



Site Suitability Assessment for Further Development at
The Heights Primary School, 82 Gosbrook Road, Caversham
For Reading Borough Council
Report No. [JAE10329-REPT-00-R1]

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Quality Management

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1 Introduction

- 1.1 The Acoustics Team at the Brighton office of RPS Planning and Environment (RPS) has been appointed by Reading Borough Council School Services to provide an acoustics assessment to support a planning application for further development at 82 Gosbrook Road, Caversham, Reading to:
- extend an existing approval for a temporary school building for a further two years;
 - apply for approval for a further two storey, six classroom modular block unit; and
 - apply for approval to temporarily annex an area of adjacent recreation ground.
- 1.2 Planning permission for the school was granted in 2014 and RPS provided a noise assessment report to support the planning application. RPS updated the noise assessment report in 2015 (JAE7973 Rev3; 17 July 2015), to support the application for an extension. Accordingly, this report provides an update to the previous reports that supported those applications.
- 1.3 Measurements of the baseline noise levels from 2014 have been validated within this report. An assessment of the suitability of the extension for use as a school has been carried out based upon the measured noise levels according to the Department for Education guidance in 'Building Bulletin 93 Acoustic Design of Schools: Performance Standards' (BB 93:2014) [1]. An assessment of the noise impact from road traffic associated with the proposals has also been provided. A summary of the standards and guidance on which this report is based is provided in Appendix A.
- 1.4 The technical content of this assessment has been provided by RPS personnel, all of whom are corporate (MIOA) or non-corporate, associate members (AMIOA) of the IoA (the UK's professional body for those working in acoustics, noise and vibration). This report has been peer reviewed within the RPS team to ensure that the wealth of experience within the team is reflected in the assessment. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics.

2 Baseline Conditions

2014 Baseline Noise Survey

- 2.1 In order to establish the existing baseline noise environment, one baseline noise survey (LT_1) was undertaken over a seven day period between Tuesday 20th May and Tuesday 27th May 2014. The baseline noise monitoring location is shown on Figure 1. A summary of the measured noise levels is provided in Table 2.1, with further details provided in Appendix B and a time-histogram provided in Figure 2.
- 2.2 Survey LT_1 was located towards the western boundary of the proposed school. The microphone was installed in free-field conditions (i.e. at least 3.5 m from any reflecting surfaces, excluding the ground) and mounted on a pole approximately 1.5 m high. During the setting up and collection of the survey, the following noise sources were audible: road traffic on Gosbrook Road, members of the public in the adjacent recreation ground, aircraft overhead and birdsong. The instrumentation used for the survey was a Rion NL-31 Class 1 sound level meter set to record 100 ms samples.
- 2.3 In addition to the long term survey described above, one attended 30-minute short-term survey (ST_1) was also carried out on Wednesday 27th May 2014; the location of the short-term survey is shown on Figure 1. A summary of the measured noise levels is provided in Table 2.2, with further details provided in Appendix B.
- 2.4 Survey ST_1 was located towards the eastern boundary of the proposed school. The microphone was installed in free-field conditions (i.e. at least 3.5 m from any reflecting surfaces, excluding the ground) and mounted on a pole approximately 1.5 m high. During the survey period, the following noise sources were audible: road traffic on Gosbrook Road, aircraft overhead and birdsong. The instrumentation used for the survey was a Rion NL-31 Class 1 sound level meter set to record 100 ms samples.
- 2.5 The meters were checked for calibration immediately prior to and following the surveys using a Rion NC-74 calibrator. All instrumentation was within a two-year calibration period.
- 2.6 A summary of the measured noise levels is provided in Tables 2.1 and 2.2. For the long-term survey, noise levels have been calculated for the period of a typical school day (08:00 to 16:00 hours) using data obtained from the survey during days that the school would be operational (i.e. term-time days 21st, 22nd, and 23rd May). The metrics have been determined for each full 8-hour period below, and for each 30-minute period in Appendix B. Levels have been rounded to the nearest whole number.
- 2.7 Weather conditions were noted for the survey period from a nearby weather station¹. These were largely dry with minimal rain and with wind speeds below 5 m/s on most days. On the night of beginning Wednesday 21st May, there was some more heavy rainfall that may have influenced the survey data.

