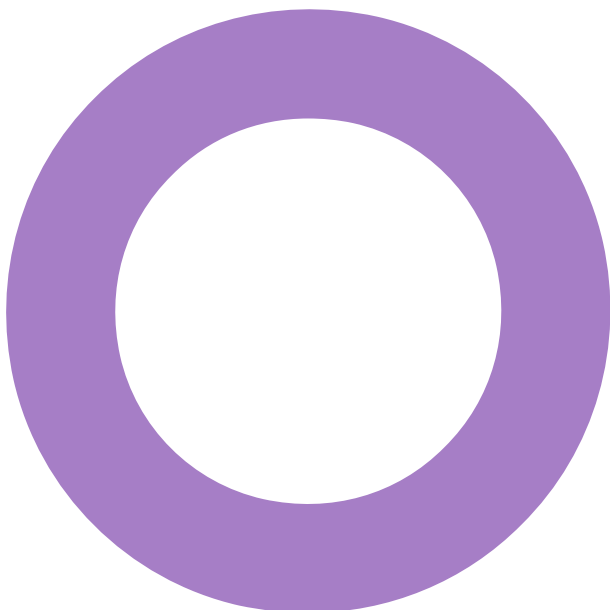


Blue Dragon - Student Accommodation. Cardiff. Expedite.

ACOUSTICS

NOISE ASSESSMENT REPORT

REVISION 00 – 07 JULY 2022



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	07/07/2022	Draft issue	JH	AS	JB

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Executive summary.

This report has been compiled by Hoare Lea LLP to provide a noise assessment to accompany the planning application for new build student accommodation in Cardiff.

An acoustic survey has been carried out in the area to quantify the existing general sound climate at the nearby sensitive receptor (Premier Inn) and on the proposed development facades.

Noise limits for external building services plant have been derived based on the results of the acoustic survey and Local Authority requirements. An indicative assessment of the development proposals has been carried out; complying with the relevant noise limits is considered achievable through appropriate design.

Noise levels incident on the proposed development facades have been predicted and the acoustic performance requirements for facades have been specified. These are manageable and achievable through 'off the shelf' products.

Noise levels in external areas serving the proposed development are above recommended guidelines. This is partially offset by the site being located close to other external areas, as noted in recognised guidance.

The assessment of noise levels incident on the proposed development includes for the noise contributions of sports pitches serving the proposed development.

The noise from the sports pitches is capable of disturbing occupants of the Premier Inn, but only under the strict assumption that occupants of the Premier Inn are to rest/sleep during the day with windows open in the presence of elevated levels of road traffic noise.

Therefore, the proposed development is considered to be suitable acoustically, provided the necessary provisions highlighted in this report are adopted and that the Local Authority agree that occupants of the Premier Inn are generally unlikely to sleep during daytime periods with windows open.

1. Introduction.

Hoare Lea has been appointed by Expedite to carry out a noise assessment for accommodation serving Cardiff Sixth Form students (hereafter referred to as the “proposed development”). The proposed development is located on the site of the existing Q park Car Park, Pierhead St, Cardiff CF10 4PH.

This assessment serves to be submitted to the Local Planning Authority to accompany the planning application for the proposed development.

As the proposed development is to form student accommodation with associated mechanical plant and sports facilities, it is both markedly noise sensitive and noise generating. Therefore, the assessment focuses on protecting nearby noise sensitive receptors against adverse noise impacts and assessing site suitability in terms of noise based on the predicted impacts of noise from surrounding sources on lodging students of the proposed development.

2. Site Description.

2.1 The site and surrounding area.

Located between Pierhead Street and the A4232, the prevailing sound climate is dominated by road traffic along these roads. It was noted that although there is a large multistorey car park situated between the site and the A4232 it offers limited shielding from the A4232 due to it being an open sided car park. Maximum events were mainly the result of emergency services vehicles and passing vehicles

Cardiff Bay train station is situated approximately 400m northwest of the site. Trains arriving and departing from this station were not noticeable over the dominant road traffic noise sources across the site.

No overhead aircraft were observed during site visits.

There are numerous commercial spaces opposite the site on the other side of Pierhead Street with associated mechanical plant. The associated mechanical plant was not noticeable during daytime visits to site.

There is a Premier Inn with associated plant directly to the southwest of the site. It was noted that during site visits a series of 3 condenser units at ground floor level could be heard near the boundary of the site.

It was noted that upon return to site to collect the equipment that there were groundworks being undertaken on an empty plot that is directly northeast of the site.

2.2 The proposed development.

As well as being noise sensitive, the proposed development will be noise generating, via external building services plant and external sports pitches.

Uses above ground floor are limited to apartments and shared living areas. All of which will be noise sensitive. There are to be a mix of uses on the ground floor. The noise-generating aspects of have not been assessed in this report, as their potential impacts are limited to occupants of the same development above. Nevertheless, during detailed design, the performance standards will need to be developed and will be in excess of Building Regulations requirements to protect against disturbance from spaces such the Karaoke room, Gym and Music spaces.

A visual summary of the Site and the context of the surrounding area is provided below in Figure 1.

