



49

Corporation
Street,
Coventry

Noise Impact Assessment

October 2018



Ref: 18-4801

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<i>Revision</i>	-
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1. Executive Summary

An assessment has been carried out of the present noise climate at **49 Corporation Street, Coventry** and the impact of that noise on the proposed development. The proposed scheme involves the conversion of the existing building to provide a café/students lounge on the ground floor and student accommodation on the first to third floors above.

The site is located between Corporation Street and Bond Street in a mixed commercial and residential area. Immediately to the south-east of the proposed development site is a small park area and a church, which is located beyond Hill Street.

The assessment is based on the results of a noise measurement survey that has been carried out over a 24-hr period at the proposed development site and has considered the advice of local and national planning policy and best practice guidance.

The initial site risk assessment identified that the site has a *medium-high* risk in terms of noise at 1st floor level and a *medium* risk in terms of noise at higher floors.

It has been identified that the requirements of the Local Authority in respect of internal noise levels can only be achieved through careful consideration of the building envelope. The construction assumptions that have led to this conclusion are:

- **The façade build-up is a standard brick and block construction (or equivalent) to achieve an R_w of approximately 55 dB.**
- **For the 1st floor:**
 - **A typical double glazing system in a 10/12/6 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of 38 dB R_w .**
 - **An alternative means of ventilation, such as appropriately specified through-wall ventilators or MVHR, will be installed to allow adequate ventilation without the requirement to open windows.**
- **For the upper floors:**
 - **A double glazing system in a 4/16/6 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of at least 34 dB R_w .**
 - **An alternative means of ventilation, such as appropriately specified through-wall ventilators or MVHR, will be installed to allow adequate ventilation without the requirement to open windows.**

No outdoor amenity areas are proposed as part of the development.

Outline advice has been provided in respect of plant noise and sound insulation between the ground floor commercial units and the first floor student accommodation. The advice provided will ensure that significant adverse impacts on future occupiers of the proposed development are avoided.

Overall, it has been shown that, through careful consideration of the building envelope construction, the proposed development should avoid future residents being exposed to harmful levels of noise. It can therefore be concluded that significant adverse impacts on the health or quality of life of those future residents would be avoided, in line with the aims of the NPPF, NPSE and PPG-Noise.

2. Introduction

This report has been prepared to support the planning application for the proposed development at **49 Corporation Street, Coventry**. The proposed scheme involves the conversion of the existing building to provide a café/students lounge on the ground floor and student accommodation on the first to third floors above.

The report assesses, through on-site noise measurements, the impact of the existing noise climate on the proposed development.

The site is located between Corporation Street and Bond Street in a mixed commercial and residential area. Immediately to the south-east of the proposed development site is a small park area and a church, which is located beyond Hill Street. The location of the proposed development site is provided in **Figure 2.1**.

