



# Noise Impact Assessment

Premier Inn Uxbridge (Riverside Way)

Whitbread PLC

09/01/2026



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# 1 Introduction

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- 1.1 Proposals are in place to extend the existing Premier Inn Uxbridge (Riverside Way) hotel, located at 500 Riverside Way, Uxbridge UB8 2YF, in order to add additional guestrooms. The extension will be located towards the south of the hotel, where the existing car park is situated; there will also be 4 No. additional guestrooms in the annex towards the north of the site (where the existing Beefeater restaurant is located). This report presents an assessment of the noise emission from new building services plant associated with the extension. Noise intrusion into the new hotel guestrooms 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 the London Borough of Hillingdon 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 environmental noise intrusion into new hotel guestrooms is assessed in 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

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### 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 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:

#### Local Policy

- London Borough of Hillingdon, *Hillingdon Local Plan: Part 1 – Strategic Policies* (adopted November 2012)

#### 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 London Borough of Hillingdon Local Plan

2.2.1 Noise is addressed in Strategic Objective SO10 and Policy EM8 of the *Hillingdon Local Plan: Part 1 – Strategic Policies*, with explanatory text.

2.2.2 Strategic Objective SO10 (under *Land, Water, Air, and Noise*) is as follows:

*“Improve and protect air and water quality, reduce adverse impacts from noise including the safeguarding of quiet areas and reduce the impacts of contaminated land.”*

2.2.3 Policy EM8 of the Local Plan is as follows:

#### Noise

*The Council will investigate Hillingdon's target areas identified in the Defra Noise Action Plans, promote the maximum possible reduction in noise levels and will minimise the number of people potentially affected.*

*The Council will seek to identify and protect Quiet Areas in accordance with Government Policy on sustainable development and other Local Plan policies.*

*The Council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated.”*

2.2.4 It is believed that the London Borough of Hillingdon do not specify any objective criteria, therefore the assessment of plant noise emission will be undertaken in accordance with good practice guidance.

## 2.3 British Standard 4142

2.3.1 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.

2.3.2 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*.

2.3.3 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.

2.3.4 It is proposed to target a BS 4142 rating level that is at or below the prevailing background sound level, at all times the new plant is to be operating, in order to achieve a “low impact” at the neighbouring noise-sensitive receivers. It is considered that by doing this, noise would be sufficiently controlled such that it is in line with the requirements of Strategic Objective SO10 and Policy EM8.

## 2.4 Premier Inn Generic Specification for a Turnkey Development

2.4.1 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)    | $\leq 35 \text{ dB } L_{Aeq,1hour}$                                      |
| Night-time (23:00–07:00) | $\leq 30 \text{ dB } L_{Aeq,1hour}$<br>$\leq 42 \text{ dB } L_{AFmax}^*$ |

*\*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)

- 2.4.2 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.
- 2.4.3 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.
- 2.4.4 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

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### 3.1 Site description

- 3.1.1 The site is located in Uxbridge, UB8 2YF, and is situated on Riverside Way. To the east of the site is St. John's Road (A23), which runs both parallel and perpendicular to Riverside Way.
- 3.1.2 The main source of noise affecting the site and neighbouring properties was observed to be road traffic noise from St. John's Road (A23). Noise owing to activities associated with the surrounding commercial developments was not observed whilst on site, though these may be audible during other periods.
- 3.1.3 Noise at the site from existing building services was generally imperceptible against the road traffic noise, although may become more audible during lulls in traffic flows.
- 3.1.4 The immediate neighbours to the south and east of the site are understood to be mainly residential properties.

### 3.2 Measurement methodology

- 3.2.1 Continuous, unattended noise level measurements were conducted at a single position towards the south-east corner of the site (facing St Johns Road). The microphone was positioned c. 2m above the local ground level, and is considered to have been placed in a reasonable approximation of free-field conditions.
- 3.2.2 The measurement position is presented on the satellite image in Figure 3-1.