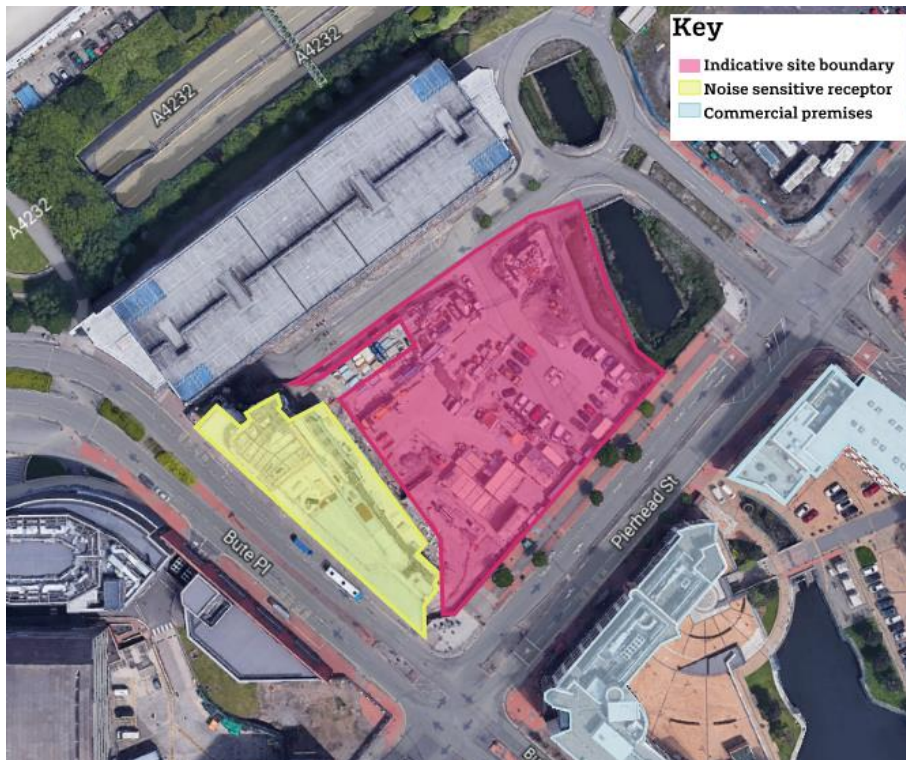


Figure 1: Site Context.

3. Policy and Guidance.

3.1 National Policy.

3.1.1 Planning Policy Wales (PPW) Edition 11 2021

Planning policy Wales (PPW) includes several sections related to noise generating developments and their proximity to sensitive receptors.

Paragraph 6.7.6

In proposing new development, planning authorities and developers must, therefore:

- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- *not create areas of poor air quality or inappropriate soundscape; and*
- *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

Paragraph 6.7.7

To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer.

3.1.2 Technical Advice Note 11: Noise (1997)

Technical Advice Note 11: Noise elaborates on the above regarding noise-sensitive development:

Noise generating development

Par agorah 8

"Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions."

Paragraph 9

"Noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development, for example, the character of the noise should be taken into account as well as its level. Sudden impulses, irregular noise or noise which contains a distinguishable continuous tone will require special consideration. In addition to noise from aircraft landing and taking off, noise from aerodromes is likely to result from engine testing as well as ground movements. The impact of noise from sport, recreation and entertainment will depend to a large extent on frequency of use and the design of facilities..."

Noise-sensitive development

Paragraph 10

"Local planning authorities should consider whether proposals for new noise-sensitive development would be incompatible with existing activities, taking into account the likely level of noise exposure at the time of the application and any increase that may reasonably be expected in the foreseeable future. Such development should not normally be permitted in areas which are, or are expected to become, subject to unacceptably high levels of noise and should not normally be permitted where high levels of noise will continue throughout the night."

3.2 Local planning policy.

3.2.1 Cardiff Local Development Plan 2006 - 2026

The Cardiff Local Development Plan 2006 – 2026 includes the following reference to noise generating developments:

EN13: AIR, NOISE, LIGHT POLLUTION AND LAND CONTAMINATION

Paragraph 5.181

"Noise can have a harmful impact on people's health and quality of life. Developments such as housing, schools and hospitals can be particularly sensitive to noise, as can areas of landscape, nature or built heritage importance. Where possible, new developments that are particularly noise-sensitive should be located 5 Detailed Policies 156 Cardiff Local Development Plan 2006 - 2026 Adopted Plan away from existing or proposed sources of significant noise. This assessment can be informed by information on noise complaints being collated by the Council as part of an on-going initiative to reduce noise nuisance."

Paragraph 5.182

"Major transport routes (road, rail and air) and some industrial and commercial activities can generate particularly high noise levels. There is specific guidance within TAN 11 that specifies Noise Exposure Categories that assists with proposed residential development near transport related noise."

3.3 Recognised Guidance.

3.3.1 British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

BS 4142 provides guidance for assessing commercial operations and fixed building services plant noise. The British Standard provides an objective method for rating the significance of impact from industrial and commercial operations based on subtracting the pre-existing background sound level ($L_{A90,T}$) from the rating level ($L_{A,r,T,r}$).

The standard does not give a definitive method for determining the background sound level but instead, as a commentary, states that *"the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*.

Clause 8.1.4, which discusses the monitoring duration, states *"there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed."* As a note to this clause the following commentary is given on obtaining a representative background sound level:

"To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."

The rating level is defined objectively as the specific source noise level in question (either measured or predicted) with graduated corrections for tonality (up to +6 dB), impulsivity (up to +9 dB), intermittency (+3 dB) and other sound characteristics (+3 dB) which may be determined either subjectively or objectively, if necessary.

The background sound level is subtracted from the rating level and the difference used to assess the impact of the specific noise source:

- A difference of around +10 dB is likely to be an indication of a significant adverse impact, depending on context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and
- A difference of +0 dB or less is an indication of the specific sound source having a low impact, depending on the context.

3.3.2 British Standard 8233

BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* (BS 8233) provides guidance for control of noise in and around buildings. The British Standard suggests appropriate criteria and limits for different situations including hotels and rooms for residential purposes. The advice for living accommodation (Table 4 of BS 8233) is reproduced below in Table 1. These are desirable internal ambient noise levels for spaces when they are unoccupied. These values are based on the guidelines published by the WHO in *Guidelines for Community Noise*.

Activity	Location	Daytime (07.00 to 23.00)	Night-time (23.00 to 07.00)
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

Table 1: BS 8233 guideline indoor ambient noise levels for dwellings.

Supplementary Notes 2, 4 and 7 to Table 4 within BS 8233 are reproduced below for reference:

'NOTE 2 The levels shown in Table 4 are based on the existing guidelines issued by the World Health Organization....

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....

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above the WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable conditions still achieved.'

The BS 8233 criteria for living accommodation have been used as a conservative basis. Table H.3 from BS 8233 provides a range of values for indoor ambient noise levels for hotel bedrooms, repeated below in Table 4. The upper ends of these ranges exceed the guidelines indoor ambient levels by 5 dB and maximum levels by 10 dB for dwellings.

Period	Noise Level
Daytime (07:00 – 23:00)	30 - 40 dB $L_{Aeq,16h}$
Night-time (23:00 – 07:00)	25 - 35 dB $L_{Aeq,8h}$
Night-time (23:00 – 07:00)	45 - 55 dB $L_{Aeq,16h}$

Table 2: BS 8233 guideline indoor ambient noise levels for hotel bedrooms.

3.3.3 Professional Practice Guidance on Planning and Noise – ProPG

ProPG Planning & Noise (Institute of Acoustics, 2017) is a recently published document aimed at providing practitioners guidance on a recommended approach to the management of noise in the context of the planning system.