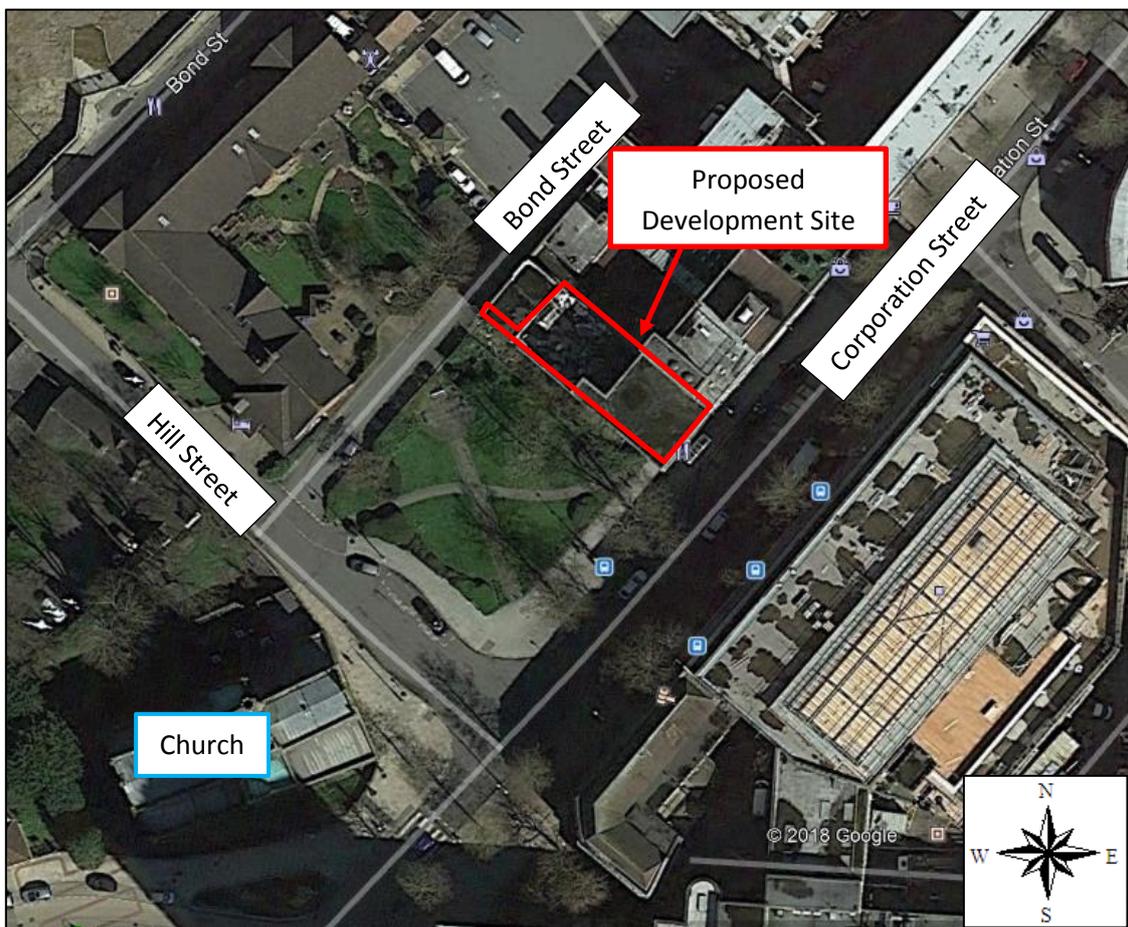


Figure 2.1: Site Location

3. Planning Policy

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was released in March 2012 and has replaced the Planning Policy Guidance which previously covered planning and pollution control and new development in England. The purpose of the planning system is to contribute to the achievement of sustainable development and to encourage good design. There are three dimensions to sustainable development: economic, social and environmental.

Central to the NPPF, paragraph 14 states: *'At the heart of the National Planning Policy Framework is a **presumption in favour of [permitting] sustainable development** which should be seen as a golden thread running through both plan-making and decision-taking...'*

*'...For **decision-taking** this means:*

- *approving development proposals that accord with the development plan without delay; and*
- *where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless:

 - *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or*
 - *specific policies in this Framework indicate development should be restricted.'**

Paragraph 17 sets out core planning principles and the most relevant elements to noise are: *'... be a creative exercise in finding ways to enhance and improve the places in which people live...'*, *'... always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings'* and *'... contribute to conserving and enhancing the natural environment and reducing pollution.'*

Paragraph 109 states *'The planning system should contribute to and enhance the natural and local environment by... preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of... noise pollution...'* and Paragraph 123 states: *'Planning policies and decisions should aim to:*

- *Avoid noise from giving rise to significant adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established (Subject to the provisions of the Environmental Protection Act 1990 and other relevant law); and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

3.2. Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) aims to ‘*through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.’*

3.3. Local Planning Policy

The site is located within the administrative boundary of Coventry City Council (CCC).

The following comments have been made by CCC’s Environmental Protection Team and provided by Liam D’Onofrio, Senior Planning Officer at CCC, in respect of the proposed development:

“Noise

The proposed development lies on a busy road with a bus stop directly outside and so I will require a noise assessment. This must ensure that the criteria set out in Table 4 (indoor ambient noise levels for dwellings) BS 8233:2014 can be achieved in the property together with any mitigation measures that are required to achieve this. This will need to be provided before I can consider this application further.

I will also require an assessment of the party floor between the ground floor commercial unit and the residential accommodation on the first floor. There will also need to be an assessment of any proposed plant such as an odour extraction unit for the café. I am happy for this part to be conditioned.”

Syntegra will utilise the guidance documents set out **Section 4** in order to demonstrate compliance with the identified requirements.

4. Guidance Documents

4.1. Planning Practice Guidance for Noise

The Planning Practice Guidance for Noise (PPG-Noise) was published in March 2014 and updated in December 2014. The PPG-Noise provides advice on how to determine the noise impact on development:

‘Local planning authorities’ plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.’

The document goes on to provide a definition for the levels of noise exposure at which an effect may occur:

‘Significant observed adverse effect level: *this is the level of noise exposure above which significant adverse effects on health and quality of life occur.*

Lowest observed adverse effect level: *this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*

No observed effect level: *this is the level of noise exposure below which no effect at all on health and quality of life can be detected.’*

It is important to understand that as the PPG-Noise does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment.

4.2. Professional Practice Guidance on Planning & Noise.

The Professional Practice Guidance (ProPG) on Planning and Noise for New Residential Development was published in May 2017 by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH). The document has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England and provides numerical acoustic standards in line with the objectives of the Government’s planning and noise policy. As a collaboration between the ANC, IOA and CIEH the document has been designed to encourage a good acoustic design process and aims to protect people from the harmful effects of noise.

The ProPG notes that it ‘does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate’.

The ProPG advocates a two-stage approach, first providing an initial noise risk assessment of the proposed development site before undertaking a systematic approach to the noise impact assessment. The results of the initial noise risk assessment are an indication as to how detailed the noise impact assessment will need to be in order to satisfactorily assess all acoustic challenges.

4.2.1. Stage 1: Initial Site Noise Risk Assessment

The initial noise risk assessment compares the site noise levels (which can be obtained by measurement or prediction, or a combination of the two, as appropriate) against a risk scale and determines the risk of adverse effects from noise at the site. The purpose of the initial noise risk assessment is to provide an indication of the level of acoustic challenges at the site. In general, the higher the level of risk identified, the greater the level of detail that will be required within the noise impact assessment in order to satisfactorily demonstrate that adverse impacts will be minimised to an acceptable level.

The initial risk assessment and associated notes are provided in Figure 1 of the ProPG and reproduced in **Table 4.1**.