¹ <http://www.wunderground.com/personal-weather-station/dashboard?ID=IBERKSHI7>

Table 2.1 Baseline Noise Monitoring Data from Long Term Survey LT_1

Period	Noise Survey Metric (dB)			
	L _{Aeq,8hr}	L _{Amax}	L _{A10,8hr}	L _{A90,8hr}
Wednesday 21/05/2014 08:00-16:00	54	85	54	44
Thursday 22/05/2014 08:00-16:00	54	90	54	46
Friday 23/05/2014 08:00-16:00	54	90	54	48

Table 2.2 Baseline Noise Monitoring Data from Short-term Survey ST_1

Location	Date	Start Time	Duration (min)	Noise Survey Metric (dB)			
				L _{Aeq,T}	L _{Amax}	L _{A90,T}	L _{A10,T}
ST_1	27/05/2014	12:31	30	52	79	46	53

2018 Noise Survey for Validation of 2014 Data

- 2.8 A noise survey was carried out at the site on 12th March 2018 while the school was operational, in order to verify that the data collected in 2014 is still representative of the noise climate on the site. Short term measurements were carried out at two locations bordering the school site, as shown in Figure 3, one to the rear of the neighbouring flats, and one outside the main school gates in the adjacent park. Measurements were taken over three consecutive hours over the course of a normal school day, whilst the children were inside the building.
- 2.9 The survey was carried out using a 'Class 1' Rion NL-52 sound level meter, in accordance with BS 7445-2:1991 [4]. The meter was calibrated before and after use with a Rion NC-74 calibrator with no significant drift occurring. Data were logged of the broadband A-weighted sound pressure levels in 100 ms samples, with the required periods extracted in post-processing.
- 2.10 A summary of the measured data is provided in Table 2.3.

Table 2.3 2018 Short Term Validation Survey Results

Start Time	Duration	Noise Metric / dB(A)				Sources
		L _{Aeq,T}	L _{Amax,T}	L _{A10,T}	L _{A90,T}	
Location 1 – Rear of Gosbrook Road flats						
11:39:00	00:14:53	50	72	51	42	Traffic on local roads and birds are continuous; frequent aircraft; distant voices; doors closing and keys from flats.
13:19:00	00:14:05	47	67	49	41	Local road traffic and birdsong continuous; occasional car horn; aircraft and doors slamming.

Start Time	Duration	Noise Metric / dB(A)				Sources
		L _{Aeq,T}	L _{Amax,T}	L _{A10,T}	L _{A90,T}	
14:21:00	00:14:55	49	64	53	42	Traffic on local roads and birds are continuous; ; frequent aircraft;. occasional distant voices.
Location 2 – Park outside school gates						
11:58:00	00:14:42	54	67	57	50	Road traffic dominates; frequent aircraft; voices inside classrooms, and from playground to the north; church bells.
13:39:00	00:14:53	55	62	57	50	Local traffic is continuous; distant voices; passing pedestrians talking; birds; light rain through the measurement.
14:39:00	00:14:22	56	82	58	52	Local traffic dominates; children's voices from school audible whilst outside; occasional aircraft; pedestrian activity around school entrance; school gate slamming.

- 2.11 The results from the 2018 survey have a strong correlation with the results from the 2014 long term survey. Location 2 from the 2018 survey was situated very close to the long term location (LT_1) from the 2014 survey, and shows an average of 1 dB increase in the L_{Aeq}. The original 2014 survey was conducted when the site was empty, and any changes are likely to be due largely to the fact that it is now in use, particularly with regards to the third measurement in Location 2, during which there was some pedestrian activity around the site entrance. Whilst on site it was observed that during break times there was noise from children within the playgrounds of the adjacent school, St Anne's Catholic Primary, which was dominant at Location 1, and also some contribution to the noise from children playing within the outdoor areas of The Heights school.
- 2.12 Whilst there was a 2 dB increase in the measured L_{A90} during the 2018 survey, compared with the 2014 survey, this may have been due to a temporary increase in road traffic during the survey period and is not considered likely to represent an overall increase in the baseline noise environment. It is therefore considered, that for the purpose of this assessment, long-term baseline data measured in 2014 is still representative of the existing sound environment at the site.

3 Assessment

Building Façade Specifications – Proposed New Modular Block

- 3.1 Internal ambient noise level in classrooms should meet the values given in Tables 1 and 2 of BB 93, provided in Appendix A. The majority of teaching and learning spaces need to achieve an internal ambient noise level of 35 dB $L_{Aeq,30min}$ or less. For some specialist teaching rooms, including some music rooms and large lecture rooms, an internal ambient noise level of 30 dB $L_{Aeq,30min}$ or less would be required. For open plan teaching areas, and less sensitive spaces such as science laboratories and sports halls, an internal ambient noise level of 40 dB $L_{Aeq,30min}$ or less is required.
- 3.2 Sound insulation of façades is usually determined by the insulation provided by the glazing and the ventilation. A classroom façade with open windows will provide a sound reduction of 10 to 15 dB(A) to road traffic noise. Based upon the monitoring carried out at LT_1 between the 21st and 23rd May 2014, from Appendix B, the external daytime noise levels typically range between 50 and 58 dB $L_{Aeq,30min}$, with levels in only two periods below this range at 49 dB $L_{Aeq,30min}$ and only one period above this range at 63 dB $L_{Aeq,30min}$. From Table 2.2, the noise level monitored at ST_1 was 52 dB $L_{Aeq,30min}$, which is within the typical range of the long term survey and validated by the $L_{Aeq,15min}$ measurements taken in March 2018, indicating that there is little variation in the noise climate on site. On this basis, the typical daytime noise levels are robustly represented by the $L_{Aeq,8h}$ measured over the operational hours of the school which was 54 dB $L_{Aeq,8h}$ on each of the days surveyed. For these noise levels, natural ventilation via open windows will be appropriate for this site.
- 3.3 Further specifications for sound insulation and indicative constructions are set out in Table 3.1 below considering spaces with criteria for IANLs of 40 dB $L_{Aeq,30min}$, 35 dB $L_{Aeq,30min}$ and 30 dB $L_{Aeq,30min}$.

Table 3.1 Required Façade Performance of Elements

Internal Noise Requirements	Walls	Glazing	Ventilation
40 dB $L_{Aeq,30min}$ Spaces	R_w 45 dB Standard Brick and Block OR Lightweight cladding with acoustic linings	R_w 20 dB Any	Any
35 dB $L_{Aeq,30min}$ Spaces	R_w 45 dB Standard Brick and Block OR Lightweight cladding with acoustic linings	R_w 20 dB Any	Any

Internal Noise Requirements	Walls	Glazing	Ventilation
30 dB $L_{Aeq,30min}$ Spaces	R_w 45 dB Standard Brick and Block OR Lightweight cladding with acoustic linings	R_w 25 dB Any	Any

- 3.4 In addition, it is considered that, as the façade performance requirements stated above are the same as those previously presented in the original RPS report, internal ambient noise levels within the existing school buildings are within acceptable limits.

Noise Impact of the Extension on Surrounding Area

- 3.5 The site is located in a mainly residential area with flats immediately to the south-east on Gosbrook Road and other residential areas located between 80 m and 150 m away in all directions. The additional modular block and outdoor space will result in a larger number of pupils and could consequently result in higher sound levels from the school site. This will be particularly prevalent at break times when the children are outside. Due to the site being located adjacent to another primary school, St Anne's Catholic Primary, and the two schools sharing break times, it is not practicable to measure the influence of each school on overall noise levels. However, whilst on site in March 2018 it was observed that the existing sound environment during break times was dominated by noise from the adjacent St Anne's Catholic Primary School. It was noted that during these periods, the comparative noise impact from The Heights Primary School was minimal.
- 3.6 It is understood that there have previously been complaints from local residents relating to noise from the adjacent playing field and park area. The current proposal would see the temporary annexation of a section of playing field to the east of the existing school site. This area would be used by pupils during break times and as such, noise from the playing field would likely increase during these periods.
- 3.7 Whilst the additional pupils may result in higher than existing noise levels during break periods, due to the relatively short period of time over which this would occur (assuming a cumulative total of 1.5 hrs during the normal school day) it is not considered that noise from pupils during break times are likely to result in a significant impact at the nearest NSRs.
- 3.8 We understand that there will be no new mechanical plant installed on site as part of the proposals; therefore this has not been considered further.

Road Traffic Noise

- 3.9 An assessment of noise from traffic generation associated with the development has been carried out based upon traffic data provided by RPS for the following scenarios:

- 2018 with the current development;
 - 2036 without the proposed development; and
 - 2036 with the proposed development.
- 3.10 The quoted levels are the change in noise levels arising along each road-link; these reflect the maximum noise change over the 18 hour period that might be experienced by the NSRs for which that link is the dominant noise source. Data have been produced for each scenario for a total of six different road-links.
- 3.11 Traffic data have been generated for the daytime period in terms of AAWT 06:00 to 24:00 as this is commensurate with the methodology contained with Calculation of Road Traffic Noise [2] calculation methodology. As there is no increase in night-time traffic, a night-time noise assessment is not necessary.
- 3.12 Calculations of noise change have been undertaken for the following scenarios:
- 2036 with the proposed development compared with 2018 with the current development; and
 - 2036 with the proposed development compared with 2036 without the proposed development.
- 3.13 The results of the traffic noise change assessment are provided in Appendix C. These have been assessed in accordance with the criteria from the Design Manual for Roads and Bridges Volume 11 Section 3 Part 7: 'Noise and Vibration' [3] (DMRB) for the assessment of road traffic noise in the long term as the links are existing and there is no new road introducing a new source to the area.
- 3.14 The calculations in Appendix C indicate that, for the comparison between 2036 with the proposed development minus 2018 with the current development, a noise change of up to 1.1 dB is expected. From Table A.3, this constitutes a '**negligible**' change in the long-term. For the comparison between 2036 with the proposed development minus 2036 without the proposed development, a noise change of up to 0.5 dB is expected. From Table A.3, this constitutes a '**negligible**' change in the long-term. On this basis the traffic associated with the new development will not cause a noise increase that would be perceptible at NSRs within the vicinity of the site.