The document was published jointly by the three professional bodies in the acoustics industry: Acoustics and Noise Consultants (ANC); the Institute of Acoustics (IOA); and the Chartered Institute of Environmental Health (CIEH).

The guide is focussed on new residential development being affected by transport noise. Its primary goal is to assist in the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise. It seeks to do this by encouraging good acoustic design processes in and around proposed new residential development, having particular regard to national policy on planning and noise.

The guidance recommends that an Acoustic Design Statement (ADS) be provided using a two-stage approach comprising: an initial site noise risk assessment (stage 1); and a full assessment and systematic consideration of four elements (stage 2) as follows, thereby encouraging early consideration of noise issues.

- Stage 2: Element 1 – Good Acoustic Design Process
- Stage 2: Element 2 – Internal Noise Level Guidelines
- Stage 2: Element 3 – External Amenity Area Noise Assessment
- Stage 2: Element 4 – Assessment of Other Relevant Issues

3.3.4 Acoustics Ventilation and Overheating (AVO guide)

The Acoustics Ventilation and Overheating Residential Design Guide (Acoustics and Noise Consultants, 2020) serves to inform acousticians as to a recommended approach for assessing noise impacts of transport noise impacting on residential development, whilst giving due attention to how any advice serving this goal impact on ventilation and overheating strategies.

The AVO guide makes various references to statements in BS 8233 and ProPG that internal noise limits may be relaxed by up to 5 dB where a development is desirable and natural ventilated is used.

4. Local Environmental Health Consultation.

Hoare Lea have reached out to the Cardiff Council Environmental Health Team to establish internal levels and plant noise emission limits. The following reply was received to the respective question.

Query:

"For plant, what rating level compared to the typical background level is required by Cardiff Council?"

Response:

"Typically, the start point is 10dB below which has been accepted through committee and inspectorate on a number of cases, in that view that if it can be achieved sustainably then it should be done so – however we equally must consider context in line with 4142 so if there are specifics as to why this cannot be achieved then the next default is achieving the lowest possible below background."

Query:

"For the student dwellings are the internal guidelines set out in BS8233:2014 acceptable to protect occupants?"

Response:

"Yes, specifically the tighter standards (ie not relaxed by 5dB) as in BS8233 even with student accommodation."

5. Acoustic Survey.

An environmental acoustic survey has been conducted to characterise the prevailing sound climate across the site and at the nearest noise sensitive residential receptors. The survey locations were chosen to be representative of the worst affected façades of the proposed development and to quantify propagation of road traffic noise levels in the area.

The survey locations are shown in Figure 2 below.

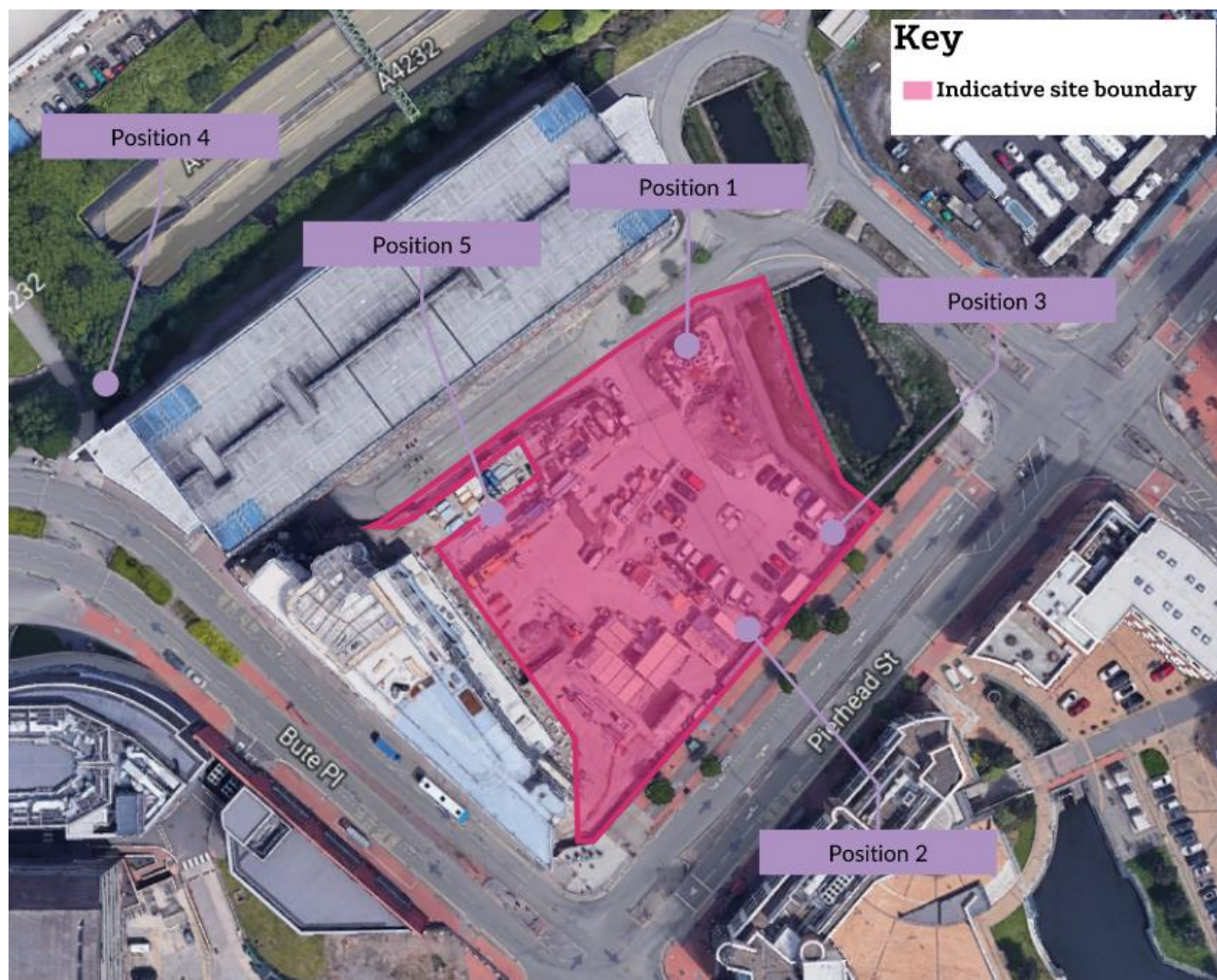


Figure 2: Acoustic survey measurement positions

Unattended survey measurements were undertaken at Position 1 from Thursday 12th May to Wednesday 18th May 2022. Unattended survey measurements were undertaken at Position 2 and from Thursday 12th May to Thursday 19th May 2022. Attended survey measurements were undertaken at Position 3, Position 4 and Position 5 on Thursday 19th May 2022.

The purpose of measuring at Position 1 was to quantify road traffic noise levels incident at the worst-case proposed development buildings closest to Pierhead Street. The measurements at Position 1 included continuous 15-minute duration samples of broadband A-weighted ambient sound levels ($L_{Aeq,15\text{ min}}$), maximum sound levels ($L_{Amax(fast),15\text{ min}}$), and background sound levels ($L_{A90,15\text{ min}}$). The measurements also recorded instantaneous sound pressure levels. Measurements were made at one-third octave band resolution.

The purpose of measuring at Position 2 was to quantify road traffic noise levels incident at the worst-case proposed development buildings closest to the A4232 Street. The measurements at Position 2 included continuous 15-minute duration samples of broadband A-weighted ambient sound levels ($L_{Aeq,15\text{ min}}$), maximum sound levels ($L_{Amax(fast),15\text{ min}}$), and background sound levels ($L_{A90,15\text{ min}}$). The measurements also recorded instantaneous sound pressure levels. Measurements were made at one-third octave band resolution.

Measurements at Position 1 and Position 2 also served to quantify background sound levels at locations representative of the sound climates at the nearest noise sensitive residential receptors.

Short duration measurements were undertaken at Position 3, 4 and 5 to quantify road traffic noise levels propagating across the site. The measurements included continuous one-minute duration samples of broadband A-weighted ambient sound levels ($L_{Aeq,T}$) and maximum sound levels ($L_{Amax(fast),T}$). Measurements were in one-third octave band resolution. Measurements were simultaneously made with the logging sound level meters running.

All attended and unattended measurements at were taken at 1.5 metres above ground level under free field conditions with the microphone being at least 3.5 metres from any acoustically reflective surface other than ground below.

Weather conditions were not measured on site but were monitored remotely and were dry and fair throughout.

The survey equipment was field calibrated immediately before and immediately after the measurement period; no significant drift in level was found to have occurred. Details of the measurement instrumentation used is included in Appendix A.

5.1 Results.

5.1.1 Unattended measurements

Ambient

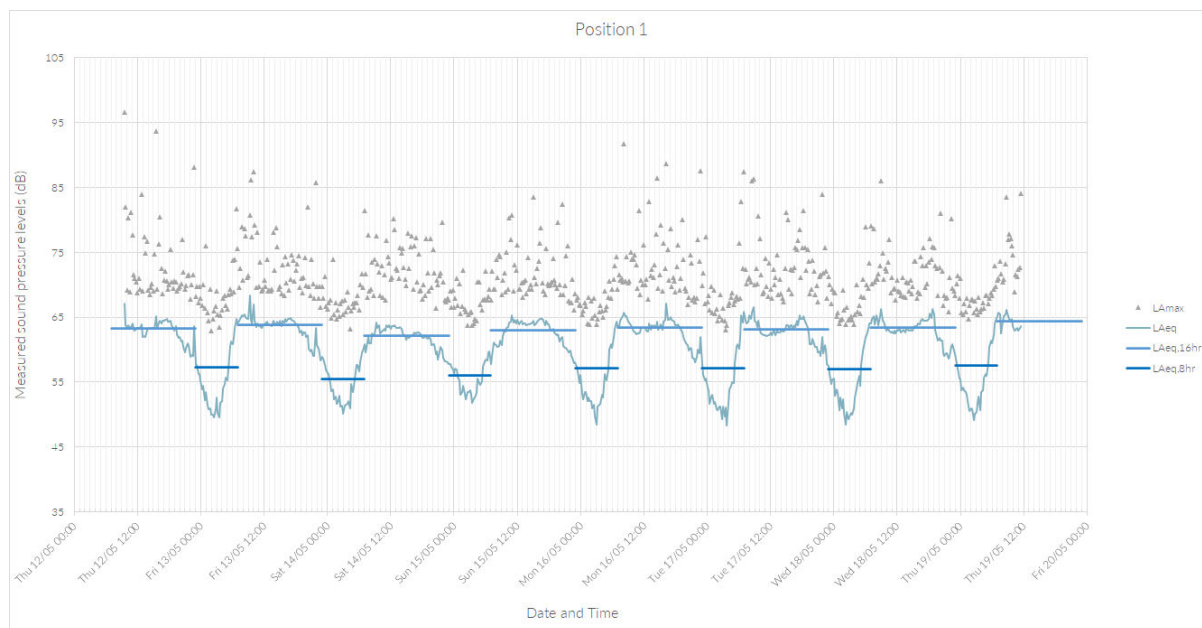


Figure 3: Survey time history chart (Position 1)



Figure 4: Survey time history chart (Position 2)

Date	Daytime ambient noise level (07:00 to 23:00)	Night-time ambient noise level (23: to 07:00)
Thursday 12 th May 2022	63 dB LAeq,2 h 30 minutes	57 dB LAeq,8 h
Friday 13 th May 2022	64 dB LAeq,16 h	56 dB LAeq,8 h
Saturday 14 th May 2022	62 dB LAeq,16 h	56 dB LAeq,8 h
Sunday 15 th May 2022	63 dB LAeq,16 h	57 dB LAeq,8 h
Monday 16 th May 2022	63 dB LAeq,16 h	57 dB LAeq,8 h
Tuesday 17 th May 2022	63 dB LAeq,16 h	57 dB LAeq,8 h
Wednesday 18 th May 2022	63 dB LAeq,16 h	58 dB LAeq,8 h
Thursday 19 th May 2022	64 dB LAeq,4 h 30 minutes	N/A

Table 3: Summary of ambient noise levels measured at unattended survey Position 1.

Date	Daytime ambient noise level (07:00 to 23:00)	Night-time ambient noise level (23: to 07:00)
Thursday 12 th May 2022	62 dB	56 dB L _{Aeq,8 h}
Friday 13 th May 2022	62 dB L _{Aeq,16 h}	55 dB L _{Aeq,8 h}
Saturday 14 th May 2022	61 dB L _{Aeq,16 h}	56 dB L _{Aeq,8 h}
Sunday 15 th May 2022	62 dB L _{Aeq,16 h}	56 dB L _{Aeq,8 h}
Monday 16 th May 2022	62 dB L _{Aeq,16 h}	58 dB L _{Aeq,8 h}
Tuesday 17 th May 2022	62 dB	58 dB L _{Aeq,8 h}

Table 4: Summary of ambient noise levels measured at unattended survey Position 2.

5.1.2 Background sound levels.

The following is stated in BS 4142:

"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods..."

To "quantify what is typical during particular time periods", a statistical analysis of the measured background sound levels has been undertaken.

The periods of interest for this development are daytime and night-time. Daytime is taken as between the hours of 07:00 and 23:00. Night-time is taken as between the hours of 23:00 and 07:00.

In place of using a 1-hour reference time interval for daytime periods recommended in BS 4142, a 15-minute sample has been used instead. As the metric used to determine background levels is a percentile of level exceeded, using a shorter reference period is a conservative approach.

The below figures show the range of background sound levels for the daytime and night-time periods measured at Position 1 and Position 2 respectively, as well as the number of measurements made of each integer value as a percentage (i.e. proportion) of the total number of readings at that location.

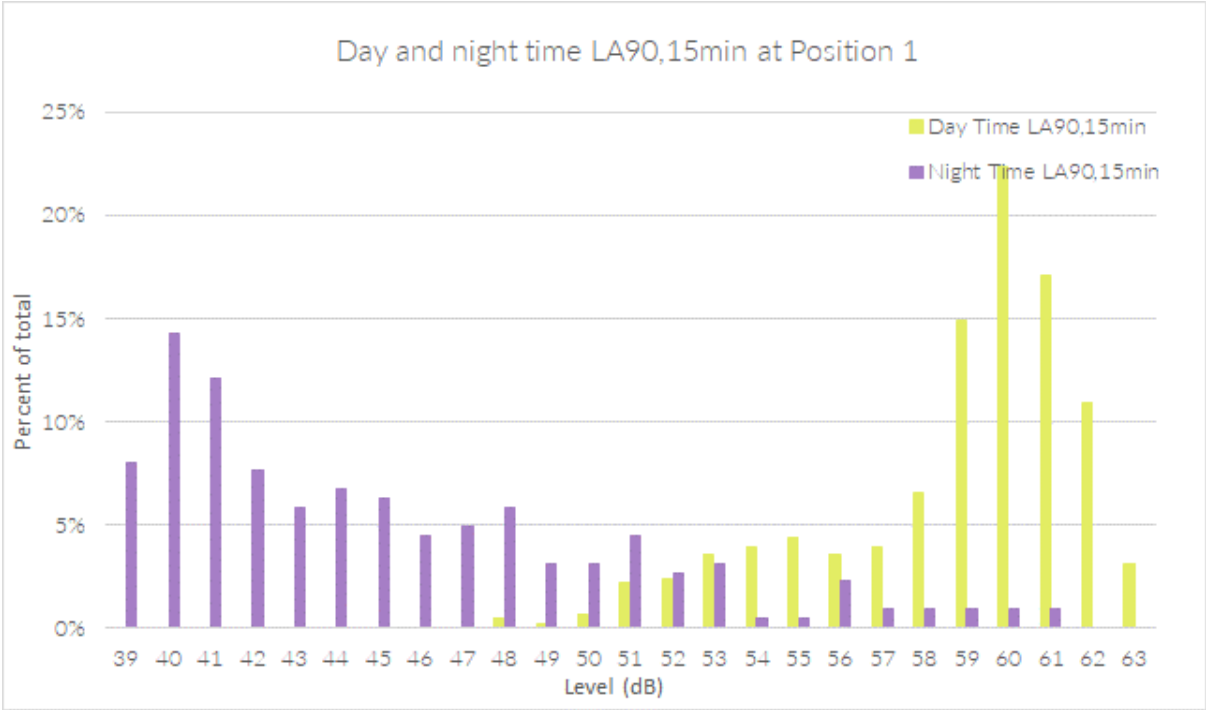


Figure 5: Measured background sound levels (Position 1).

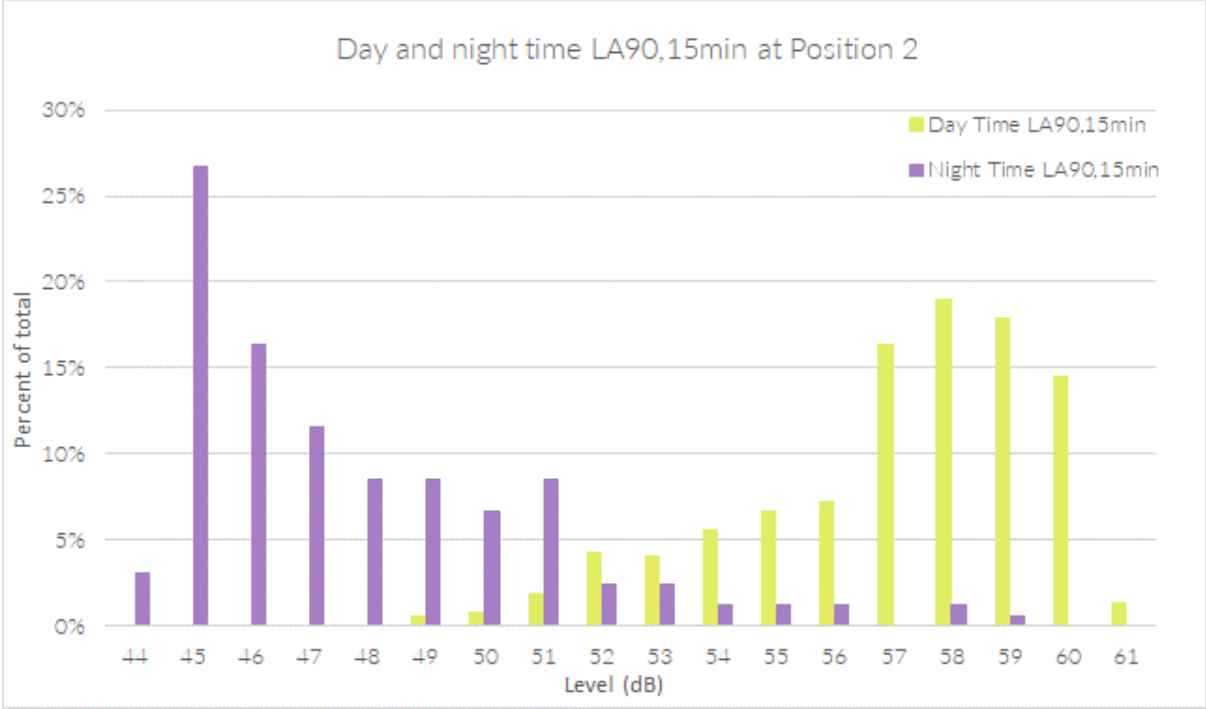


Figure 6: Measured background sound levels (Position 2).

Based on the values shown in Figure 5 and Figure 6, typical lowest background sound levels have been derived and are shown in the table below.

Receptors	Typical lowest background sound level	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Position 1	LA90,15min 58 dB	LA90,15min 40 dB
Position 2	LA90,15min 57 dB	LA90,15min 45 dB

Table 5: Typical lowest background levels at Position 1 and Position 2.

6. Noise Model.

Based on the results of the acoustic survey, a noise model has been compiled in the software CadnaA. This model assumes (following observations on site) that existing ambient sound levels are determined by the road traffic noise from the A4232 and Pierhead Street. Other sound sources were determined to either be too low in level, or too infrequent to meaningfully contribute to the levels measured over 16-hour (for daytime) or 8-hour (for night-time) periods, or maximum sound levels.

Road traffic noise levels have been assumed to propagate in accordance with the guidance stipulated in Calculation of Road Traffic Noise (Department for Transport Welsh Office, 1988). Based on the traffic flows provided by the traffic consultant, corrections have been made to account for increased traffic flows caused by the proposed development.

Operation of the proposed development will also include the noise contributions of the sports courts. Predicted noise levels for the sports courts are made based on historic data for basketball courts (the most onerous likely usage) and based on and Sports England guidance (Sport England, 2015). Noise from the courts is assumed to propagate according to the guidance stipulated within International Standard ISO 9613-2 (International Standards Organisation, 1996).

The below figures show the predicted noise levels on the proposed development facades, allowing for the contributions of both road traffic noise and sports court noise. Roads are shown as grey lines with white dashes and sports courts are shown as blue rectangles.

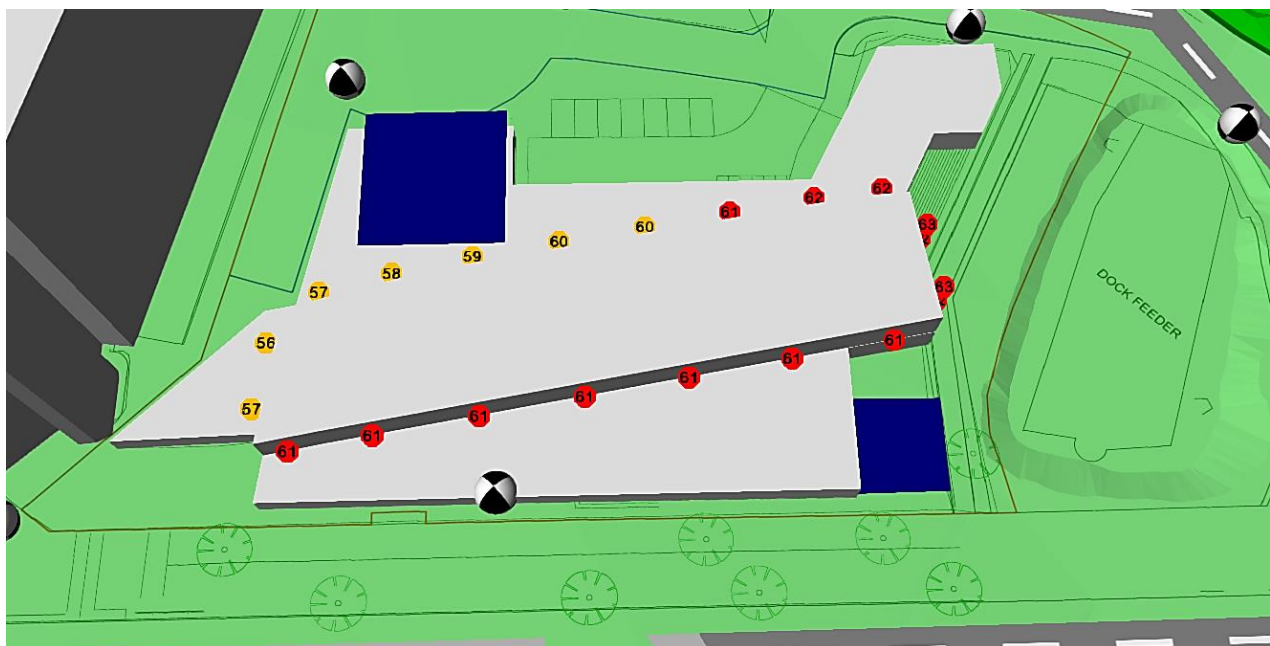


Figure 7: Predicted daytime ambient sound levels incident on facades



Figure 8: Predicted night-time ambient sound levels incident on facades

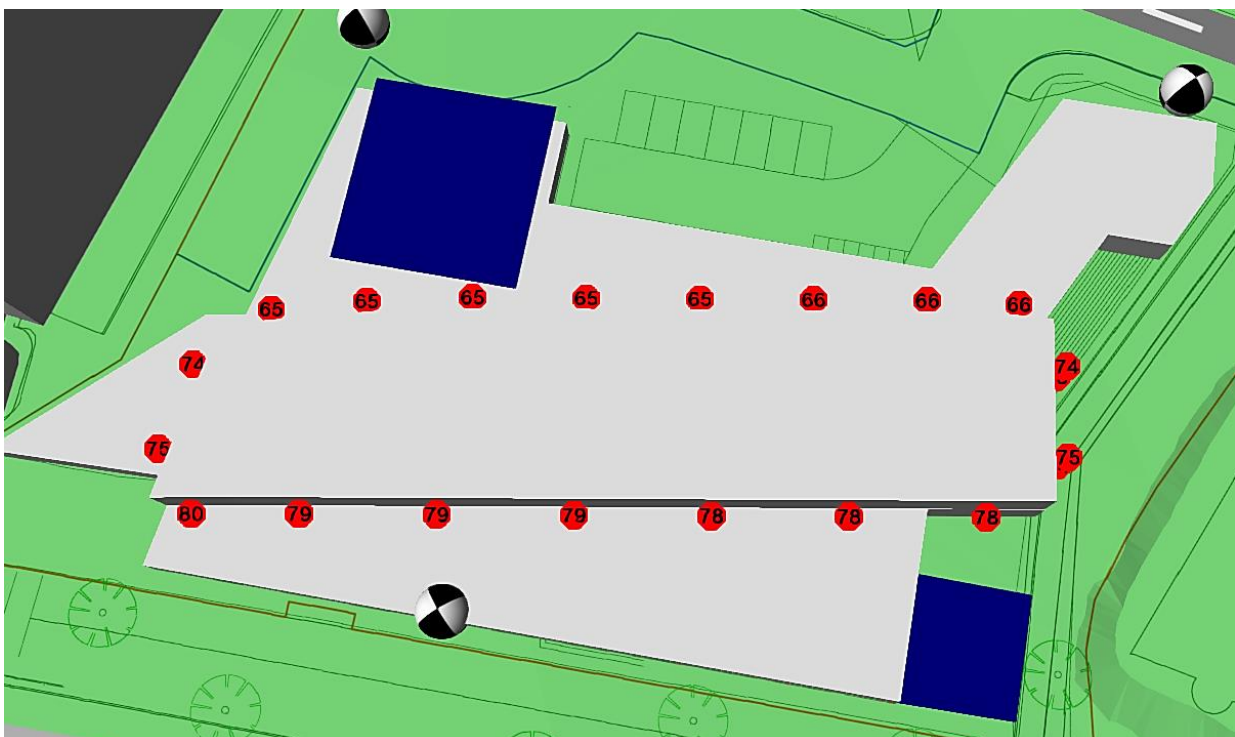


Figure 9: Predicted night-time maximum sound levels incident on facades

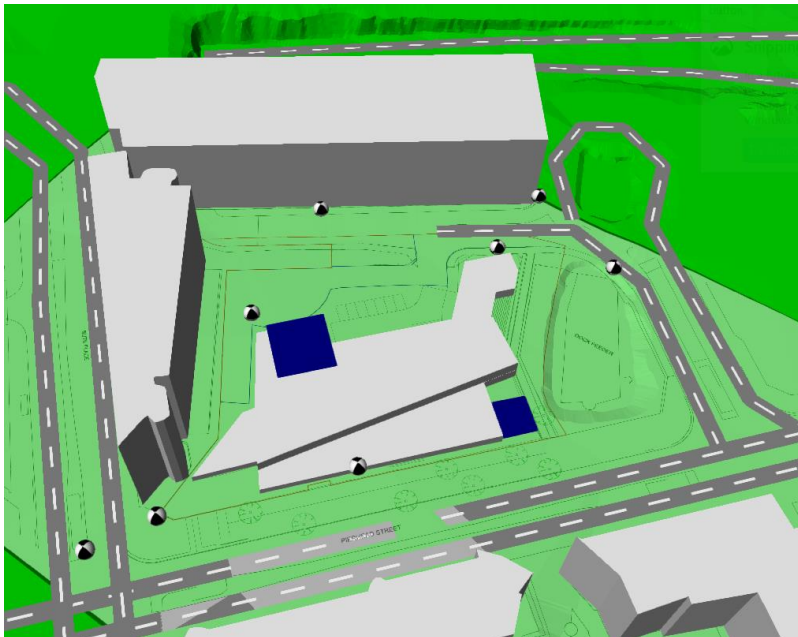


Figure 10: Image of model showing noise sources

7. Plant noise assessment.

7.1 Plant noise limits.

Table 5 shows the noise limits for building services plant noise. These limits are:

- Applicable at the facades of the nearest sensitive receptor – the Premier Inn - and facades of the proposed development.
- Applicable to the total noise from all plant operating concurrently. Therefore, the noise contributions of individual plant require consideration separately to facilitate compliance with the total limits.
- Rating levels as defined in BS 4142, meaning that they should include for any warranted character corrections, such as tonality.
- Derived based on the typical background sound levels summarised in Section 5 and Cardiff Council requirements summarised in Section 4.

Location	Daytime noise limit, dB L _{Ar,Tr}	Night-time noise limit, dB L _{Ar,Tr}
Premier Inn, as well as west, north and east facing facades of proposed development	48	30
South facing façade of proposed development	47	35

Table 6: Plant noise limits

7.2 High level assessment.

Ultimately, the proposed development is to be designed to achieve the plant noise limits in Table 6. Nevertheless, a high-level assessment has been carried out to provide an indication of the likely measures necessary to facilitate compliance with these limits.

A ground floor plant room (below the larger sports court) serving the proposed development is to be located close to the Premier Inn. Plant will be enclosed, minimising noise emissions. Nevertheless, plant will likely require ventilation and any air handling plant will have atmospheric connections. Based on the proposed

layouts, and the limits in Table 6, a provisional maximum sound power level of 59 dB L_w from the plant room connections to atmosphere is expected to facilitate compliance with the limits in Table 6, allowing for multiple openings (up to 4). This single level represents the total sound power level through each connection, based on a noise model compiled in the software CadnaA, assuming sound propagates in accordance with the guidance contained in international standard ISO 9613-2. Therefore, if multiple plant emit noise through a shared louvre, individual plant will need to be selected so that the total sum of all sound power levels does not exceed this level. This level allows for night-time operation. To comply with these limits, mitigation measures would be necessary. Atmospheric side connections to air handling plant would require attenuators to be selected based on achieving 59 dB L_w at connection to atmosphere; louvres would likely require splitters or to be acoustic louvres to result in compliance.

If any roof plant is to be included within the proposed development, they would be required to be selected to a similar total maximum sound power level. Therefore, any noise generating external plant would likely require acoustic packs or enclosures. Acoustic screening would be ineffective, given the relative greater height of the Premier Inn.

8. Acoustic Design Statement for site suitability.

As the proposed development is residential, an Acoustic Design Statement (ADS) has been provided in accordance with ProPG.

8.1 Stage 1 – Initial Site Noise Risk Assessment

Based on the ambient sound levels summarised in Table 3 and Table 4, the proposed development is classed as medium risk based on the classifications in ProPG. The corresponding text in ProPG for a medium risk site is as follows.

"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."