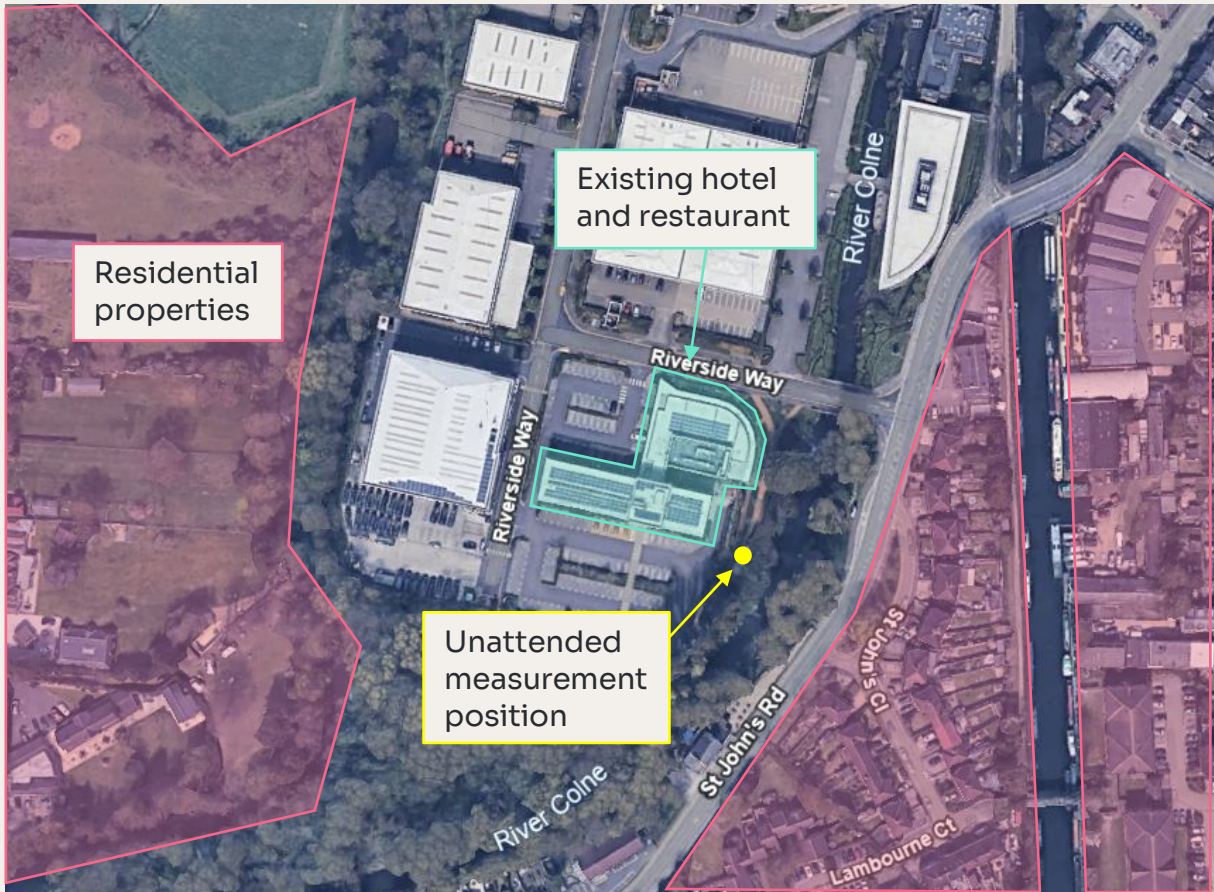


Figure 3-1: Satellite image showing noise measurement location (source: Google Earth)

- 3.2.3 Statistical and spectral octave-band data were recorded in 15-minute samples between 12:30 on Tuesday 27th August and 12:30 on Wednesday 28th August 2024. The “fast” (125ms) time constant was used.
- 3.2.4 The data measured at this location 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 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:

| Type                      | Model         | Serial no. |
|---------------------------|---------------|------------|
| Class 1 sound level meter | Norsonic 131  | 1312766    |
| Environmental microphone  | Norsonic 1227 | 491212     |
| Portable calibrator       | Norsonic 1251 | 34926      |

Table 3-1: Noise survey equipment

3.2.7 The calibration of the sound level meter and associated microphone were 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<sup>1</sup> are believed to have been dry with average windspeeds of approximately  $\leq 5$  m/s, and so the weather conditions are considered to have had minimal impact on the measurements.

### 3.4 Results & commentary

3.4.1 Full measurement data are available in digital format on request. A summary of the key data is presented in this report.

3.4.2 A graph showing the noise level history is presented in Figure 3-2.

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<sup>1</sup> <https://www.timeanddate.com/weather/uk/uxbridge/historic?month=8&year=2024>