4 Summary and Conclusions

- 4.1 The Acoustics Team at the Brighton office of RPS Planning and Development (RPS) has been appointed by Reading Borough Council School Services to provide an acoustics assessment to support a planning application for further development at 82 Gosbrook Road, Caversham, Reading to:
- extend an existing approval for a temporary school building for a further two years;
 - apply for approval for a further two storey, six classroom modular block unit; and
 - apply for approval to temporarily annex an area of adjacent recreation ground.
- 4.2 Planning permission for the school was granted in 2014 and RPS provided a noise assessment report to support the planning application. RPS updated the noise assessment report in 2015, to support the application for an extension. Accordingly, this report provides an update to the previous reports that supported those applications.
- 4.3 One long term survey was undertaken at the site in 2014 over a seven day period which included three periods that were representative of the school day. Additional validation surveys were undertaken in 2018 which showed that survey data collected in 2014 was still considered representative of the existing noise environment. As such, previously recommended façade requirements for the existing school building are still considered appropriate.
- 4.4 An assessment was carried out to determine if the internal noise levels recommended in BB 93:2014 could be achieved at the proposed new modular block. Based on the measured noise levels, natural ventilation via partially open windows would be appropriate for teaching and learning spaces within this building.
- 4.5 Noise from road traffic has been considered in the assessment. The expected change in noise levels due to road traffic associated with the new development will be at a level sufficiently low that it will not cause a noise increase that would be perceptible at NSRs within the vicinity of the site.
- 4.6 On the basis of the above, it is considered that noise should not be a material concern with respect to the determination of planning permission for the proposed site.

References

- 1 Department for Education. Building Bulletin 93. Acoustic Design of Schools: Performance Standards. Crown Copyright. 2014.
- 2 Department of Transport (1988) Calculation of Road Traffic Noise
- 3 Highways Agency. Design Manual for Roads and Bridges. Volume 11. Section 3. Part 7: Noise and Vibration. August 2008.
- 4 British Standards Institute. British Standard 7445: Description and Measurement of Environmental Noise. Part 1: Guide to Environmental Quantities and Procedures. 2003.
- 5 Office of the Deputy Prime Minister. The Building (Amendment) (No. 2) Regulations. 2002.
- 6 Office of the Deputy Prime Minister. Statutory Instrument 2002 No. 2871 Building Regulations 2000 – Approved Document E.
- 7 Statutory Instrument No. 1763. The Noise Insulation Regulations 1975. Statutory Instrument No. 2000. The Noise Insulation (Amendment) Regulations 1988. HMSO. 1975 Amended 1988.
- 8 Highways Agency. Design Manual for Roads and Bridges. Volume 11: Environmental Assessment. Section 3: Environmental Assessment Techniques. Part 7: Noise and Vibration. HMSO. November 2011.