Noise Risk Assessment		Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels, $L_{Aeq,16hr}$	Indicative Night-time Noise Levels, $L_{Aeq,8hr}$		
		<p>High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed Acoustic Design Statement (ADS). Applicants are strongly advised to seek expert advice.</p> <hr/> <p>As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.</p> <hr/> <p>At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.</p> <hr/> <p>These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.</p>	
<p>Notes:</p> <ul style="list-style-type: none"> a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures. b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is “not dominant”. c. $L_{Aeq,16hr}$ is for daytime 0700 hrs – 2300 hrs, $L_{Aeq,8hr}$ is for night-time 2300 hrs – 0700 hrs. d. An indication that there may be more than 10 noise events at night (2300 hrs – 0700 hrs) with $L_{Amax,F} > 60$ dB means that the site should not be regarded as negligible risk. 			

Table 4.1: Stage 1: Initial Site Risk Assessment

Where sites are exposed to industrial or commercial noise that is considered to be “dominant” then an assessment in line with BS 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ should be carried out.

4.2.2. Stage 2: Full Assessment

4.2.2.1. Stage 2: Element 1 – Good Acoustic Design Process

Following a good acoustic design process is an implicit part of achieving good design as required by Government planning and noise policy. It is imperative that acoustic design is considered at an early stage of the development process and the aim should be to avoid “unreasonable” acoustic conditions and prevent “unacceptable” acoustic conditions.

Good acoustic design does not simply mean compliance with the recommended internal and external noise criteria. Instead, an integrated solution should be provided whereby the optimal acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of residents or other sustainable design objectives and requirements.

A good acoustic design should consider (in this order):

- *‘Maximising the spatial separation of noise sources and receptors.*
- *Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources.*
- *Using topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.*
- *Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise.*
- *Using the layout of the scheme to reduce noise propagation across the site.*
- *Using the orientation of buildings to reduce the noise exposure of noise-sensitive rooms.*
- *Using the building envelope to mitigate noise to acceptable levels.’*

4.2.2.2. Stage 2: Element 2 – Internal Noise Level Guidelines

The ProPG contains Figure 2, which is a table with associated notes drawing on the advice contained within BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’, the World Health Organization’s Guidelines for Community Noise 1999 (WHO guidelines) and current best practice. This table is reproduced in **Table 4.2**.

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,F}$ ^(Note 4)

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.

Table 4.2: ProPG Internal Noise Level Guidelines

4.2.2.3. Stage 2: Element 3 – External Amenity Area Noise Assessment

The ProPG considers the advice provided within BS 8233:2014 and the PPG-Noise in respect of external amenity areas, and presents the following advice, which is selected from both documents, in order to carry out a full assessment of noise levels:

- i. *'If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.'*
- ii. *'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.'*
- iii. *'These guideline values may not be achievable in all circumstances where development might*

be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.'

- iv. *'Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process'*
- v. *'Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*
 - *A relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
 - *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
 - *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
 - *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.'*

4.2.2.4. Stage 2: Element 4 – Assessment of Other Relevant Issues

The final element of Stage 2 is an assessment of 'other relevant issues' and the ProPG suggests that the following issues are considered before making any final conclusions with respect to noise impacts:

- i. *'compliance with relevant national and local policy'*
- ii. *'magnitude and extent of compliance with ProPG'*
- iii. *'likely occupants of the development'*
- iv. *'acoustic design v. unintended adverse consequences'*
- v. *'acoustic design v. wider planning objectives'*

The ProPG notes that *'not all of the issues listed above will arise in every planning application and some may already have been addressed as an inherent part of good acoustic design. In addition, LPAs [Local Planning Authorities] may wish to add other relevant issues depending on local circumstances and priorities.'*

4.3. British Standard 4142:2014

British Standard 4142:2014 "Methods for rating and assessing industrial and commercial sound" provides a method for the measurement and rating of industrial type noise sources and background noise levels outside dwellings. The rating level (defined in the BS) is used to rate the noise source outside residential dwellings (this is defined as the "specific sound level").

The rating level is determined by assessing the character of the noise and applying an acoustic feature correction if appropriate. Corrections are applied for the tonality and intermittency of the noise source which can both make noise more noticeable.

The initial assessment described in BS 4142 to determine whether an adverse impact is likely is based on establishing the difference between the rating level and the background noise level outside the residential property of interest. The British Standard states that the following points should be considered:

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

5. Baseline Noise Levels

In order to determine the extent to which the site is currently affected by noise, a detailed measurement study has been carried out at the site. Measurements have been carried out in order to characterise the existing noise climate over a 24-hour period. The dominant noise source in the area was distant road traffic noise from the A4053 (Ringway) and road traffic noise from Corporation Street and Hill Road.

The noise measurements utilised a Norsonic 140 Type 1 Precision Sound Level Meter with a current certificate of calibration, the full list of equipment is detailed in **Appendix 2**. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

Measurements were carried out between 0930 hrs on Wednesday 24th October 2018 and 0930 hrs on Thursday 25th October 2018.

During the noise measurement survey, the temperature was up to 13°C, dropping to 9°C overnight. There was a moderate north-westerly wind (1-2 m/s) throughout the survey. At the start of the survey the cloud cover was approximately 50% and approximately 80% at the end of the survey.

Noise measurements were carried out at Measurement Position 1 (MP1) in a free-field location at a height of approximately 14m (2m above the third floor flat roof) on the corner of the building with a good line of site to both Corporation Street and Hill Street.

The noise monitoring position is shown in **Figure 5.1**.