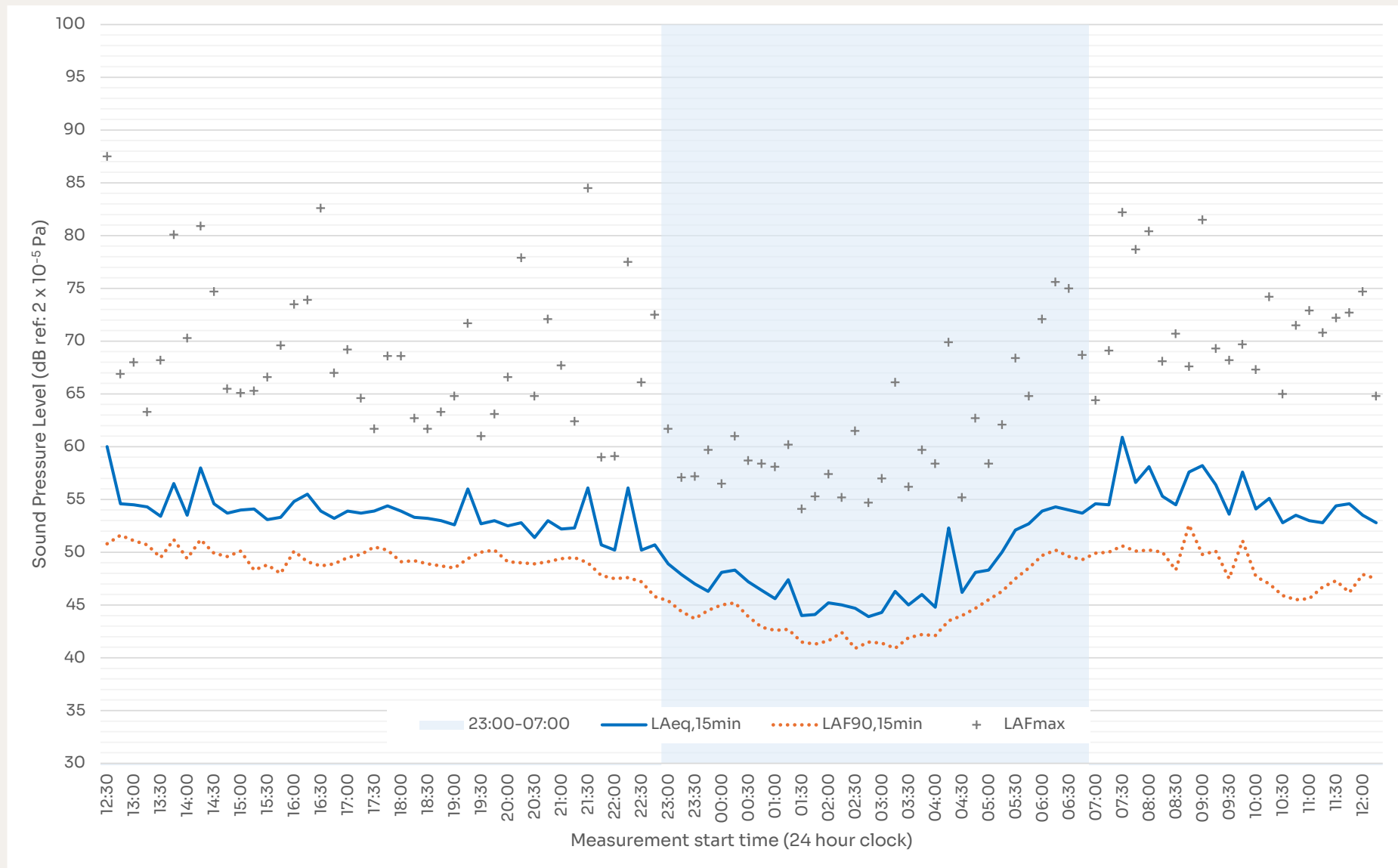


Figure 3-2: Measured noise level history between 27th and 28th August 2024

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

| Time                     | Lowest background sound levels |
|--------------------------|--------------------------------|
| Daytime (07:00-23:00)    | 46 – 53 dB $L_{AF90,15min}$    |
| Night-time (23:00-07:00) | 41 – 50 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 to neighbouring properties

### 4.1 Plant noise emission limits

4.1.1 In order to achieve a “low impact” according to a BS 4142 assessment, the rating level of the proposed building services plant needs to be no greater than the background sound level when assessed at the existing neighbouring properties. The background sound level used should reflect the level that is typically expected to occur at different times during the day.

4.1.2 In order to represent a worst-case scenario, the lowest background sound levels obtained during the survey have been used to define the plant noise emission limits at the nearest noise-sensitive receivers (NSRs). The following limits are based on the results of the noise survey, and are expected to satisfy the requirements of the Local Authority:

| Time                     | Plant noise emission limits at nearest NSRs |
|--------------------------|---|
| Daytime (07:00-23:00)    | 46 dB $L_{Ar}$                              |
| Night-time (23:00-07:00) | 41 dB $L_{Ar}$                              |

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

### 4.2 Plant proposals

4.2.1 The proposed plant is understood to comprise 4 No. condenser units serving the new guestrooms (3 No. Mitsubishi PURY EP250YNW-A2 and 1 No. Mitsubishi PURY EP300YNW-A2), and 3 No. water heaters serving the new and existing guestrooms (Mitsubishi Q-ton ESA30EH-25).