Figures

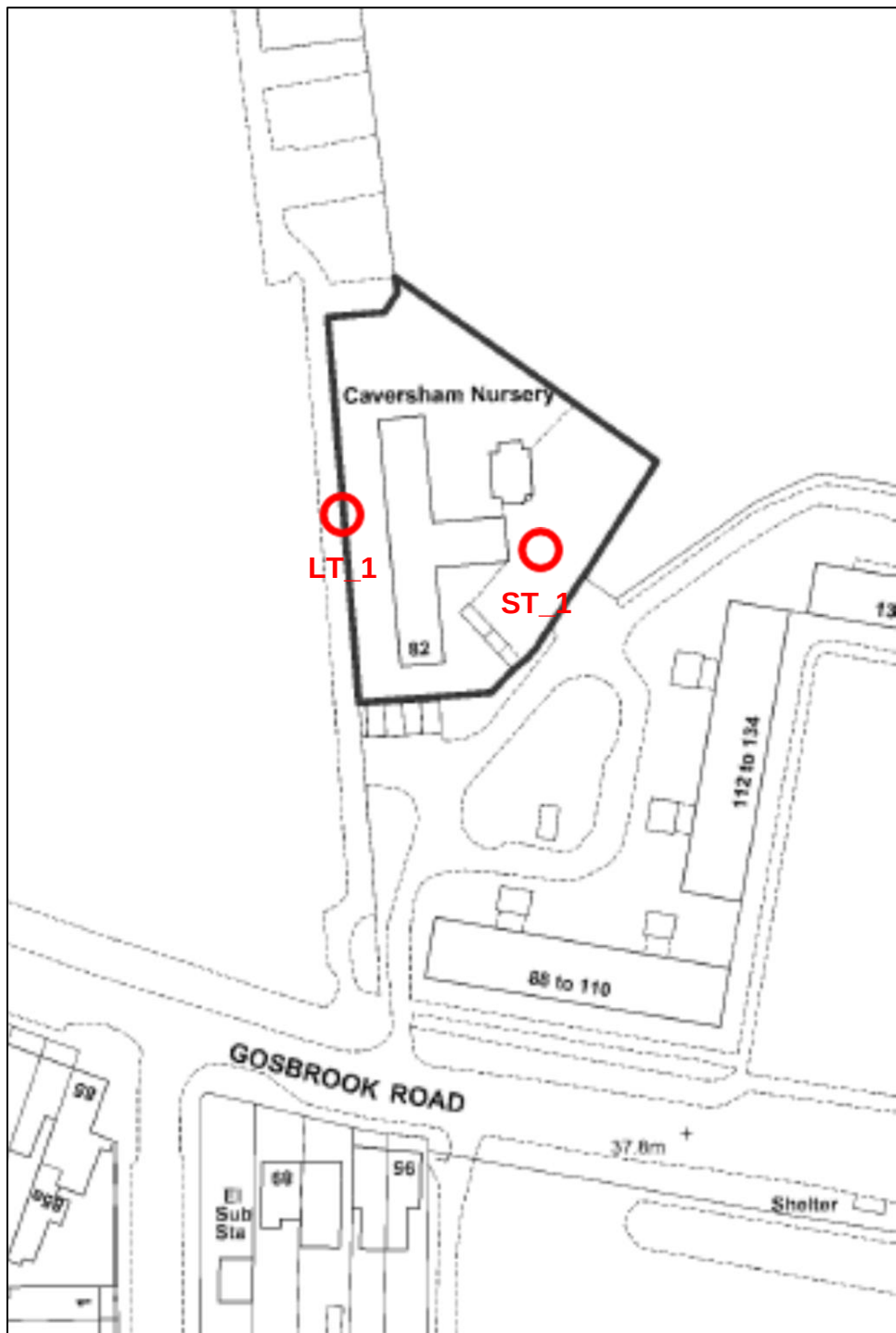
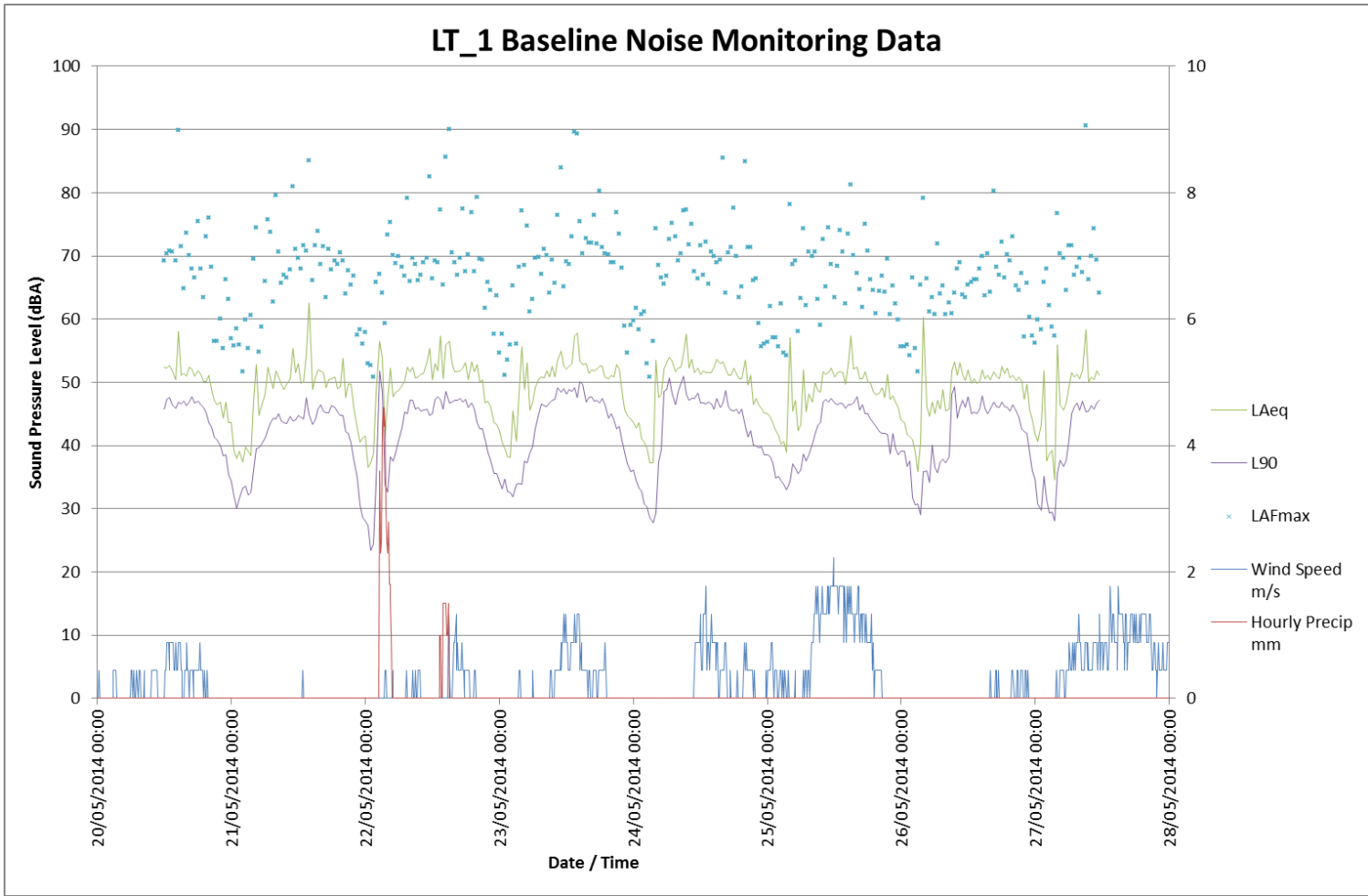