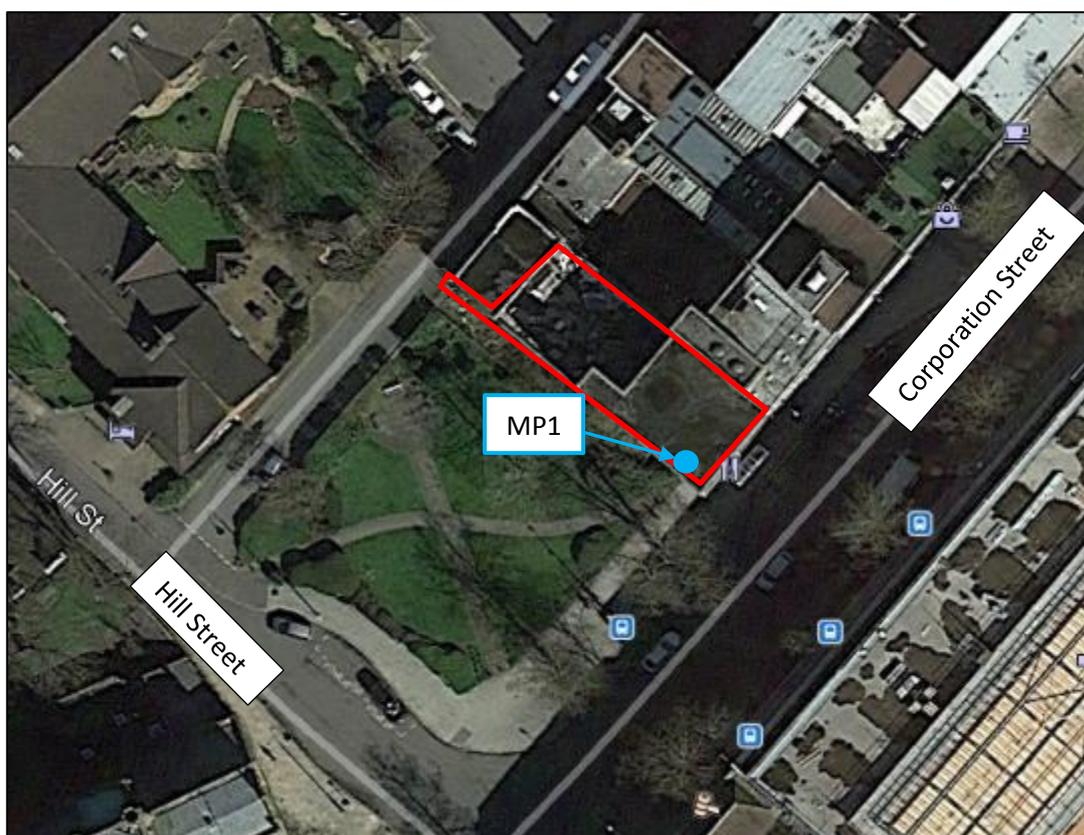


Figure 5.1: Noise Monitoring Location

Table 5.1 below displays a summary of the measured noise levels and detailed measurement results are presented in **Appendix 3**.

Measurement Position	Period (hours)	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	L_{A90} (dB)
MP1	Daytime (0700 – 2300)	64	82	59
	Night-time (2300 – 0700)	56	73	45

Table 5.1: Summary of Free Field Semi-Permanent Noise Levels

Note: The average noise levels stated are logarithmic for L_{Aeq} . The $L_{Amax,F}$ noise levels stated are the arithmetic average of the hourly noise levels during the daytime (0700 hrs – 2300 hrs) and the 10th highest $L_{Amax,F,5min}$ noise level at night (2300 hrs – 0700 hrs), as noted in Table 4.2. The L_{A90} is the typical (most commonly measured) $L_{A90,5min}$ across the assessment period (refer to Appendix 3).

5.1. Assessment Noise Levels

The noise levels measured at MP1 were taken at 2m above the existing roof level. In order to determine the noise levels at the different floor heights, a distance correction has been taken to account for height above road level using standard acoustic formulae. The corrections have assumed a line source for L_{Aeq} in line with normal good acoustic practice. As the specific location of the L_{Amax} event is not known, the same correction as for the L_{Aeq} will be taken as a reasonable approximation of the likely L_{Amax} noise level at the different floor heights. **Table 5.2** below presents the assessment noise levels.

Floor Level	Daytime $L_{Aeq,16hr}$ (dB)	Night-time $L_{Aeq,8hr}$ (dB)	Night-time L_{Amax} (dB)
1	73	65	82
2	68	60	77
3	65	57	74

Table 5.2: Assessment Noise Levels

6. Initial Site Risk Assessment

The initial site risk assessment has been carried out by comparing the results of the noise measurement survey against the criteria presented in **Table 4.1**. The outcome of the initial site risk assessment is presented in **Table 6.1**.

Floor Level	Daytime Ambient Noise Level $L_{Aeq,16hr}$ (dB)	Initial Noise Risk Assessment (Daytime)	Night-time Ambient Noise Level $L_{Aeq,8hr}$ (dB)	Initial Noise Risk Assessment (Night-time)
1	73	<i>Medium-High</i>	65	<i>Medium-High</i>
2	68	<i>Medium</i>	60	<i>Medium</i>
3	65	<i>Medium</i>	57	<i>Medium</i>

Table 6.1: Initial Site Risk Assessment

The results of the initial site risk assessment based on the measured noise levels indicate that the site has a *medium-high* risk in terms of noise at 1st floor level and a *medium* risk in terms of noise at higher floors. The pre-application advice associated with these risk categories are:

High: ‘High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed Acoustic Design Statement (ADS). Applicants are strongly advised to seek expert advice.’

Medium: ‘As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.’

7. Full Assessment

7.1. Internal Noise Level Assessment

Note 5 of **Table 4.2** suggests that internal noise levels should ideally be achieved in as many properties as possible with windows open. Due to the relatively high noise levels present at the site, habitable rooms will not be able to achieve the requirement with windows open, and therefore the sound insulation of the building façade will be required to mitigate noise levels. In carrying out our assessment, Syntegra have therefore made the following assumptions:

- The façade build-up is a standard brick and block construction (or equivalent) to achieve an R_w of approximately 55 dB.
- For the 1st floor:
 - A typical double glazing system in a 10/12/6 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of 38 dB R_w .
 - An alternative means of ventilation, such as appropriately specified through-wall ventilators or MVHR, will be installed to allow adequate ventilation without the requirement to open windows.
- For the upper floors:
 - A double glazing system in a 4/16/6 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of at least 34 dB R_w .
 - An alternative means of ventilation, such as appropriately specified through-wall ventilators or MVHR, will be installed to allow adequate ventilation without the requirement to open windows.

Table 7.1 identifies the likely L_{Aeq} and L_{Amax} internal noise levels, assuming windows closed, utilising the *Simple Calculation Method* described in BS 8233:2014.

Assessment Location	Period (hrs)	External Noise Levels (dB) (ref. Table 5.2)	Sound Insulation of Glazing (dBA)	Internal Noise Levels (dB)	Compliance with ProPG Criteria
Ambient Noise Level L_{Aeq} (dB)					
1 st Floor	Daytime (0700 – 2300)	73	38	35	✓
1 st Floor	Night-time (2300 – 0700)	65	38	27	✓
2 nd and 3 rd Floors	Daytime (0700 – 2300)	68	34	34	✓
2 nd and 3 rd Floors	Night-time (2300 – 0700)	60	34	26	✓
Maximum Noise Level L_{AFmax} (dB)					
1 st Floor	Night-time (2300 – 0700)	82	38	44	✓
2 nd and 3 rd Floors	Night-time (2300 – 0700)	77	34	43	✓

Table 7.1: Internal Noise Levels

7.2. External Noise Level Assessment

No outdoor amenity areas are proposed as part of the development.

7.3. Assessment of Other Relevant Issues

The assessment has shown that a reasonable internal noise environment can be achieved, in line with the requirements of the Local Authority, BS 8233 and the ProPG through careful consideration of the building envelope and ventilation requirements. Whilst it would be ideal to achieve the internal level criteria with open windows, it is common to achieve the criteria relying on closed windows in noisier areas. Such as an approach is advocated in the PPG-Noise.

No outdoor amenity areas are proposed as part of the development.

Overall, it has been shown that, through careful consideration of the building envelope construction, the proposed development should avoid future residents being exposed to harmful levels of noise. It can therefore be concluded that significant adverse impacts on the health or quality of life of those future residents would be avoided, in line with the aims of the NPPF, NPSE and PPG-Noise.

8. Plant Noise Assessment

The precise details of the proposed plant types are not yet available; therefore, the maximum sound level has been derived utilising the typical background noise level presented in **Table 5.1** and the basic methodologies presented in BS 4142:2014. This derivation is summarised in **Table 8.1**. The aim is to achieve a *low impact*, for which the rating level should be equal to be the background noise level.

Results	Daytime (0700 hrs – 2300 hrs)	Night-time (2300 hrs – 0700 hrs)	Relevant Clauses of BS 4142:2014	Commentary
Typical Background Sound Level L _{A90} (dB)	59	45	8.1, 8.2	Refer to Table 5.1 .
Required Difference between Rating Level and Background Sound Level	+0	+0	9.2	The requirement is to be equal to the background sound level (to achieve a <i>low impact</i>)
Rating Level L _{Ar} (dB)	59	45	7.3.7, 7.3.9, 7.3.11	(Background Sound Level + Required Difference)
Acoustic Feature Correction	Unknown	Unknown	9.2	No acoustic feature correction has been applied to account for the specific acoustic features as the precise plant specifications are unknown.
Specific Sound Level L _{Aeq,T} (dB)	59	45	9.2	(Rating Level - Acoustic Feature Correction)

Table 8.1: Total Sound Level of Plant Equipment

It will be important to ensure that the selected plant does not exceed the specific noise levels identified in this section of the report. If the plant is tonal, intermittent, or contains any other acoustic features, this would reduce the maximum specific noise level identified in **Table 8.1**. Careful consideration is required as to the specification and siting of any plant. If the plant was positioned further away from the identified noise sensitive receptors or is in screened position, a higher sound power level would be acceptable to achieve the total sound levels identified in **Table 8.1**.

When the exact items of plant to be installed have been identified, Syntegra would recommend that a detailed plant noise assessment is carried out in order to ensure compliance with the target noise criteria.

9. Internal Sound Insulation

The sound insulation of walls and floors between adjacent dwellings should be designed to achieve the requirements of the Building Regulations Approved Document E (2010) *Resistance to the passage of sound (ADE)*. For new build properties, the requirements are:

- Airborne Sound Insulation of walls separating dwellings must be at least 45 dB $D_{nT,w} + C_{tr}$.
- Airborne Sound Insulation of floors separating dwellings must be at least 45 dB $D_{nT,w} + C_{tr}$.
- Impact Sound Insulation of floors separating dwelling must not be greater than 62 dB $L'_{nT,w}$.

The sound insulation of the walls and floors between dwellings and commercial units should be assessed in detail as the level of noise that is likely to be produced in the commercial units will need to be considered. **Typically, a sound insulation rating that is 10 dB better than the requirements of ADE (without the C_{tr} correction, as this is for typical residential noise) should provide sufficient noise reduction, assuming typical noise levels within commercial units.** The following sound insulation criteria could therefore be adopted:

- Airborne Sound Insulation of floors should be at least 55 dB $D_{nT,w}$.

As the commercial units are located below the proposed dwellings, there is no impact sound insulation criterion.

When the wall and floor constructions have been finalised, Syntegra would recommend that a detailed sound insulation assessment is carried out in order to ensure compliance with the target sound insulation criteria.

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection (such as resilient bars or floating floors). Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

10. Conclusion

An assessment has been carried out of the present noise climate at **49 Corporation Street, Coventry** and the impact of that noise on the proposed development.

The assessment is based on the results of a noise measurement survey that has been carried out over a 24-hr period at the proposed development site and has considered the advice of local and national planning policy and best practice guidance.

The initial site risk assessment identified that the site has a *medium-high* risk in terms of noise at 1st floor level and a *medium* risk in terms of noise at higher floors.

It has been identified that the requirements of the Local Authority in respect of internal noise levels can only be achieved through careful consideration of the building envelope. The construction assumptions that have led to this conclusion are:

- **The façade build-up is a standard brick and block construction (or equivalent) to achieve an R_w of approximately 55 dB.**
- **For the 1st floor:**
 - **A typical double glazing system in a 10/12/6 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of 38 dB R_w .**
 - **An alternative means of ventilation, such as appropriately specified through-wall ventilators or MVHR, will be installed to allow adequate ventilation without the requirement to open windows.**
- **For the upper floors:**
 - **A double glazing system in a 4/16/6 configuration (or equivalent) will be installed to give a Sound Reduction Index (SRI) of at least 34 dB R_w .**
 - **An alternative means of ventilation, such as appropriately specified through-wall ventilators or MVHR, will be installed to allow adequate ventilation without the requirement to open windows.**

No outdoor amenity areas are proposed as part of the development.

Outline advice has been provided in respect of plant noise and sound insulation between the ground floor commercial units and the first floor student accommodation. The advice provided will ensure that significant adverse impacts on future occupiers of the proposed development are avoided.

Overall, it has been shown that, through careful consideration of the building envelope construction, the proposed development should avoid future residents being exposed to harmful levels of noise. It can therefore be concluded that significant adverse impacts on the health or quality of life of those future residents would be avoided, in line with the aims of the NPPF, NPSE and PPG-Noise.

11. Appendix 1: Glossary of Acoustic Terminology

Term	Description
'A'-Weighting	<i>This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.</i>
Decibel (dB)	<i>This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.</i>
$L_{Aeq,T}$	<i>The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.</i>
L_{A10}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the L_{A10T}. The L_{A10} is used to describe the levels of road traffic noise at a particular location.</i>
L_{A50}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the L_{A50T}.</i>
L_{A90}	<i>The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the L_{A90T}. The L_{A90} is used to describe the background noise levels at a particular location.</i>
L_{Amax}	<i>The 'A'-weighted maximum sound pressure level measured over a measurement period.</i>

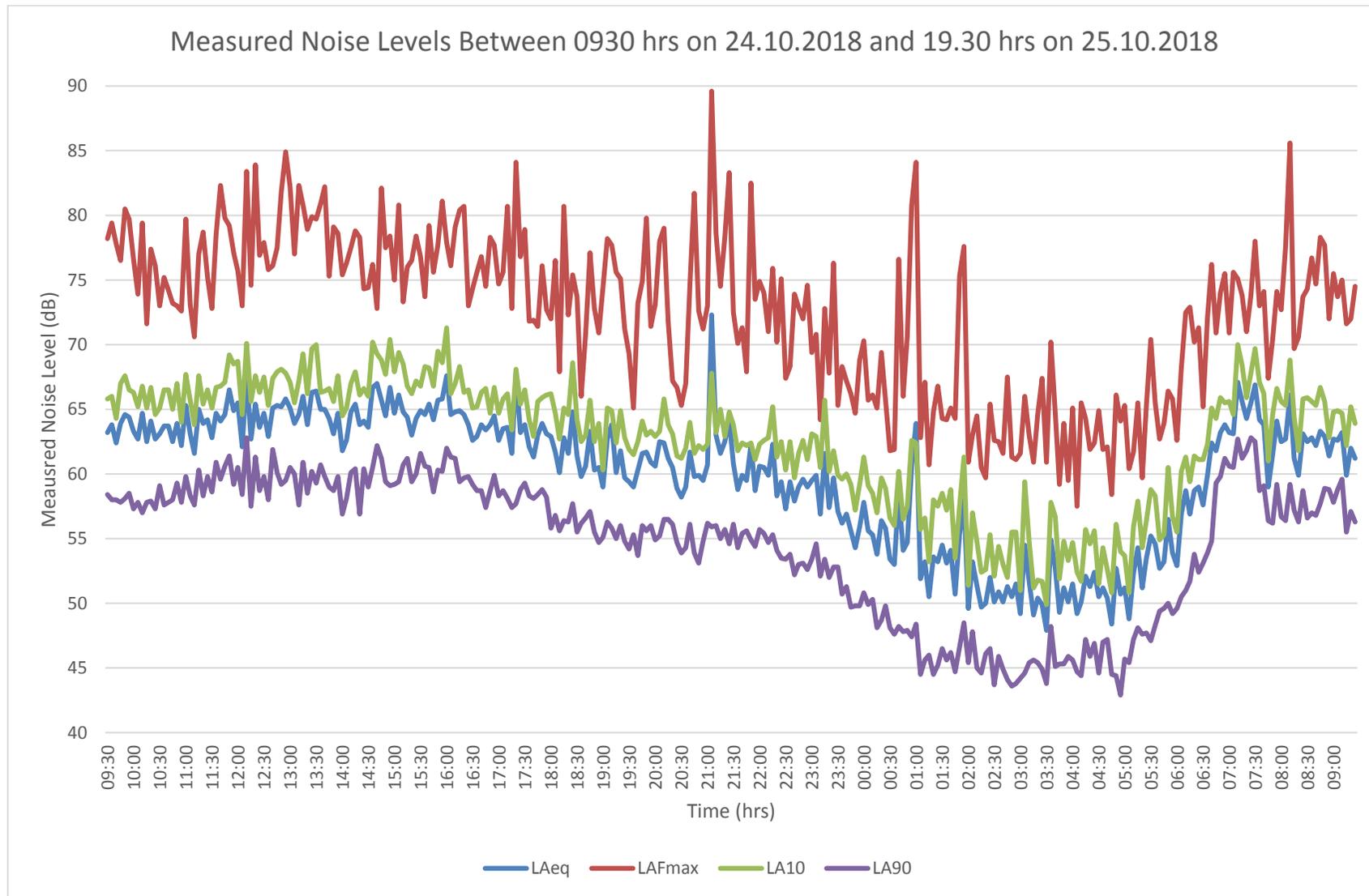
12. Appendix 2: List of Equipment

Equipment Type	Manufacturer	Serial Number	Calibration Certification Number	Date of Last Calibration Check
Nor-140 Type 1 Sound Level Meter	Norsonic	1406389	27193	December 2017
Nor-1225 Microphone	Norsonic	225519	27192	December 2017
Nor-1209 Preamplifier	Norsonic	20598	27193	December 2017
Nor-1251 Sound Calibrator	Norsonic	35115	022-2017-8679	December 2017

13. Appendix 3: Detailed Noise Measurement Results

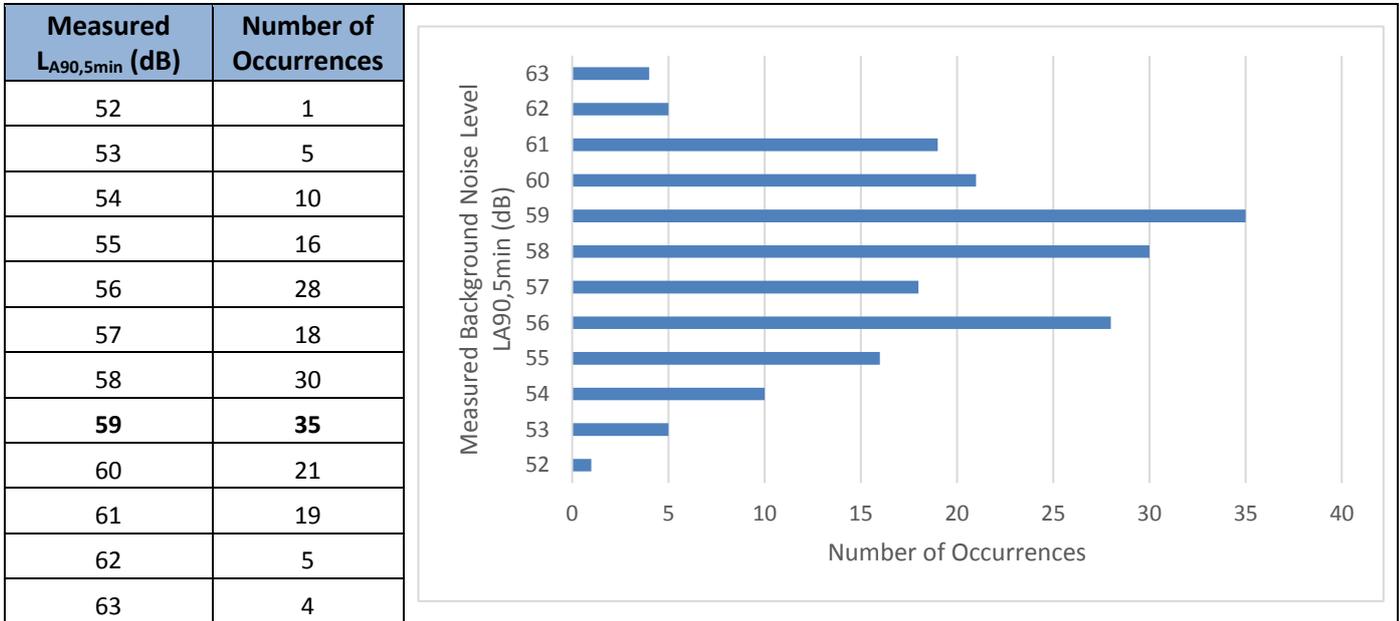
Measured Noise levels – MP1

Time	L _{Aeq,T} (dB)	L _{AF(max)} (dB)	L _{A10} (dB)	L _{A90} (dB)
07:00-08:00	64.5	78.0	66.5	60.1
08:00-09:00	62.8	85.6	65.3	57.5
09:00-10:00	63.0	80.5	65.2	57.8
10:00-11:00	63.3	79.4	65.7	57.9
11:00-12:00	64.4	82.3	66.7	59.5
12:00-13:00	64.9	84.9	67.2	59.8
13:00-14:00	65.0	82.3	67.3	59.6
14:00-15:00	65.0	82.1	67.5	59.5
15:00-16:00	64.9	81.1	67.9	60.1
16:00-17:00	64.5	80.7	66.7	59.7
17:00-18:00	63.6	84.1	65.4	58.3
18:00-19:00	61.9	80.7	64.5	56.2
19:00-20:00	61.1	79.8	63.1	55.3
20:00-21:00	60.6	81.7	62.8	55.0
21:00-22:00	64.3	89.6	63.3	55.3
22:00-23:00	59.6	75.9	62.0	53.9
23:00-00:00	58.1	76.3	60.8	51.9
00:00-01:00	56.4	80.8	58.7	48.7
01:00-02:00	56.4	84.1	57.5	46.0
02:00-03:00	51.0	67.5	53.8	45.1
03:00-04:00	51.5	70.2	53.7	45.3
04:00-05:00	51.0	66.1	53.7	45.4
05:00-06:00	53.5	70.4	56.1	47.9
06:00-07:00	60.3	76.2	61.9	54.3
07:00-23:00	63.6	81.8	65.4	57.9
23:00-07:00	56.0	74.0	57.0	48.1



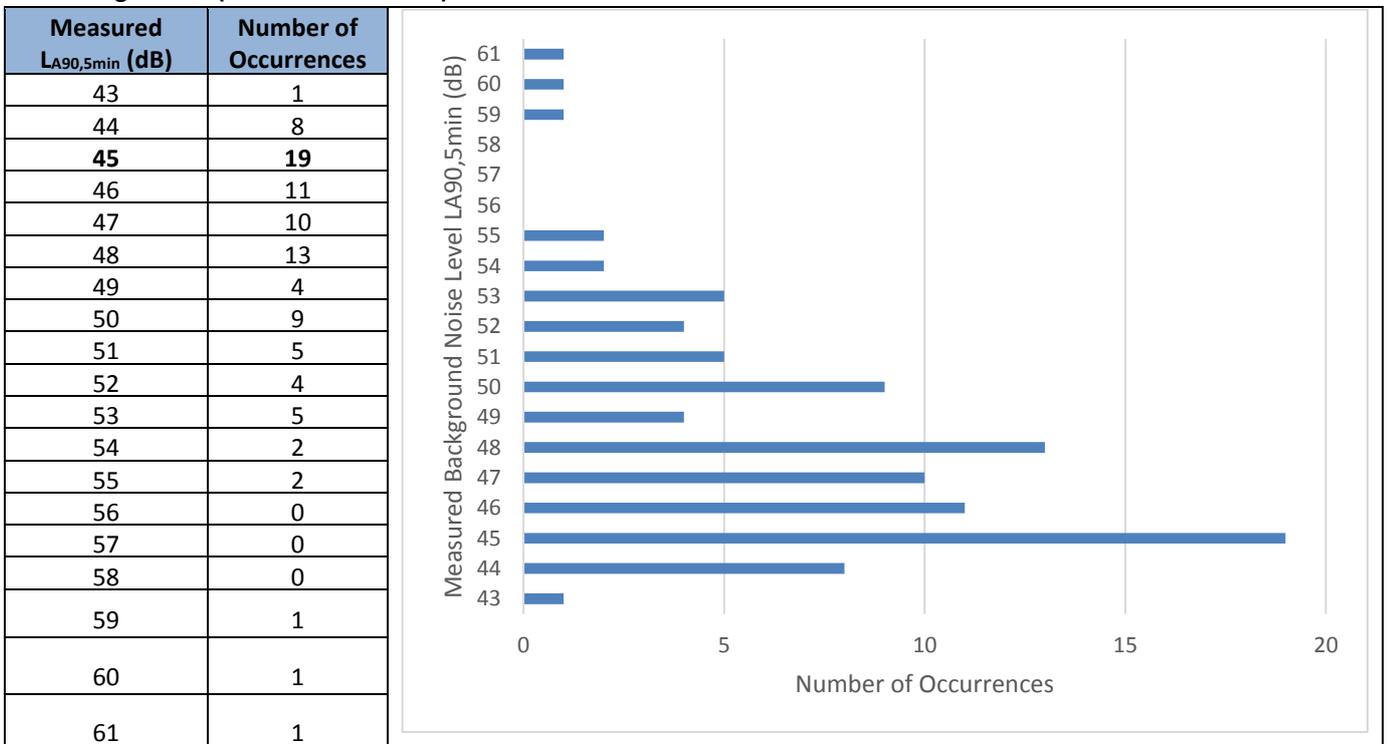
13.1. Typical Background Noise Level Analysis for BS 4142:2014 Assessment

MP1 - Daytime (0700 hrs – 2300 hrs)



Note: The row marked in bold is the chosen Typical LA90 for the BS 4142 plant noise assessment.

MP1 - Night-time (2300 hrs – 0700 hrs)



Note: The row marked in bold is the chosen Typical LA90 for the BS 4142 plant noise assessment.