

MIMWEP | Rhondda Cynon Taff
Council

RCT Schools

Plant Noise Emission Limits for
Penygawsi Primary School

RH0401-ARP-XX-XX-RP-Y-00031

P01 | 22 October 2021

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.

Job number 281143

Ove Arup & Partners Ltd

The Arup Campus

Blythe Gate

Blythe Valley Park

Solihull B90 8AE

United Kingdom

www.arup.com

ARUP

Contents

	Page	
1	Introduction	1
2	Standards	1
3	Baseline noise survey	1
3.1	Application site and context	1
3.2	Measurement locations	2
3.3	Instrumentation	2
3.4	Measurement methodology	3
3.5	Measurement results	3
4	Noise emission limits at nearby receptors	6
4.1	Local planning authority requirements	6
4.2	Deriving the BS4142 background sound level	6
4.3	Noise emission limits	7
4.4	Noise mitigation strategies	7
5	Noise from school children	8
6	Summary	8

Appendices

Appendix A

Full measurement results

1 Introduction

Building services noise emission limits have been set for Penygawsi 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 29 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. Proposals are for a new school development in the North of the site to replace the existing school building.

The site boundary, current building layout (the existing Penygawsi 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 Penygawsi Primary School site

The dominant source of background noise is road traffic on the A4119 to the South West of the site.

3.2 Measurement locations

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

Measurement location 1 was chosen to be representative of the noise exposure of the proposed new school building.

Measurement location 2 was chosen to be representative of the existing noise environment at the nearest noise sensitive receptors to the proposed new school building.

Measurement location L was chosen to be representative of the existing noise environment at the nearest noise sensitive receptors to the current school, and the nearest to the proposed new school building to the South of the site.

The unattended measurements at location L and attended measurements at location 2 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	00264533	Sound level meter
Rion NH-25 Preamplifier	64658	Microphone
microphone RION UC-59	09681	Microphone
Rion NC-74	34467730	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 Penygawsi 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 noise level.

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	55	51	67	-
2	56	52	69	-
Logger	65	55	72	42

Table 2: Summary of average baseline noise measurements at the Penygawsi 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.

Location 2 was located next to the neighbouring residential receptors to the North of the site and the measurements were dominated by road traffic, with distant noise from the children playing during outside play in the daytime.

The noise logger was located as close as possible to the neighbouring residential receptors to the South of the site. The measurements were dominated by distant road traffic. Peaks in the noise level were seen when children were playing during outside play in the daytime (Figure 2).

These locations are representative of the existing noise environment and the measurements therefore provide a basis on which to calculate the BS4142^[1] background sound level.