Figure 1: 2014 Baseline Noise Monitoring Locations

Project Number	JAE 7973	Project Title	The Heights Primary School		
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		Date:	30/05/2014	Checked By:	SH
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Figure 2: Long Term Baseline Noise Monitoring Data - 2014

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Figure 3: 2018 Validation Survey Locations

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Appendices

Appendix A: Standards and Guidance

Noise

- A1. Noise is defined as sound unwanted by the recipient. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.
- A2. For variable noise sources such as traffic, a difference of 3 dB(A) is generally perceived as just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB(A). The “loudness” of a noise is a purely subjective parameter but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.
- A3. External noise levels are rarely steady but rise and fall according to activities within an area. In an attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:
- **The L_{Aeq} noise level:** This is the “equivalent continuous A-weighted sound pressure level, in decibels” and is defined in British Standard BS 7445 [4] as the “value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time”. It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.
 - **The L_{A90} noise level:** This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

Building Regulations 2000 Approved Document E (Revised Edition)

- A4. Regulation E4 of the Building Regulations 2000 [5] deals with the acoustic requirements in schools. E4 states:
- “(1) Each room or other space or other space in a school shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.”*

- A5. Section 8 of Approved Document E (ADE) [6] ADE states:

“In the secretary of state’s view the normal way of satisfying requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise level which are given in section 1 of building bulletin 93. Acoustic Design of Schools: A design guide.”

Building Bulletin 93 – Acoustics Design of Schools: Performance Standards

- A6. The Department for Education has produced Building Bulletin 93, Acoustic Design of Schools: Performance Standards (BB93:2014). The aim of the Bulletin is to provide guidance on the acoustic design for schools and is supported by the Building Regulations. It provides a comprehensive guide for architects, building control bodies, building services engineers and others involved in the design of new school buildings. The objective is to provide suitable internal ambient noise levels for clear communication between students and teachers, between students themselves and for quiet study.
- A7. The document states that all teaching and learning spaces within a school building should meet the performance standards defined within the document for ambient noise, reverberation time and airborne and sound insulation for each of the areas defined. Table 1 of the document contains recommended performance standards for indoor rooms, measured as the internal ambient noise level (IANL), $L_{Aeq,30mins}$. Table A.1 below provides a summary of the sections of Table 1 of BB93:2014 that relate to IANLs.

Table A.1 Upper limits for indoor ambient noise levels

Type of room	Upper Limit for the indoor ambient noise level $L_{Aeq,30mins}$ dB	
	New build	Refurbishment
Nursery school rooms <i>Primary school:</i> classrooms, class base, general teaching area, small group room <i>Secondary school:</i> classroom, general teaching area, seminar room, tutorial room, language laboratory Music room / control room ¹ Lecture room	35	40
<i>Open plan:</i> Teaching area, Resource/breakout area Study Room <i>Libraries:</i> Quiet study area, resource area Science laboratory Design and technology Sports hall / studio / gymnasium Meeting room, interviewing / counselling room Drama studio, assembly hall, multi-purpose hall	40	45
Performance/recital room, ensemble room, recording studio ¹ Teaching space intended specifically for students with special hearing and communication needs ²	30	35

Type of room	Upper Limit for the indoor ambient noise level $L_{Aeq,30mins}$ dB	
	New build	Refurbishment
SEN calming room	35	35
Atrium, circulation space Dining room	45	50
Swimming pool	50	55
<i>Administration and ancillary spaces:</i>		
Kitchen, changing area, toilet	50	55
Office, medical room, staff room	40	45
Corridor, stairwell, coats and locker area	45	55

1 Music rooms – the levels of sound insulation between some music rooms may not be sufficient for particularly noisy activities and timetabling/management will need to be considered. Wherever possible music accommodation should make use of buffer spaces such as stores to increase the levels of sound insulation between rooms and to isolate rooms where very noisy activities such as drum practice will take place. If timetabling/management or isolation is not possible the levels of sound insulation should be increased. For further guidance on the design of music accommodation see 'Music Accommodation in Secondary Schools: a Design Guide', DfE, NBS/RIBA, 2010 and 'Acoustics of Schools: a design guide'

2 APSs are commonly required for these rooms and should be agreed by an acoustician and the school client body. See section 0.4.

A8. A summary of the IANL limit for normal ventilation conditions is provided in Table A.2

Table A.2 Summary of system type and associated IANL tolerance for normal ventilation conditions

Condition	Ventilation system	Noise level limit
Normal – ventilation for normal teaching and learning activities	Mechanical ¹	Table 1 value
	Natural ²	Table 1 value + 5 dB ³
	Hybrid ²	Mechanical system noise: Table 1 value
		Total noise level: Table 1 value + 5 dB ³

1 The normal condition for a ventilation system with purely mechanical air supply is defined as when the system is operating to limit the daily average carbon dioxide concentration to no more than 1,000ppm with the maximum concentration not exceeding 1,500ppm for more than 20 consecutive minutes on any day during normal school operating hours. This would normally equate to a minimum ventilation rate of approximately 8l/s per person. Mechanical ventilation in this context refers to systems (or parts of systems) that use mechanical fans to mix or drive the air including those in mechanical, hybrid, mixed mode and natural ventilation systems and in fan convactor heaters.

2 The normal condition for a ventilation system in natural or hybrid mode is defined as when the system is operating to limit the daily average carbon dioxide concentration to no more than 1,500ppm with the maximum concentration not exceeding 2,000ppm for more than 20 consecutive minutes on any day. This would normally equate to a minimum ventilation rate of approximately 5l/s per person. For hybrid systems, the mechanical noise excluding external noise break in, should meet the IANL figure in Table A.1.

3 The +5 dB does not apply to teaching and learning spaces where the Table A.1 IANL is greater than or equal to 45 dB.

Calculation of Road Traffic Noise, 1988

A9. The Department of Transport document, Calculation of Road Traffic Noise (CRTN), describes the procedures for measuring and calculating noise from road traffic. These procedures are necessary to enable entitlement under The Noise Insulation Regulations [7] to be determined but they also provide guidance appropriate to the calculation of traffic noise for more general applications e.g. environmental appraisal of road schemes, highway design and land use

planning. The document can also be used to generate scaling factors for expected increases in road traffic and expected levels of attenuation from barriers.

Design Manual for Roads and Bridges Volume 11, Section 3, Part 7: Noise and Vibration

- A10. The 'Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7'[8], provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration impacts arising from all road projects including new construction, improvements and maintenance.
- A11. Generally a project should be considered for assessment if it alters the alignment of any existing carriageways including new sections of road, additional junctions and slip roads or if there is a change in traffic volume, traffic speed, proportion of heavy vehicles or changes in infrastructure surrounding the road that could cause a change in noise level of more than 1 dB(A); and if there are any dwellings within two kilometres of the project that would be subject to a change in noise or vibration. DMRB states that an increase in traffic flow by at least 25% or a decrease by 20% is equivalent to a 1 dB(A) change in noise level.
- A12. DMRB defines a simple and detailed method for assessing the impacts of road traffic noise. The simple method is used as a preliminary assessment to determine if there will be any significant change in noise levels. It is based on a comparison between baseline conditions in the opening year of the development and conditions with the development in the future assessment year which is typically the 15th year after the opening of a project. Calculations are made of the increase or decrease in noise level between the two scenarios for dwellings and other sensitive receptors within 600 m either side of the centreline of the affected routes.
- A13. The detailed method is based upon two comparisons; one between baseline conditions within the opening year of the development and conditions with the development in the opening year; and one between conditions with the development in the opening year and conditions with the development in the future year. For this assessment calculations are made both of the increase or decrease in noise level and of the increase or decrease in nuisance level. The calculation of nuisance level draws upon a number of studies on perceived traffic noise nuisance which are referred to in Annex 3 of the document.
- A14. The classification of magnitude of impacts to be used for traffic noise from the base year is provided in Table A.3 for short term effects, between the base year and the opening year; and Table A.4 for long term effects, between the base year and the future year.

Table A.3: Calculation of Magnitude of Noise Impacts in the Short Term

Noise Change, $L_{A10,18hr}$	Magnitude of Impact
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5+	Major

Table A.4: Calculation of Magnitude of Noise Impacts in the Long Term

Noise Change, $L_{A10,18hr}$	Magnitude of Impact
0	No change
0.1 – 2.9	Negligible
3 – 4.9	Minor
5 – 9.9	Moderate
10+	Major

- A15. Annex 4 of the document provides additional advice on procedures for the calculation of road traffic noise to that already published in the 'Calculation of Road Traffic Noise' (CRTN). It draws upon more recent research which correlates to developments in road design, surface materials and noise mitigation measurements.

