenuators on the intake and exhaust connection of the MVHR units

It is suggested building services noise emissions be incorporated into the conditions for the development and be discharged as a reserved matter.

5 Noise from school children

This assessment is based on noise emissions from proposed fixed plant. The site is an existing school and the increase in school capacity with the new development is minor. Therefore, noise from school children has been considered a part of the existing noise environment at the site. Further, there is no policy or standard that requires noise from school children to be assessed. On this basis, our assessment does not include noise from school children playing outside.

6 Summary

A site-specific noise survey has been completed at Pontyclun Primary School to establish existing baseline noise levels.

Site noise is dominated by road traffic on the A4222 (Cowbridge Road) and this is considered representative of the existing noise environment at the nearest noise sensitive receptors on Heol-y-Felin, Cowbridge Road and Palalwyf Ave.

Building services noise emission limits have been set according to RCT Council requirements that the BS4142^[1] rating level does not exceed 5dB below the existing background sound level.

It is suggested building services noise emissions be incorporated into the conditions for the development and be discharged as a reserved matter.

Appendix A

Full measurement results

A1 Measurement Results

A1.1 Attended Measurements

The summary tables for each measurement location provide an arithmetic average of the individual measurements during each time period for L_{A90} and L_{A10} , a logarithmic average for L_{Aeq} and a range of the values for L_{Amax} .

A1.1.1 Location 1

Location Description:

Location 1 is to the North West of the site on Heol-Y-Felin.

Environment and Observations:

Dominant source of noise is road traffic from A4222 (Cowbridge Road).

Measurement Duration:

Mon 27/09/2021 15:16 to Mon 27/09/2021 16:18

Weather Conditions:

Wind Speed: 2.8
Wind Direction: W
Summary: Full cloud cover, temperature of 14 degrees C, few moments of light rain

Personnel:

Matthew Gray and Grace Lampkin

Additional Comments:



Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-23:00)	54	59	62	66 - 73

Table A1: Summary of averaged sound pressure levels at Location 1

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
Day							
27/09/2021	15:16	00:05:00	52.7	57.3	60.1	70.4	
27/09/2021	15:23	00:05:00	54.1	58.9	61.7	69.9	
27/09/2021	15:28	00:05:00	55.1	60.5	63.4	73.4	

27/09/2021	16:02	00:05:00	54.2	59.3	62.0	65.9	
27/09/2021	16:08	00:05:00	53.4	59.1	62.1	67.3	
27/09/2021	16:13	00:05:00	54.3	59.6	61.9	71.9	

Table A2: Measured sound pressure levels at Location 1

A1.1.2 Location 2

Location Description:

Location 2 is to the North East of the site boundary by part of the playground. The location is considered representative of the noise exposure of the proposed new school building at the North of the site.

Environment and Observations:

Dominant source of noise is road traffic from A4222 (Cowbridge Road).



Measurement Duration:

Mon 27/09/2021 15:41 to Mon 27/09/2021 16:51

Weather Conditions:

Wind Speed: 2.8
Wind Direction: W
Summary: Full cloud cover, temperature of 14 degrees C, few moments of light rain

Personnel:

Matthew Gray and Grace Lampkin

Additional Comments:

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-23:00)	53	55	56	58 - 68

Table A3: Summary of averaged sound pressure levels at Location 2

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							
27/09/2021	15:41	00:05:00	52.3	54.0	55.1	67.9	
27/09/2021	15:46	00:05:00	53.1	54.2	55.1	58.9	

27/09/2021	15:53	00:05:00	53.9	55.5	56.9	59.3	
27/09/2021	16:24	00:03:58	52.4	54.5	55.7	65.4	
27/09/2021	16:41	00:05:00	52.1	53.9	55.5	57.9	
27/09/2021	16:46	00:05:00	53.3	55.0	56.4	60.1	

Table A4: Measured sound pressure levels at Location 2

A1.2 Unattended

A1.2.1 Location L

Location Description: Environment and Observations:

The noise logger was located next to one of the school buildings on the edge of a playground in the South of the site. The location was chosen to be close to the neighbouring residential receptors.

The noise was dominated by children playing during outside play in the daytime and distant road traffic from the A2444 (Cowbridge Road) at other times.

Measurement Duration:

Mon 27/09/2021 14:58
to
Wed 29/09/2021 13:33

Logging Interval:

00:05:00

Weather Conditions:

Conditions were generally cloudy with a moderate breeze and daytime temperatures around 14 degrees C. There were periods of heavy rain on 28/09/21 between 13:00-16:00 and 18:00-20:00.

Additional Comments:

