# Noise Impact Assessment

Premier Inn Huddersfield Central

Whitbread

30/10/2025

ScotchPartners

Building Services | Energy | Sustainability | Acoustics

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# 1 Introduction

1.1 Planning permission has been granted for the demolition of the existing hotel restaurant and erection of additional hotel bedrooms at the Premier Inn Huddersfield Central hotel, located on St Andrew's Road in Aspley, Huddersfield, HD1 6SB (application number: 2024/62/91828/W). A condition relating to the control of plant noise was stipulated as part of the approval, and so this report has been prepared to assess noise emission from new building services plant associated with the proposed works, in order to demonstrate compliance with the requirements of the condition. Noise intrusion into the new hotel bedrooms has also been assessed within this report.

1.2 An external noise survey has been conducted at the site, and the measurement data have been used to establish the prevailing ambient and background noise levels affecting the site and neighbouring noise-sensitive properties. This data has then been used to assess the noise impact in accordance with Kirklees Council's anticipated requirements.

1.3 Chapter 2 of this report presents the acoustic requirements, Chapter 3 describes the external noise survey, and the assessment of plant noise emission to neighbouring properties is presented in Chapter 4. Plant noise intrusion into existing hotel guestrooms is assessed in Chapter 5, and external noise intrusion into new hotel guestrooms is assessed Chapter 6. Conclusions have been provided in Chapter 7.

1.4 The full measurement data are available on request. Definitions of some of the terminology used throughout the report have been included in Appendix A.

# 2 Criteria

## 2.1 Overview

2.1.1 When assessing the impact of noise emission from new building services plant associated with the proposed development, and noise intrusion into the proposed development, consideration has been given to the permitted Planning Decision Notice, local planning policy, available good practice guidance, and the hotel operator's brand standards. A list of the documents that have been consulted is provided below:

Planning Decision Notice
- Kirklees Council, Permitted Planning Decision Notice, Application Number: 2024/62/91828/W (dated 30th January 2025)

Local Policy
- Kirklees Council, Kirklees Local Plan Strategies and Policy (adopted 27th February 2019)
- Kirklees Noise Design Advice (May 2007)

Good Practice Guidance
- British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

Hotel Operator's Brand Standards
- Premier Inn Generic Specification for a Turnkey Development (February 2025 – Edition Rev O)

2.1.2 Summaries of the guidance considered relevant to the proposals are presented within this chapter.

## 2.2 Planning Decision Notice

2.2.1 The relevant Condition from the Decision Notice is presented below:

> *"14. Prior to the commencement of development, a further noise assessment report by a suitably competent person shall be submitted to and approved in writing by the Local Planning Authority. The report shall include:*
>
> - *An assessment of all noise emissions from the proposed development;*
> - *Details of existing background and predicted future noise levels at the boundary of the nearest noise sensitive premises; and*
> - *A written scheme of how the occupants of the above-mentioned noise sensitive premises will be protected from noise from the proposed development including details of all necessary noise attenuation.*

*The development shall not be brought into use until all works comprised within the measures specified in the approved report have been carried out in full and such measures shall be thereafter retained.*

*Reason: To ensure the proposed development does not cause harmful noise pollution within neighbouring noise sensitive locations, in the interest of amenity, and to comply with the aims and objectives of Policies LP24 and LP52 of the Kirklees Local Plan and Chapters 12 and 15 of the National Planning Policy Framework. This pre-commencement condition is necessary to ensure that noise mitigation measures are agreed at an appropriate stage of the development process."*

2.2.2 The Condition does not specify any objective criteria for the assessment of plant noise emission, so further guidance has been sought from Kirklees Council's Local Plan and supplementary planning documents.

## 2.3 Kirklees Local Plan Strategies and Policy

2.3.1 Kirklees Council's Local Plan Strategies and Policy (adopted 27th February 2019) contains a policy concerning the protection and improvement of environmental quality that is considered relevant to the proposals:

*"Policy LP52*

*Protection and improvement of environmental quality*

*Proposals which have the potential to increase pollution from noise, vibration, light, dust, odour, shadow flicker, chemicals and other forms of pollution or to increase pollution to soil or where environmentally sensitive development would be subject to significant levels of pollution, must be accompanied by evidence to show that the impacts have been evaluated and measures have been incorporated to prevent or reduce the pollution, so as to ensure it does not reduce the quality of life and well-being of people to an unacceptable level or have unacceptable impacts on the environment.*

*Such developments which cannot incorporate suitable and sustainable mitigation measures which reduce pollution levels to an acceptable level to protect the quality of life and well-being of people or protect the environment will not be permitted.*

*Where possible, all new development should improve the existing environment."*

## 2.4 Kirklees Noise Design Advice

2.4.1 The Kirklees Noise Design Advice document (May 2007) provides objective guidance for the assessment of noise emission from industrial and commercial noise sources. The relevant criteria are presented below:

*"Developers should carry out an assessment in accordance with BS4142 to determine the rating level of the new development. It is recommended that during normal daytime hours (0700 to 2300 hours), the BS4142 rating level, measured over 1 hour, should be 5dB below the background ($L_{A90}$). During the night-time period (2300 to 0700 hours), the BS4142 rating level, measured over 5 minutes should be 5dB below the background ($L_{A90}$).*

*The assessment should be carried out at the site boundary or at the nearest noise sensitive premises, depending on the circumstances. These noise levels are intended to ensure that existing noise sensitive premises and land which may be used for noise sensitive development in future does not become blighted by noise.*

*To aid regeneration, in certain circumstances, a higher rating level may be accepted provided the need is justified.*

*In addition, the levels specified in Appendix 1 should not be exceeded. These should be calculated assuming windows in noise sensitive premises are open for ventilation (see Appendix 1)"*

2.4.2 The internal noise levels specified in Appendix 1 of the Kirklees Noise Design Advice document are presented in Figure 2-1.

| Room/Area | $L_{Aeq}$ (16 hr) 700-23.00 | $L_{Aeq}$ (8 hr) 23.00-07.00 | $L_{A1(15\ min)}$ 23.00-07.00 | $L_{Amax\ 23.00-07.00}$ |
|---|---|---|---|---|
| **Living Rooms/Studies** | 35dB | xxxxx | xxxxx | xxxxx |
| **Gardens** | 55dB | xxxxx | xxxx | xxxxx |
| **Bedrooms** | xxxxx | 30dB | 45dB | 55dB |

*Figure 2-1: Table of internal noise levels that should not be exceeded (Kirklees Noise Design Advice Appendix 1)*

## 2.5 British Standard 4142

2.5.1 British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* presents a methodology for comparing the noise level of the new source (the *specific sound level*) with that of the existing background noise level in the area in the absence of the new source (the *background sound level*), and establishing the likely impact of the noise.

2.5.2 The methodology requires consideration be given to all aspects of the assessment process, and accounts for unusual acoustic features, such as tonal, impulsive, and intermittent characteristics of the noise by the addition of various corrections to the *specific sound level*. This corrected level is known as the *rating level*.

2.5.3 The *background sound level* is then arithmetically subtracted from the *rating level*. The greater the positive difference between the *rating level* and the *background sound level*, 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 upon the context.
- A difference of around +5 dB or more is likely to be an indication of an "adverse impact", depending upon the context.
- Where the rating level does not exceed the background sound level, this is an indication of a "low impact", depending upon the context.

## 2.6 Premier Inn Generic Specification for a Turnkey Development

2.6.1 All new Premier Inn developments and extensions are to be constructed so as to control noise intrusion in line with the requirements of the Premier Inn Generic Specification for a Turnkey Development, hereinafter referred to as the "PI Spec". Revision O (February 2025) of the PI Spec contains internal background noise limits for hotel guestrooms owing to external sources, as presented in Table 2-1.

| Period | Noise level |
|---|---|
| Daytime (07:00-23:00) | ≤ 35 dB $L_{Aeq,1hour}$ |
| Night-time (23:00-07:00) | ≤ 30 dB $L_{Aeq,1hour}$<br>≤ 42 dB $L_{AFmax}$* |

**The maximum criterion applies to all vehicle and railway train passbys and all aircraft flyovers. It also applies to the noise from all street activities including those associated with patrons attending and leaving adjacent, neighbouring or connected entertainment venues; noise associated with commercial and industrial neighbouring premises including delivery activities and process equipment; seagulls and church bells. Genuinely infrequent and unpredictable sources of noise such as car alarms occurring no more than twice a night are excluded.*

*Table 2-1: Internal background noise level requirements (Premier Inn brand standards)*

2.6.2 The standards have been chosen to complement the Good Night Guarantee offered by Premier Inn, which refunds guests if they have been disturbed by noise while trying to sleep. These standards are more onerous than those recommended in British Standard 8233, the usual guidance adopted for controlling noise intrusion into residential accommodation. It is therefore intended to control noise intrusion into the hotel in line with the requirements of the PI Spec. Complying with these requirements can also be expected to satisfy any reasonable Planning requirements for noise intrusion into the hotel.

2.6.3 The PI Spec also requires that noise emission from all plant associated with the hotel be designed to be at least 5 dB below the lowest measured background sound level at night with all plant operating simultaneously, when assessed at the boundary (assumed to be any normally occupied position) of the nearest noise-sensitive property.

2.6.4 Furthermore, the PI spec requires the following regarding background noise levels in hotel bedrooms:

> *"The background noise level in any hotel bedroom as a result of any other building services systems serving the bedroom, neighbouring bedrooms or any other parts of the hotel or development, shall not exceed NR20 $L_{eq}$ within the bedroom. Particular attention is drawn to noise intrusion from roof top plant above or adjacent to bedrooms."*

# 3 External noise survey

## 3.1 Site description

3.1.1 The site is located on St Andrew's Road (B6432) in Aspley, Huddersfield, HD1 6SB, and is situated on the Huddersfield Broad Canal, overlooking Aspley Wharf Marina. Shorehead Roundabout is also located to the north-west of the site, which connects Wakefield Road (located to the south of the site) to Southgate and Queensgate.

3.1.2 The main source of noise affecting the site and neighbouring properties was observed to be road traffic on the surrounding roads, and existing building services plant. It is worth noting that noise from the plant serving the existing hotel restaurant (to be demolished) was audible during the periods of attendance on site; this plant is located towards the rear of the site, next to the nearest neighbouring property.

3.1.3 The immediate neighbours surrounding the site are understood to mainly comprise commercial / office buildings. There are also student accommodation buildings located along Firth Street, to the south of the site.

## 3.2 Measurement methodology

3.2.1 Continuous, unattended noise level measurements were conducted at two positions; one towards the front of the site (facing Aspley Wharf Marina), and one towards the rear (in the existing hotel car park). The microphone was positioned c. 1.5m above the local ground level in both locations, and is considered to have been placed in a reasonable approximation of free-field conditions.

3.2.2 The measurement positions are shown on the satellite image in Figure 3-1.

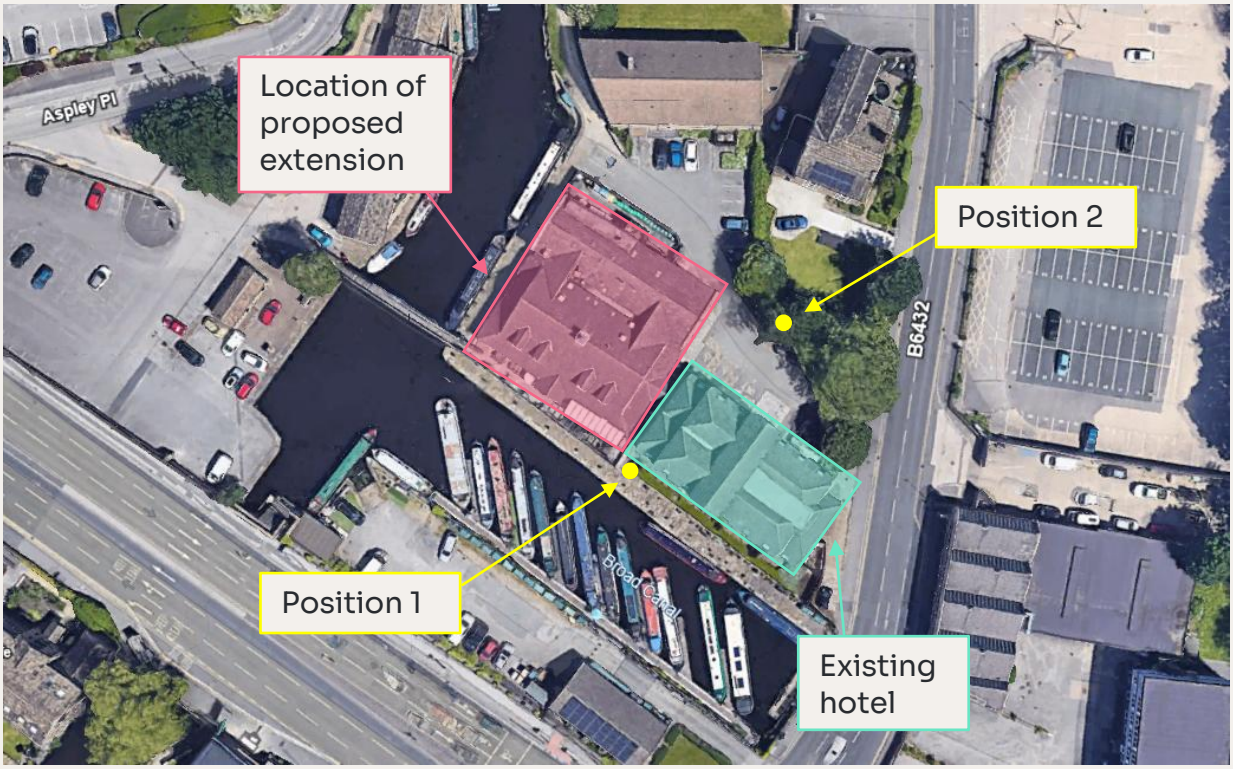



*Figure 3-1: Satellite image showing noise measurement locations (source: Google Earth)*

3.2.3 Statistical and spectral octave-band data were recorded in 15-minute samples between 17:45 on Thursday 25th September and 11:30 on Friday 26th September 2025 at measurement position 1, and between 12:00 on Friday 26th September and 10:30 on Wednesday 1st October 2025 at measurement position 2. The "fast" (125ms) time constant was used.

3.2.4 The data measured at these locations are considered representative of the typical and lowest background sound levels experienced at nearby neighbouring properties.

3.2.5 Measurements were undertaken generally in accordance with the procedures advised within British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound and British Standard 7445-1:2003 Description and measurement of environmental noise.

3.2.6 The following equipment was used to carry out the measurements in both locations:

| Equipment | Manufacturer/model | Serial no. |
|---|---|---|
| Class 1 sound level meter | Norsonic 131 | 1313605 |
| Environmental microphone | Norsonic 1227 | 491212 |
| Portable sound calibrator | B&K 4231 | 2291098 |

*Table 3-1: Equipment used for noise survey*

3.2.7 The calibration of the sound level meter and associated microphone was checked prior to and on completion of the survey in accordance with recommended practice. No significant drift in calibration occurred during the survey. The accuracy of the calibrator can be traced to National Physical Laboratory Standards.

## 3.3 Weather

3.3.1 Weather conditions throughout the survey[1] are believed to have been mostly dry with average windspeeds of < 5 m/s, and so the weather conditions are considered to have had minimal impact on the measurements.

## 3.4 Results

3.4.1 Full measurement data are available on request. A lot of data was collected during the survey, and so a summary of the key data is presented in this report.

3.4.2 Graphs showing the noise level histories at measurement positions 1 and 2 are presented in Figure 3-2 and Figure 3-3, respectively.

[1] https://www.timeanddate.com/weather/uk/huddersfield/historic?month=9&year=2025

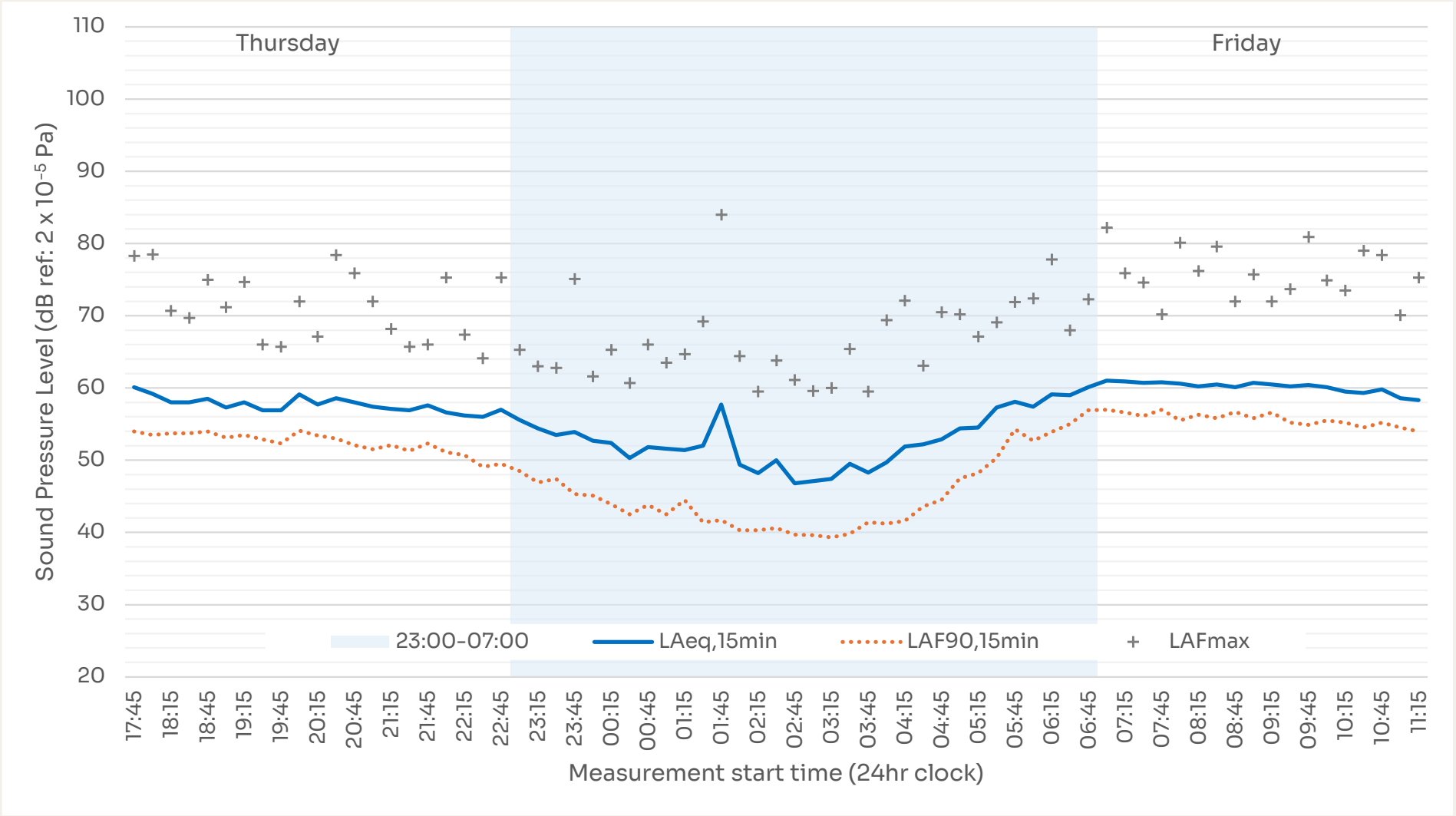



*Figure 3-2: Measured noise level history at position 1 (facing Aspley Wharf Marina)*

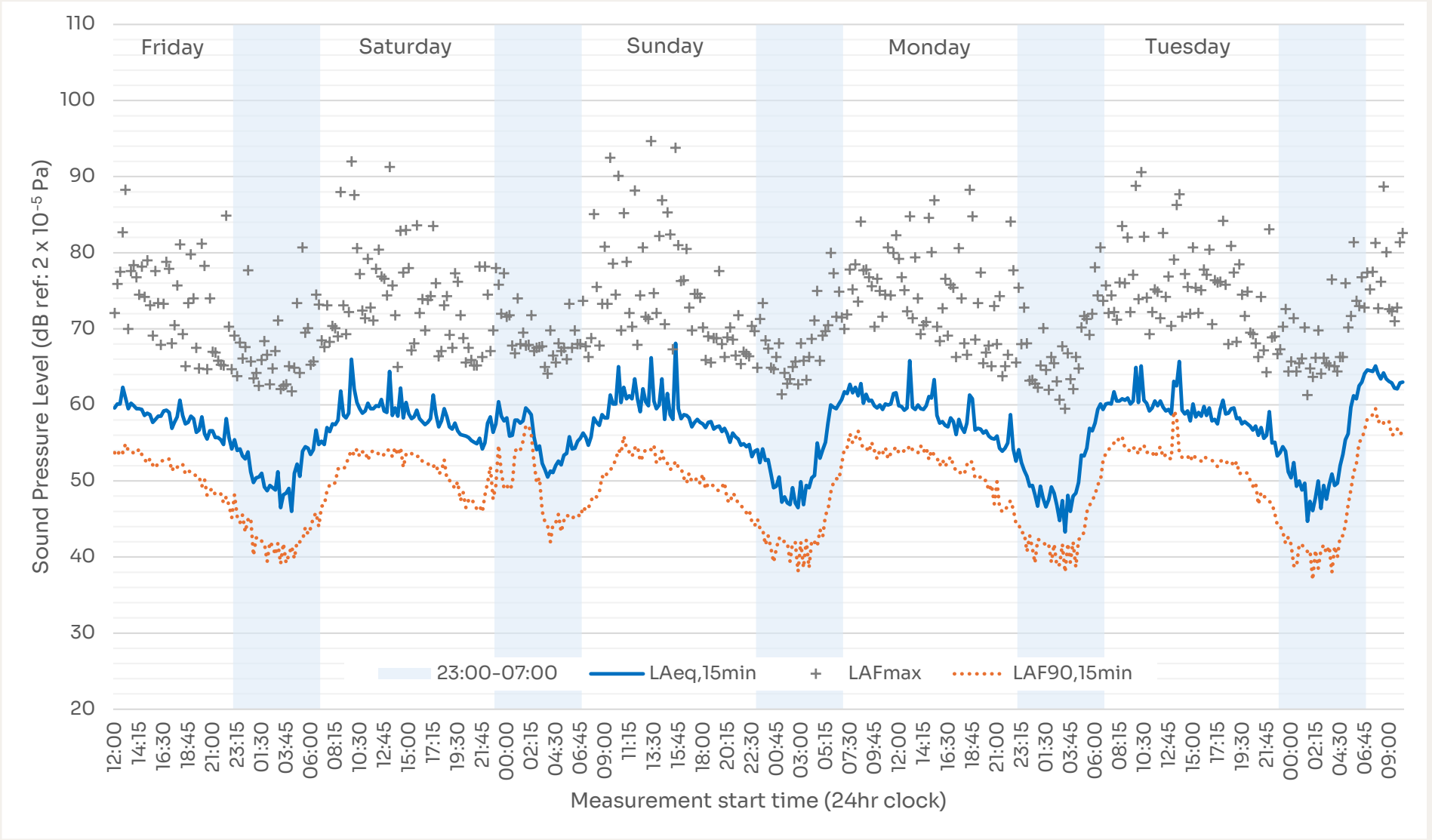



*Figure 3-3: Measured noise level history at position 2 (in the existing hotel car park)*

3.4.3 Based on the measured data, the lowest background sound levels expected to occur during the daytime and night-time at the nearest noise-sensitive properties are presented in Table 3-2.

| Measurement position | Time | Lowest background sound levels |
|---|---|---|
| Position 1 (facing Aspley Wharf Marina) | Daytime (07:00-23:00) | 49 dB $L_{AF90,15min}$ |
| | Night-time (23:00-07:00) | 39 dB $L_{AF90,15min}$ |
| Position 2 (in the existing hotel car park) | Daytime (07:00-23:00) | 44 dB $L_{AF90,15min}$ |
| | Night-time (23:00-07:00) | 37 dB $L_{AF90,15min}$ |

*Table 3-2: Typical background sound levels obtained during the survey*

3.4.4 Noise levels can be seen to have generally followed a diurnal pattern, falling to the lowest levels overnight and rising to the highest levels in the morning. This is typical for sites that are exposed to road traffic noise.

3.4.5 There is no obvious flattening out of the noise levels, as may be expected if dominated by constant building services noise, or similar. The noise level history accords with the subjective impressions of the various sources of noise observed during the periods of attendance.

# 4 Plant noise emission assessment

## 4.1 Plant noise emission limits

4.1.1 In order to satisfy the Local Authority's anticipated requirements (presented in 2.4), the rating level of the proposed building services plant, measured during the daytime over a 1-hour period, needs to be at least 5 dB below the background sound level when assessed at the boundary of the nearest noise-sensitive receiver. During the night-time, the rating level also needs to be at least 5 dB below the background sound level, when measured over a 5-minute period and assessed at the same location.

4.1.2 As the noise levels measured at position 1 spanned a duration of less than 24 hours, the lowest background sound levels obtained during the whole survey have been used to define the plant noise emission limits at the nearest noise-sensitive receiver, in order to represent a worst-case scenario. The following limits are based on the results of the noise survey, and are expected to satisfy the requirements of the Local Authority:

| Time | Lowest background sound level obtained during survey | Plant noise emission limit at nearest noise-sensitive receiver |
|---|---|---|
| Daytime (07:00-23:00) | 44 dB $L_{AF90,15min}$ | 39 dB $L_{Ar}$ |
| Night-time (23:00-07:00) | 37 dB $L_{AF90,15min}$ | 32 dB $L_{Ar}$ |

*Table 4-1: Plant noise emission limits at nearest noise-sensitive receiver, based on measurement data*

## 4.2 Plant proposals

4.2.1 Two outdoor condenser units serving the new hotel guestrooms (Mitsubishi PURY EP200YNW-A1) and one water heater (Mitsubishi Qton ESA30EH-25) are proposed to be installed on the roof of the proposed extension.

4.2.2 The location of the proposed plant is highlighted in Figure 4-1, alongside a section view of the plant in Figure 4-2.

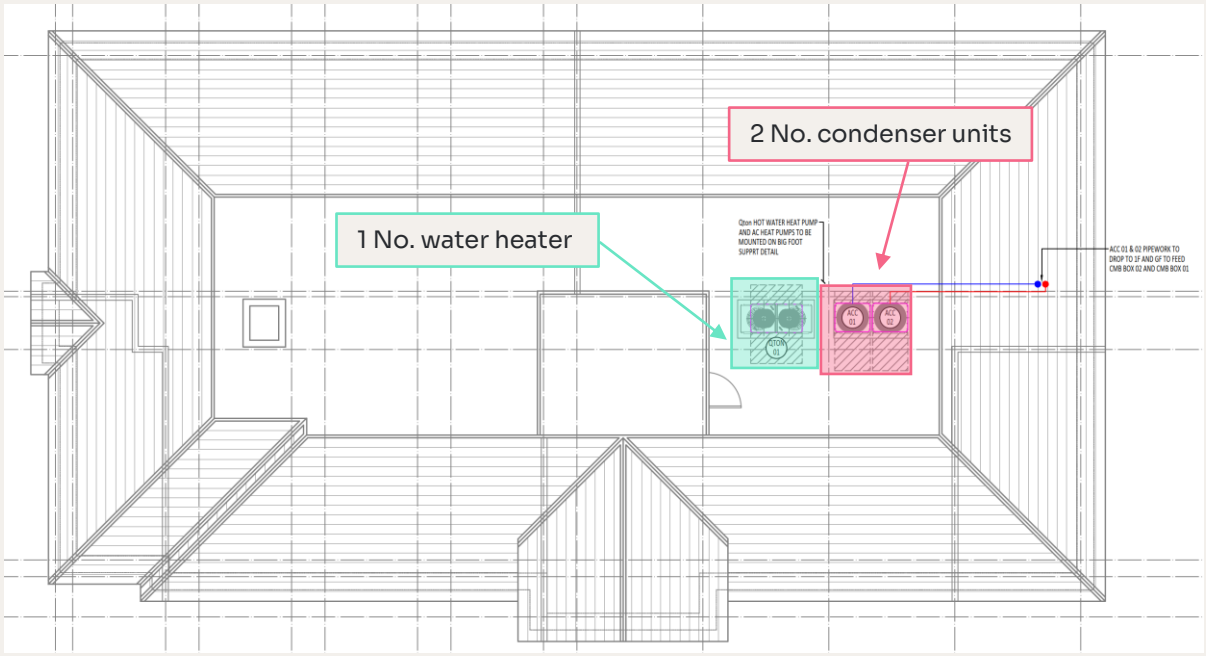



*Figure 4-1: Proposed location of new rooftop plant (plan view)*

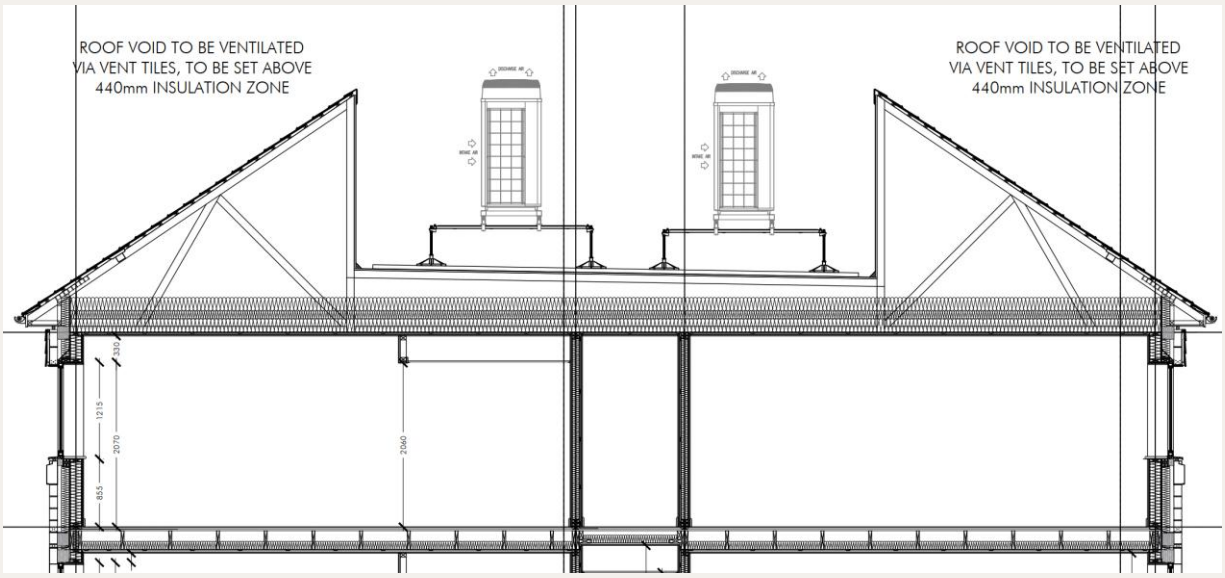



*Figure 4-2: Proposed location of new rooftop plant (section view)*

4.2.3 The condenser units (2 No. Mitsubishi PURY-EP200 units) are able to be controlled to 70% duty during the daytime (07:00-23:00) and to 50% duty overnight (23:00-07:00). The water heater (Mitsubishi Q-ton ESA30EH-25) is expected to be required to operate at normal duty during both daytime and night-time hours.

4.2.4 The sound power levels for the units have been provided by the manufacturer, and are presented in Table 4-2. The equipment is noisier when operating in heating mode (rather than other modes) so only the data for heating mode has been used in the assessment.

| Unit | Linear sound power levels in octave band centre frequencies (dB) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz |
| PURY-EP200 70% duty | 79 | 74 | 69 | 67 | 65 | 62 | 64 | 60 |
| PURY-EP200 50% duty | 75 | 68 | 60 | 59 | 56 | 53 | 57 | 55 |
| Q-ton ESA30EH-25 | 68 | 63 | 57 | 57 | 60 | 55 | 51 | 45 |

*Table 4-2: Manufacturer provided sound power levels (per unit), (in dB ref: 1 x $10^{-12}$ W)*

## 4.3 Nearest noise-sensitive receivers

4.3.1 The nearest noise-sensitive receiver to the proposed plant area is considered to be the Capitol Students Firth Point Student Accommodation building, which is located at 100 Firth Street to the south of the hotel. This is highlighted in Figure 4-3.

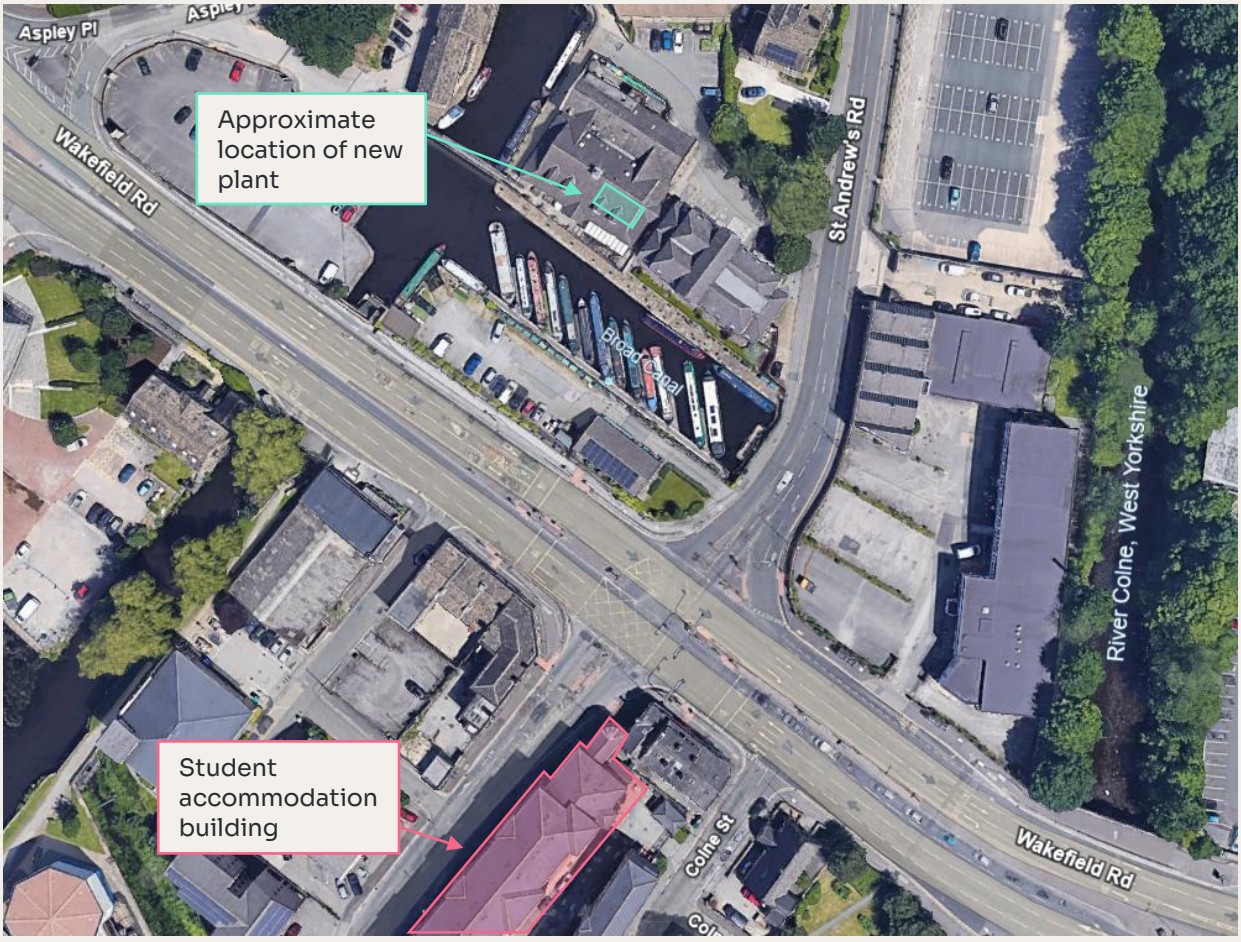



*Figure 4-3: Satellite image showing nearest noise-sensitive receiver (source: Google Earth)*

4.3.2 The distance between the plant and the assessment location is approximately 105m, which equates to about 40 dB of distance attenuation, based on point-source propagation and relative to a 1m propagation distance.

4.3.3 The noise impact to other neighbouring noise-sensitive properties not identified in this report is expected to be less than that presented, owing to the increased propagation losses (from both distance and screening). The assessment is therefore considered to be representative of a reasonable worst-case scenario.

## 4.4 Background sound levels

4.4.1 The noise levels at both measurement positions are considered to be representative of the background sound levels experienced at the assessment location.

## 4.5 Calculation methodology

4.5.1 The calculation of the specific sound level for the nearest noise-sensitive receiver has been carried out in accordance with the general calculation methodology outlined in ISO 9613-2:2024, as per typical industry practice. Calculations have been made for each of the following means of attenuation, where considered to be relevant:

- **Geometric divergence** – which describes the reduction in sound pressure level as the distance from the source increases.
- **Screening** – which describes the attenuation provided when the line-of-sight between source and receiver is obscured by an imperforate object with a surface mass of at least 10 kg/m$^2$.
- **Specific attenuation measures** – such as reduced operating duties.

4.5.2 The line-of-sight between the plant and the most affected window of the student accommodation building is expected to be only partially obscured by the roof of the proposed extension. Screening effects have therefore not been considered in the assessment, in order to represent a reasonable worst-case scenario.

4.5.3 A +3 dB correction has been applied to each unit to account for reflections off the roof edge.

4.5.4 The proposed reduction in operating duties for the condenser units (to 70% during the day, and to 50% overnight) has been included in the calculations.

4.5.5 The guidance in BS 4142 requires that decibel corrections be added to the specific sound level if the noise contains unusual acoustic characteristics. The corrected sound level is known as the rating level. The following characteristics have been considered:

- **Tonality** – Noise from the proposed units will typically be airflow noise at maximum duty, which is broadband in character (i.e. distributed over a wide frequency range), and therefore not expected to contain tonal qualities. However, a precautionary +2 dB correction has been included to allow for a "just" perceptible tonality.
- **Impulsivity** – When properly maintained, noise from the proposed units is not expected to exhibit impulsive characteristics, therefore this correction has not been applied.
- **Intermittency** – The duty of the units will adjust depending on the duty requested by the occupants. The equipment is, however, expected to operate with gradual stop/starts, so it is unlikely that an intermittent characteristic would be experienced at the neighbouring properties. However, a precautionary +3 dB correction has been included.
- **Other** – The units are not expected to emit any other characteristics that would be readily distinctive against the existing acoustic environment, therefore no correction has been applied.

4.5.6 The BS 4142 rating level will therefore be 5 dB higher than the specific sound level at the nearest noise-sensitive receiver.

## 4.6 Predicted noise levels

4.6.1 The specific sound levels of the proposed plant at the assessment location are presented in Table 4-3, along with the associated rating levels. The levels are inclusive of the proposed reduction in operating duties for the condenser units.

| Time | Lowest background level | Receiver | Specific sound level | Rating level | Difference from background |
|---|---|---|---|---|---|
| Daytime (07:00-23:00) | 44 dB $L_{AF90,15min}$ | Student accommodation block | 26 dB $L_{pA}$ | 31 dB $L_{Ar}$ | -13 dB |
| Night-time (23:00-07:00) | 37 dB $L_{AF90,15min}$ | Student accommodation block | 20 dB $L_{pA}$ | 25 dB $L_{Ar}$ | -12 dB |

*Table 4-3: Predicted plant noise level at the assessment location*

4.6.2 Provided that the proposed reduction in operating duties for the condenser units is implemented correctly, noise emission from the proposed plant is expected to be at least 5 dB below the lowest background levels obtained during the survey, which is expected to satisfy Kirklees Council's anticipated requirements for plant noise emission.

4.6.3 Furthermore, the façade of the student accommodation block is expected to provide a sound level difference of at least 10 dBA (assuming windows are open). The specific sound level inside the student accommodation block, owing to the proposed plant, is therefore expected to be 16 dB $L_{Aeq,T}$ during the day, and 10 dB $L_{Aeq,T}$ overnight, which is expected to satisfy the internal noise level criteria provided in the Kirklees Noise Design Advice document (presented in Figure 2-1).

4.6.4 This report is consequently expected to satisfy the requirements of Condition 14 of the permitted Planning Decision Notice.

# 5 Plant noise intrusion into existing hotel guestrooms

5.1 The proposed units will be installed in close proximity to existing hotel guestrooms; it is understood that these guestrooms are mechanically-ventilated, and so do not rely on openable windows for ventilation. The location of the existing hotel in relation to the proposed plant is highlighted in Figure 5-1 below.




*Figure 5-1: Location of the existing hotel in relation to proposed plant (source: Google Earth)*

5.2 There are no windows located on the most affected façade of the existing hotel (facing the proposed plant), so the line-of-sight between the plant and the most affected windows is expected to be obscured by the hotel itself. The effects of acoustic screening can therefore be considered.

5.3 The background noise levels inside the nearest and most affected guestrooms of the existing hotel (owing to the new building services plant) are expected to satisfy the Premier Inn criterion of NR20 $L_{eq}$. Further mitigation measures are therefore not considered to be necessary for the proposed items of plant.

# 6 External noise intrusion into new hotel guestrooms

## 6.1 Reference noise levels

6.1.1 The highest noise levels obtained during the survey at each individual octave-band centre frequency are presented below in Table 6-1, alongside the highest A-weighted values obtained during the survey. Note that the A-weighted values have not been calculated from the octave-band values in Table 6-1. These are considered to represent a reasonable worst-case.

| Position | Time | Highest noise levels (dB) in octave-band centre frequencies (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | dBA |
| Position 1 (facing Aspley Wharf Marina) | Daytime $L_{eq}$ (07:00-23:00) | 70 | 61 | 59 | 57 | 58 | 54 | 45 | 43 | 61 |
| | Night-time $L_{eq}$ (23:00-07:00) | 68 | 62 | 56 | 56 | 57 | 52 | 42 | 29 | 60 |
| | Night-time $L_{Fmax}$ (23:00-07:00) | 86 | 86 | 81 | 83 | 79 | 78 | 67 | 56 | 84 |
| Position 2 (in the existing hotel car park | Daytime $L_{eq}$ (07:00-23:00) | 74 | 73 | 71 | 68 | 62 | 64 | 56 | 50 | 68 |
| | Night-time $L_{eq}$ (23:00-07:00) | 67 | 61 | 60 | 57 | 59 | 59 | 55 | 49 | 64 |
| | Night-time $L_{Fmax}$ (23:00-07:00) | 90 | 86 | 84 | 83 | 80 | 77 | 69 | 73 | 81 |

*Table 6-1: Highest noise levels obtained during the survey*

6.1.2 Noise intrusion into the new guestrooms has been assessed using all of the measured data obtained during the external noise survey. Note that noise levels from measurement position 1 have been used to verify the design of the front façade (facing Aspley Wharf Marina), but have been discounted from the assessment for the rear façade (facing the existing car park).

6.1.3 The level of external noise intrusion into a space is a function of the volume and surface finishes of the space, and the sound insulation performance provided by the façade. The space with the largest façade area, smallest volume, and highest number of windows is considered to represent the worst-case scenario.

## 6.2 Recommended façade constructions

6.2.1 The recommended sound insulation performance of façade elements to achieve the criteria presented in Table 2-1 have been determined based on the ratio of glazing to solid façade, and the room sizes shown in the architectural drawings.

6.2.2 The ground floor layout is presented in Figure 6-1, with the worst-case rooms highlighted.

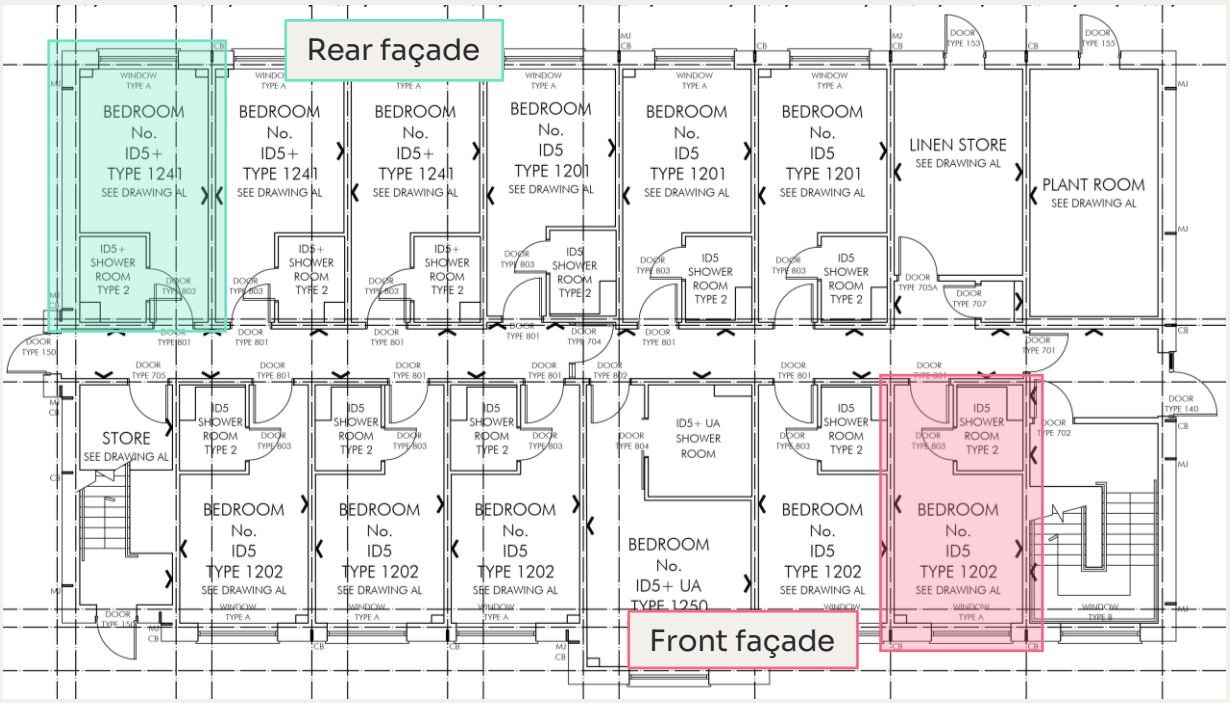



*Figure 6-1: Ground floor layout with worst-case rooms highlighted in red*

6.2.3 In order for the worst-case rooms to meet the requirements, the following sound insulation performances are recommended for all facades (as a minimum):

| Façade element | Laboratory-rated sound reduction index in octave-band centre frequencies (dB) | | | | | |
|---|---|---|---|---|---|---|
| | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz |
| External walls | 40 | 46 | 51 | 53 | 50 | 50 |
| Windows | 27 | 36 | 45 | 51 | 50 | 56 |

*Table 6-2: Recommended acoustic specifications for worst-case rooms on both facades*

6.2.4 The sound insulation performance for external walls is expected to be achieved by typical masonry constructions, supplemented with internal plasterboard linings and insulation in the cavity. Alternatively, lightweight façade wall systems are considered viable, but may need some form of cementitious board within the build-up.

6.2.5 The sound insulation performance for the windows is expected to be readily achieved by Abbey Glass' "Premierfon" product.

6.2.6 Alternative façade constructions and glazing configurations may also be suitable, so long as they achieve the internal noise level criteria presented in Table 2-1. It is also worth noting that glazing selections should account for framing losses.

# 7 Conclusions

7.1 A noise emission assessment has been undertaken of proposed new building services plant associated with the extension of the existing Premier Inn Huddersfield Central hotel, located on St Andrew's Road in Aspley, Huddersfield, HD1 6SB

7.2 An external noise survey has been conducted at the site, and the measurement data have been used to establish the prevailing ambient and background noise levels affecting the site and neighbouring noise-sensitive properties. These data have then been used to assess the noise impact in line with the requirements of Condition 14 of the permitted Planning Decision Notice.

7.3 In order for the proposed plant to satisfy Kirklees Council's requirements, it has been concluded that a reduction in operating duties will need to be implemented for the condenser units (to 70% during the daytime, and to 50% overnight).

7.4 Provided that the proposed reductions are implemented correctly, noise emission from the proposed plant is expected to be at least 5 dB below the lowest background levels when assessed at the boundary of the nearest noise-sensitive receiver. The noise levels inside the nearest noise-sensitive receiver (owing to the proposed plant) are also expected to comply with the levels stipulated within the Kirklees Noise Design Advice document. Noise emission from the proposed plant is expected to comply with Kirklees Council's anticipated requirements, and so this report is expected to satisfy the requirements of Condition 14 of the permitted Planning Decision Notice.

7.5 Plant noise intrusion into existing hotel guestrooms has been assessed, and is expected to meet the Premier Inn requirements (without installing any specific attenuation measures).

7.6 External noise intrusion into new hotel guestrooms has also been assessed, and indicative façade specifications expected to meet the Premier Inn requirements have been provided. These specifications are also expected to comply with Kirklees Council's requirements, as the Premier Inn requirements are more onerous than those found within British Standard 8233, which is the standard usually adopted for residential properties.

# Appendix A - Terminology

This appendix provides an explanation of some of the terms used in this report.

| | |
|---|---|
| **A-weighting**<br>**$L_A$ or $L_{pA}$, $L_{WA}$,** | Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would actually hear. The A-weighting is an electronic filter that matches the response of a sound level meter to that of the human ear. When A-weighted the Sound Pressure Level $L_p$ becomes $L_{pA}$ (or $L_A$) and the Sound Power Level $L_W$ becomes $L_{WA}$. |
| **$L_p$** | *The instantaneous sound pressure level* ($L_p$) |
| **$L_{pA}$ (or $L_A$)** | *The A-weighted instantaneous sound pressure level* ($L_{pA}$ or $L_A$). This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125s (FAST time constant) or the previous 1s (SLOW time constant). |
| **$L_{AF}$, $L_{AS}$** | The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them. |
| **$L_{max}$** | *The maximum instantaneous sound pressure level* ($L_{max}$), |
| **$L_{Amax}$** | *The A-weighted maximum instantaneous sound pressure level* ($L_{Amax}$) |
| **$L_{AFmax}$** | *The A-weighted maximum instantaneous sound pressure level with a FAST time constant* ($L_{AFmax}$). |
| **$L_{N,T}$** | *The percentage exceedance sound pressure level* ($L_{N,T}$), |
| **$L_{AN,T}$ $L_{AFN,T}$**<br>**$N$ = %age value, 0-100**<br>**$T$ = measurement time**<br>**e.g. $L_{A90}$, $L_{A10}$, $L_{AF90,\,5\,min}$** | *The A-weighted percentage exceedance sound pressure level* ($L_{AN,T}$), *the A-weighted percentage exceedance sound pressure level with a FAST time constant* ($L_{AFN,T}$). This is the sound pressure level exceeded for *N*% of time period *T*. e.g. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as $L_{A10,1hr}$ = x dB. $L_{A0}$ (the level exceeded for 0 % of the time) is equivalent to the $L_{Amax}$ and $L_{A100}$ (the level exceeded for 100 % of the time) is equivalent to the $L_{Amin}$. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value. |
| **$L_{eq,T}$** | The *equivalent continuous sound pressure level over period T* ($L_{eq,T}$), |
| **$L_{Aeq,T}$**<br>**$T$ = measurement time**<br>**e.g. $L_{Aeq,5min}$** | *The A-weighted equivalent continuous sound pressure level over period T* ($L_{Aeq,T}$). This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the $L_{eq}$ is not a simple arithmetic mean value. The $L_{eq}$ is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation. |