4.2.2 It is understood that the units will be located on the roof of the proposed extension. The location of the proposed plant is presented in Figure 4-1.

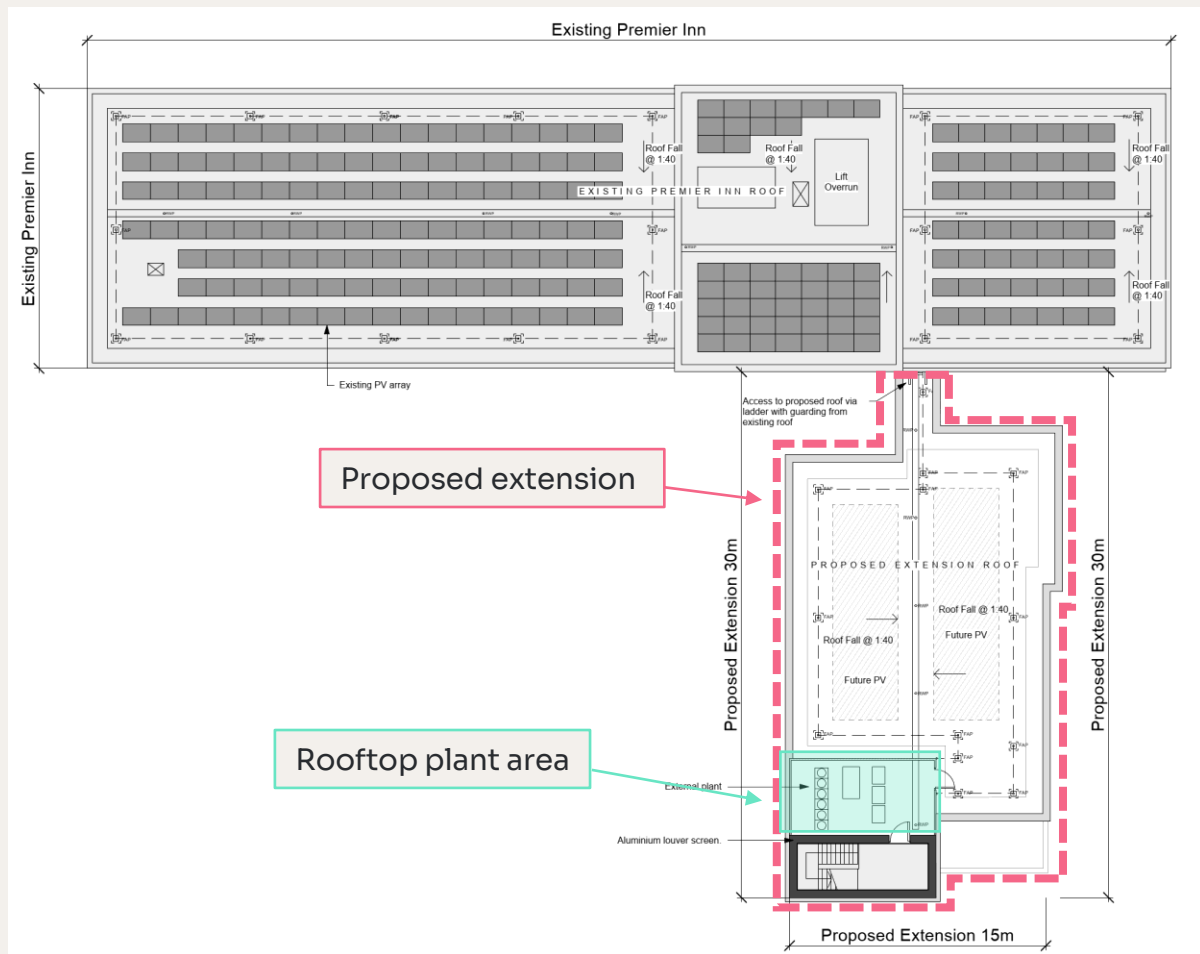


Figure 4-1: Proposed location of plant (roof level)