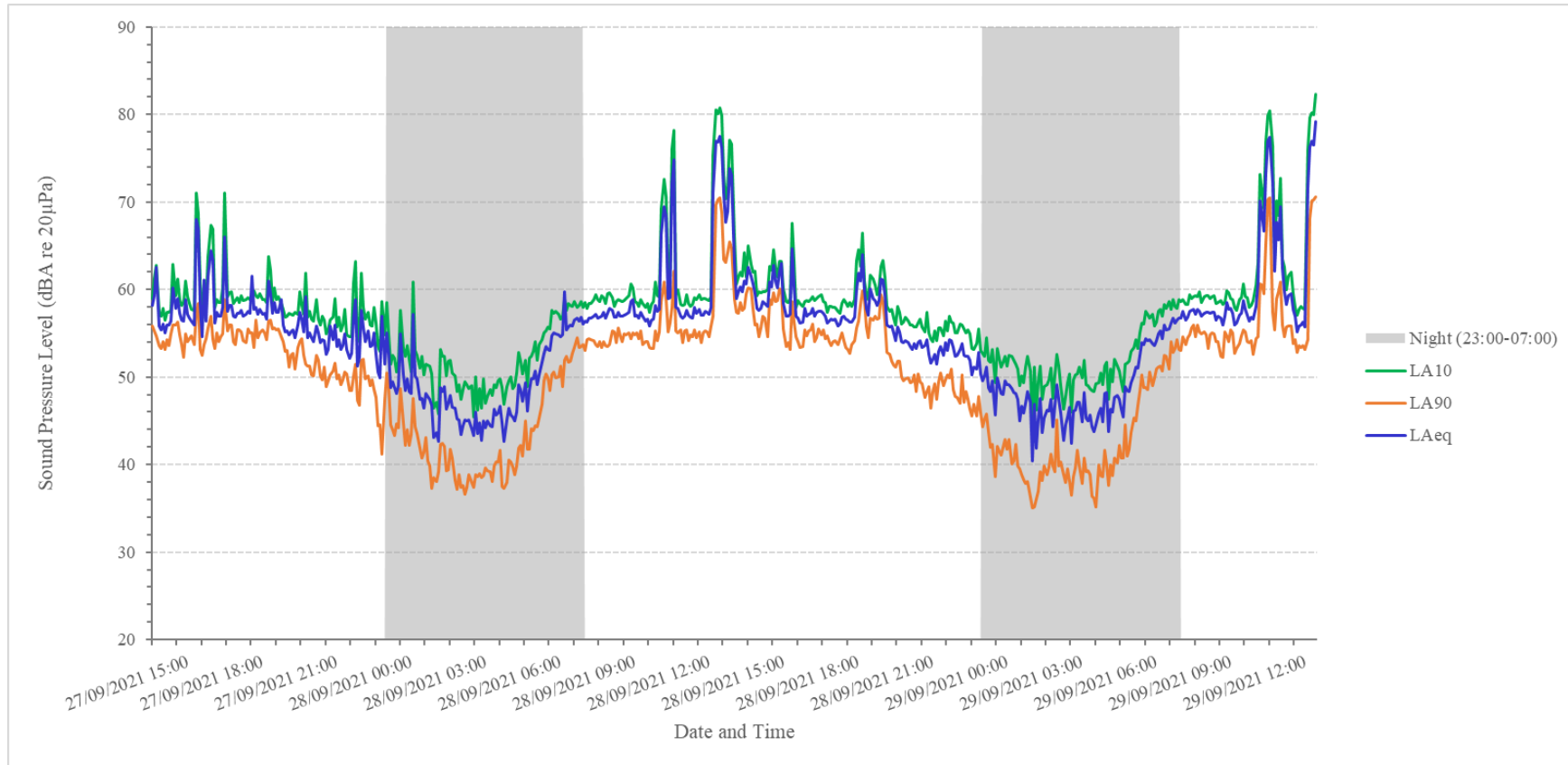


Figure 2: Time history for the unattended measurement at location L

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 Llys Derwen, Despenser Ave and Clos Leland, 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].

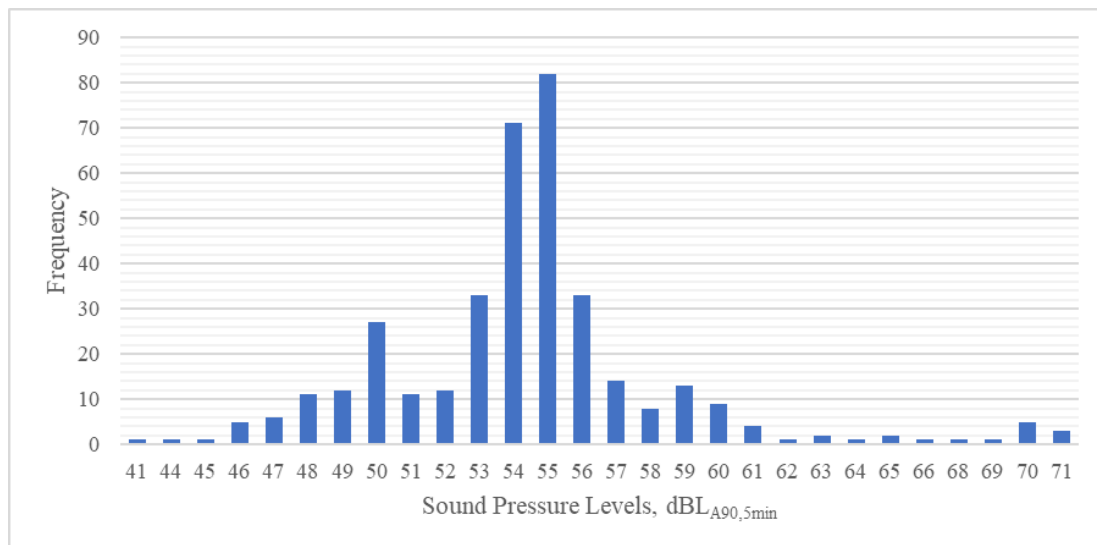


Figure 3: Distribution of daytime 5 minute L_{A90} noise levels at location L

The most commonly occurring (mode) background sound level in the daytime is 55 dB $L_{A90,5minutes}$, which is considered representative of the nearest noise sensitive receptors to the south.

The typical daytime background sound level that is representative of the nearest noise sensitive receptors to the North of the site is 52 dB $L_{A90,5minutes}$.