8.2 Stage 2 – Full Assessment

8.2.1 Element 1 – Good acoustic design process.

The general sound climate in the area is dominated by road traffic noise. As the proposed development is surrounded by roads, considerate layout design is relatively ineffective. Nevertheless, the priority is to implement design measure that reduce noise levels for occupants of the proposed development.

8.2.2 Element 2 – Internal noise level guidelines.

The sound insulation provide by a façade with an open window normally will be between 7 dB – 15 dB, depending on the opening size. Based on this sound insulation performance, open windows would be expected to result in internal ambient sound levels that exceed the internal criteria shown in Table 1.

Therefore, ventilation and management of overheating for the proposed development should be provided by other means, so that occupants are not forced to choose between overheating or opening a window to result in unacceptably high levels of internal noise.

With windows closed, based on the sound levels incident on the proposed development facades (as shown in Figures 7-9), suitable internal noise levels could be provided if the glazing is selected to achieve a minimum of $R_w + C_{tr}$ 35 dB. However, windows should still be openable in the event of purge ventilation being required, as defined in Building Regulations.

8.2.3 Element 3 – External amenity area noise assessment.

The areas that have been designated as external amenity are subjected to noise levels that are unsuitable for external amenity.

Figure 11 shows that daytime noise levels are above 55 dB $L_{Aeq,16 \text{ hours}}$ (the upper guideline) across the majority of the areas designated for external amenity space.

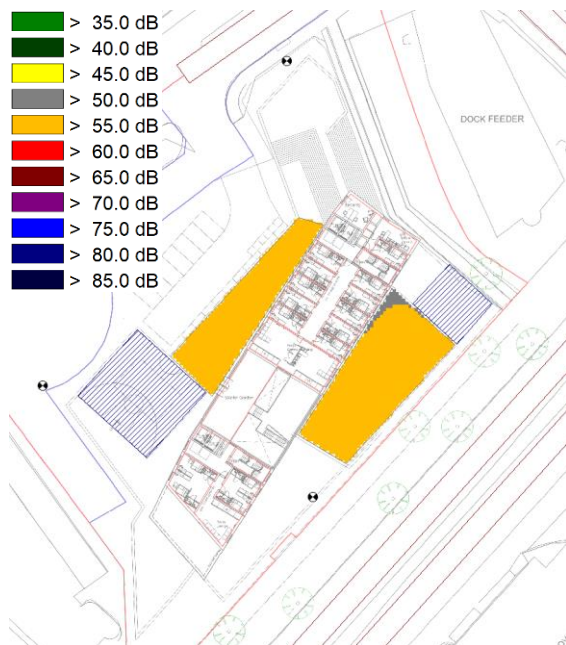


Figure 11: Daytime ambient sound levels ($L_{Aeq,16 \text{ hours}}$) across external amenity spaces

However, this does mean that users would be unable to use the allocated areas as external amenity spaces, but it does mean that the areas will not be tranquil, as they will be subject to elevated road traffic noise. ProPG Planning & Noise: New Residential Development states the following:

"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, 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 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations."

Britannia Park, which is an 8-minute walk away from the proposed development, therefore, partially offsets the lack of quiet external amenity space.

8.2.4 Element 4 – Assessment of other relevant issues.

The proposed development plant will need to be managed as described in Section 7. At these levels, plant noise would be very unlikely to influence noise levels perceived internally or in external areas by occupants of the proposed development.

The sports courts serving the proposed development are a new source of noise in the area. When assessing the predicted noise levels incident on proposed development facades, this noise has been included within the model. However, consideration should also be given to the impacts of the courts on occupants of the Premier Inn.

Use of the external sports courts is expected to be limited to daytime. On this basis, given that the Premier Inn is primarily for overnight stays, the noise impacts are expected to be minimal. However, if users of the Premier Inn were to rest/sleep during the day, they could be disturbed by noise from usage, particularly if used for basketball. Noise levels would be distinctive and in the order of 51 dB $L_{Aeq,T}$ at the nearest Premier Inn façade window, due to the sound of the ball bouncing. Although distinctive, and identifiable, this noise level is

considerably below background sound levels during the day. This would result in temporary noise levels of approximately 44 dB $L_{Aeq,T}$ or less internally, assuming windows are open. With windows closed, sound levels internally would be less than 26 dB $L_{Aeq,T}$ at the nearest Premier Inn Apartments. Given the elevated road traffic noise levels during the day, it is considered unlikely that occupants would choose to open their windows. To summarise, adverse impacts are only expected if occupants of the Premier Inn are to rest/sleep during the day with windows open whilst the sports courts are in use.

9. Summary of assessment.

Hoare Lea has carried out an acoustic assessment of student accommodation on the site of the existing Q park Car Park, Cardiff (the proposed development).

Noise limits have been derived for fixed building services plant serving operation of the proposed development. A high-level assessment of the viability of achieving these limits has been carried out and shown to be achievable through standard means.

Noise levels incident on the proposed development façade have been predicted and indicative measures to facilitate suitable internal noise levels have been specified. This includes for the noise contributions of external sport courts serving the proposed development.

The sports courts would be capable of resulting in noise disturbance at the nearby Premier Inn, but this is only probable under the conservative assumption that daytime rest/sleep could occur with windows open at the Premier Inn, during use of the sports courts.

Whilst both the plant noise and noise incident on the proposed development facades will require more attention during the detailed design of the proposed development, the indicative assessments carried out show that the current proposed development can be suitable acoustically, provided the design measures specified are implemented.

This assessment is informed by the results of an acoustic survey carried out in the area.

10. Appendix A: Acoustic survey equipment.

Position 1 (unattended)

Rion - Microphone: UC-59 sn: 00286

Rion - Pre-amplifier: NH-23 sn: 60106

Rion - Sound Calibrator: NC-74 sn: 34304644

Rion - Sound Level Meter: NA-28 sn: 01260203

Position 2 (unattended)

Rion - Microphone: UC-59 sn: 18642

Rion - Pre-amplifier: NH-25 sn: 21772

Rion - Sound Calibrator: NC-74 sn: 34304644

Rion - Sound Level Meter: NL-52 sn: 00331821

Position 3, 4 and 5 (attended)

Brüel and Kjær - Microphone: 4189 (serial number 3196389)

Brüel and Kjær - Pre-amplifier: ZC 0032 (serial number 29117)

Brüel and Kjær - Sound Level Meter: 2250 (serial number 3003702)

Brüel and Kjær - Sound Calibrator: 4231 (serial number 3014189)



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