Appendix B: Noise Monitoring Data - 2014

Long Term Noise Monitoring Data

Day	Start of Period	Noise Survey Metric dB			
		L _{Aeq}	L _{AFmax}	L _{A10}	L _{A90}
Tuesday	20/05/2014 12:00	52.4	69.2	54.1	45.7
	20/05/2014 12:30	52.3	70.3	54.8	47.3
	20/05/2014 13:00	52.7	70.8	54.5	47.6
	20/05/2014 13:30	51.9	70.6	53.8	46.4
	20/05/2014 14:00	50.4	69.2	51.8	45.9
	20/05/2014 14:30	58.1	89.9	54.4	46.9
	20/05/2014 15:00	51.1	71.5	52.7	46.6
	20/05/2014 15:30	51.4	64.8	53.5	47.0
Wednesday	21/05/2014 08:00	51.9	79.5	51.3	44.2
	21/05/2014 08:30	50.8	70.7	53.1	45.1
	21/05/2014 09:00	49.7	65.7	52.1	43.9
	21/05/2014 09:30	48.9	66.9	51.6	43.7
	21/05/2014 10:00	49.7	66.6	51.8	43.5
	21/05/2014 10:30	50.6	67.8	53.1	44.6
	21/05/2014 11:00	55.4	81.0	56.8	43.9
	21/05/2014 11:30	51.6	71.1	53.5	44.1
	21/05/2014 12:00	53.0	69.7	56.6	44.7
	21/05/2014 12:30	49.8	68.0	52.3	44.5
	21/05/2014 13:00	50.2	71.7	51.9	44.2
	21/05/2014 13:30	54.4	70.8	56.7	47.6
	21/05/2014 14:00	62.6	85.1	59.1	44.9
	21/05/2014 14:30	48.8	66.1	50.6	43.4
	21/05/2014 15:00	50.7	71.6	51.7	44.0
	21/05/2014 15:30	52.0	73.9	52.4	45.7

Day	Start of Period	Noise Survey Metric dB			
		L _{Aeq}	L _{AFmax}	L _{A10}	L _{A90}
Thursday	22/05/2014 08:00	51.7	66.0	53.5	47.1
	22/05/2014 08:30	52.4	69.7	53.9	47.1
	22/05/2014 09:00	50.7	68.7	52.6	45.7
	22/05/2014 09:30	50.8	66.1	52.8	46.1
	22/05/2014 10:00	51.3	67.0	53.6	45.5
	22/05/2014 10:30	51.4	69.0	54.2	45.6
	22/05/2014 11:00	53.2	69.7	54.7	45.8
	22/05/2014 11:30	55.3	82.5	54.6	44.7
	22/05/2014 12:00	50.4	66.4	52.9	45.0
	22/05/2014 12:30	53.0	69.2	55.3	47.3
	22/05/2014 13:00	51.8	69.0	54.0	47.8
	22/05/2014 13:30	57.4	77.3	61.5	47.3
	22/05/2014 14:00	50.6	65.4	53.0	45.8
	22/05/2014 14:30	56.0	85.7	55.0	48.6
	22/05/2014 15:00	56.5	90.0	53.0	46.7
	22/05/2014 15:30	52.9	70.5	54.7	46.9
Friday	23/05/2014 08:00	50.7	71.0	53.0	46.3
	23/05/2014 08:30	51.9	70.1	53.1	46.2
	23/05/2014 09:00	50.8	64.2	52.9	46.7
	23/05/2014 09:30	52.5	69.4	54.0	47.1
	23/05/2014 10:00	50.9	65.7	53.1	47.3
	23/05/2014 10:30	53.5	76.4	54.9	49.1
	23/05/2014 11:00	54.9	84.0	54.5	48.4
	23/05/2014 11:30	52.6	65.1	54.9	49.0
	23/05/2014 12:00	52.1	69.1	54.2	48.1
	23/05/2014 12:30	52.5	68.7	54.3	48.9
	23/05/2014 13:00	53.0	73.1	55.0	48.6
	23/05/2014 13:30	57.4	89.6	56.0	49.1
	23/05/2014 14:00	57.8	89.3	53.6	47.6
	23/05/2014 14:30	53.4	75.4	55.0	50.1
	23/05/2014 15:00	52.8	70.4	54.5	49.7
	23/05/2014 15:30	53.0	72.7	53.9	46.9

Appendix C: Road Traffic Noise Assessment

APPENDIX C: Road Traffic Noise Assessment

Job No: JAE10329

Date: 27/03/2018

CRTN CALCULATIONS FOR NOISE CHANGE - 18-hour Flows (06:00 - 24:00 hours)

		2021 With the Proposed Development	2021 With the Proposed Development	2036 With the Proposed Development	2036 With the Proposed Development
		minus	minus	minus	minus
No	Road Section	2018 Base Year	2021 Without the Proposed Development	2018 Base Year	2036 Without the Proposed Development
1	Church Street	0.4	0.2	1.1	0.2
2	Prospect Street	0.7	0.5	1.4	0.5
3	Westfield Road	0.3	0.1	0.9	0.1
4	Gosbrook Road	0.5	0.3	1.1	0.3
5	George Street	0.4	0.2	1.0	0.2
6	Gosbrook Road (East of George Street)	0.4	0.2	1.0	0.2



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