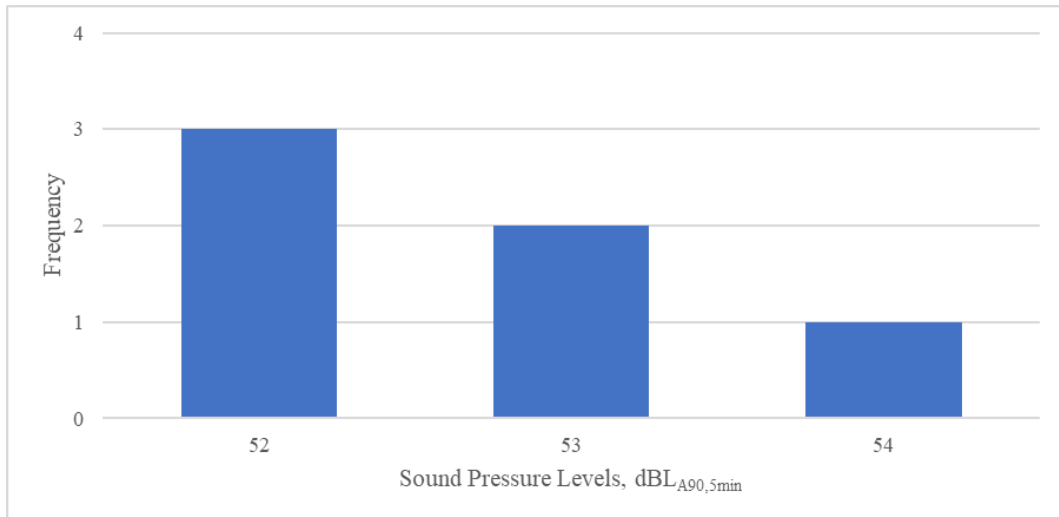


Figure 4: Distribution of daytime 5 minute L_{A90} noise levels at location 2

At the logger location the mode background sound level at night was 42 dB $L_{A90,5minutes}$. Applying the 3dB difference observed between the daytime background noise levels, the typical night time background noise level at receptors to the North is taken to be 39 dB $L_{A90,5 minutes}$.

4.3 Noise emission limits

Error! Reference source not found. 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, dBL _{Ar,Tr} (normal operation)		Emergency plant noise limit dBL _{Ar,Tr} (all times)
		Day (0700-2300)	Night (2300-0700)	
Penygawsi	Residential properties on Despenser Ave and Clos Leland	47	34	62
	Residential properties on Llys Derwen	50	37	65

Table 3: Building services noise emission limits

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 Penygawsi Primary School to establish existing baseline noise levels.

Site noise is dominated by road traffic on the A4119 and this is considered representative of the existing noise environment at the nearest noise sensitive receptors on Llys Derwen, Despenser Ave and Clos Leland.

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 in the North West corner of the site on the large grassy area. The location is considered representative of the highest noise exposure of the proposed new school building.

Environment and Observations:

Dominant source of noise is road traffic on the A4119 and school activities during the daytime. Some strong gusts of wind (up to 12m/s) causing noise from nearby rustling trees.

Measurement Duration:

Wed 29/09/2021 11:06 to
 Wed 29/09/2021 12:00

Weather Conditions:

Wind Speed: 5
 Wind Direction: WNW
 Summary: Moderate to low cloud cover, temperature of 11 degrees C, dry conditions



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)	51	55	57	62 - 76

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							
29/09/2021	11:06	00:05:00	51.4	57.3	57.4	76.0	
29/09/2021	11:12	00:05:00	50.8	54.0	55.9	61.6	
29/09/2021	11:18	00:05:00	50.8	53.7	55.3	65.1	
29/09/2021	11:44	00:05:00	50.3	53.8	56.1	62.2	
29/09/2021	11:49	00:05:00	51.3	54.9	57.6	64.3	
29/09/2021	11:55	00:05:00	51.8	54.9	57.1	65.7	

Table A2: Measured sound pressure levels at Location 1

A1.1.2

A1.1.3 Location 2

Location Description:

Location 2 is on the North East boundary of the site. The location is representative road than Location 1, but on higher ground so more exposed to the of the nearest noise sensitive road. receptor to the proposed school building.

Environment and Observations:

Dominant source of noise is road traffic on the A4119 and school activities during the daytime. Location 2 is further set back from the

Measurement Duration:

Wed 29/09/2021 10:57
to
Wed 29/09/2021 12:20

Weather Conditions:

Wind Speed: 5
Wind Direction: WNW
Summary: Moderate to low cloud cover, temperature of 11 degrees C, dry conditions

Personnel:

Matthew Gray and Grace Lampkin



Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-23:00)	53	56	57	63 - 74

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							
29/09/2021	10:57	00:05:00	54.4	56.8	58.3	69.1	
29/09/2021	11:31	00:05:00	51.8	54.2	56.1	66.7	
29/09/2021	11:37	00:05:00	51.7	53.7	55.3	62.7	
29/09/2021	12:03	00:05:00	51.8	55.7	58.3	73.7	
29/09/2021	12:09	00:05:00	53.0	56.8	59.2	68.0	
29/09/2021	12:15	00:05:00	52.5	55.4	57.1	63.7	

Table A4: Measured sound pressure levels at Location 2

A1.2 Unattended

A1.2.1 Location L

Location Description:

The noise logger was located next to the infant playground on the South end of the site. The location is considered representative of the nearest noise sensitive receptors to the south of the site.

Measurement Duration:

Mon 27/09/2021 13:33
to
Wed 29/09/2021 12:28

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.

Environment and Observations:

The daytime noise levels reflect the sound of school activities and children playing nearby. Outside of school hours and during the night, the noise levels represent the baseline conditions at nearby residential receptors to the south of the site.