- 4.2.3 The condenser units serving the new guestrooms (Mitsubishi PURY-EP250 and PURY-EP300) 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 heaters (Mitsubishi Q-ton ESA30EH) are 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 guestroom condenser units and water heaters 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 (dB) in octave band centre frequencies (Hz) |     |     |     |    |    |    |    |
|------------------------|---|-----|-----|-----|----|----|----|----|
|                        | 63  | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| PURY-EP250<br>70% duty | 80  | 76  | 72  | 71  | 69 | 65 | 67 | 61 |
| PURY-EP250<br>50% duty | 76  | 70  | 64  | 63  | 61 | 57 | 61 | 57 |
| PURY-EP300<br>70% duty | 84  | 84  | 77  | 75  | 72 | 68 | 66 | 64 |
| PURY-EP300<br>50% duty | 78  | 76  | 69  | 67  | 63 | 60 | 58 | 59 |
| Q-ton<br>ESA30EH-25    | 68  | 63  | 57  | 57  | 60 | 55 | 51 | 45 |

Table 4-2: Manufacturer provided sound power levels (per unit), (dB ref: 10<sup>-12</sup> W)

### 4.3 Nearest noise-sensitive receivers

4.3.1 The nearest noise-sensitive receiver to the proposed plant is considered to be the residential property located at 32 St John's Close, UB8 2UX. This is highlighted in Figure 4-2.



Figure 4-2: Satellite image showing nearest noise-sensitive receiver (source: Google Earth)

- 4.3.2 The distance between the plant and the assessment location is approximately 75m; this equates to about 38 dB of distance attenuation, based on point-source propagation, and relative to a distance of 1m from the source.
- 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 the measurement position 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.
- **Specific attenuation measures** – such as reduced operating duties.

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

4.5.3 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 condenser units and water heaters 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.
- **Impulsivity** – When properly maintained, noise from the proposed unit is not expected to exhibit impulsive characteristics, therefore this correction has not been applied.
- **Intermittency** – The duty of each individual condenser unit and water heater will adjust depending on the cooling/heating 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. A precautionary +3 dB correction has, however, 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.

4.5.4 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 reductions in operating duty for the guestroom condenser units.

| Time                     | Noise limit    | Receiver           | Specific sound level | Rating level   | BS 4142 assessment of impact |
|--------------------------|----------------|--------------------|----------------------|----------------|------------------------------|
| Daytime (07:00-23:00)    | 46 dB $L_{Ar}$ | 32 St John's Close | 33 dB $L_{pA}$       | 38 dB $L_{Ar}$ | Low                          |
| Night-time (23:00-07:00) | 41 dB $L_{Ar}$ | 32 St John's Close | 26 dB $L_{pA}$       | 31 dB $L_{Ar}$ | Low                          |

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

4.6.2 Provided that the proposed reductions in operating duty are implemented correctly, noise emission from the proposed plant is expected to have a “low impact” on the neighbouring properties, based on the guidance presented in BS 4142, and depending on the context of the assessment.

## 4.7 Context and uncertainty

4.7.1 BS 4142 requires the context and uncertainty of the assessment to be considered. With regard to the context, the new noise source may be considered to have a differing character to the dominant noise source in the area. Character corrections have therefore been added to the assessment to account for any distinguishable character the noise emitted by the plant may have, when considered against the prevailing ambient noise climate; these are outlined in 4.5.3. The corrections applied are considered precautionary, as any unusual acoustic features are unlikely to be perceptible at the assessment location. The inclusion of such corrections is therefore considered representative of a worst-case scenario.

4.7.2 With regard to the uncertainty of the assessment, there is some uncertainty in using a simplified model to predict noise emission, due to the complexity of noise propagation. In addition, it is not certain that the noise measurements captured during the survey will reflect the typical noise levels experienced in the surrounding area throughout the year. To account for this, the lowest measured background sound levels have been used. This conservative approach to the assessment is therefore considered to sufficiently account for any inherent uncertainty.

4.7.3 It should be noted that the background sound levels used in the assessment are the lowest levels measured during the noise survey, and only occur for short periods during the quietest times of the day and night. At all other times, the background sound levels are significantly higher than assumed for the assessment. The impact can therefore be expected to reduce further at other times.

4.7.4 Taking the above into account, no adjustment for context is considered to be necessary. It is therefore concluded that noise from the new plant will have a “low impact” on the neighbouring properties, based on the guidance presented in BS 4142. This is consequently expected to be acceptable to the London Borough of Hillingdon.

## 5 Plant noise intrusion into existing hotel guestrooms

5.1 The proposed plant will be installed in close proximity to existing hotel guestrooms, which will have direct line-of-sight to the rooftop plant. The existing guestrooms are believed to be provided with mechanical ventilation and fitted with standard double-glazed windows, which are not openable. The location of the nearest guestroom is highlighted in Figure 5-1 below.

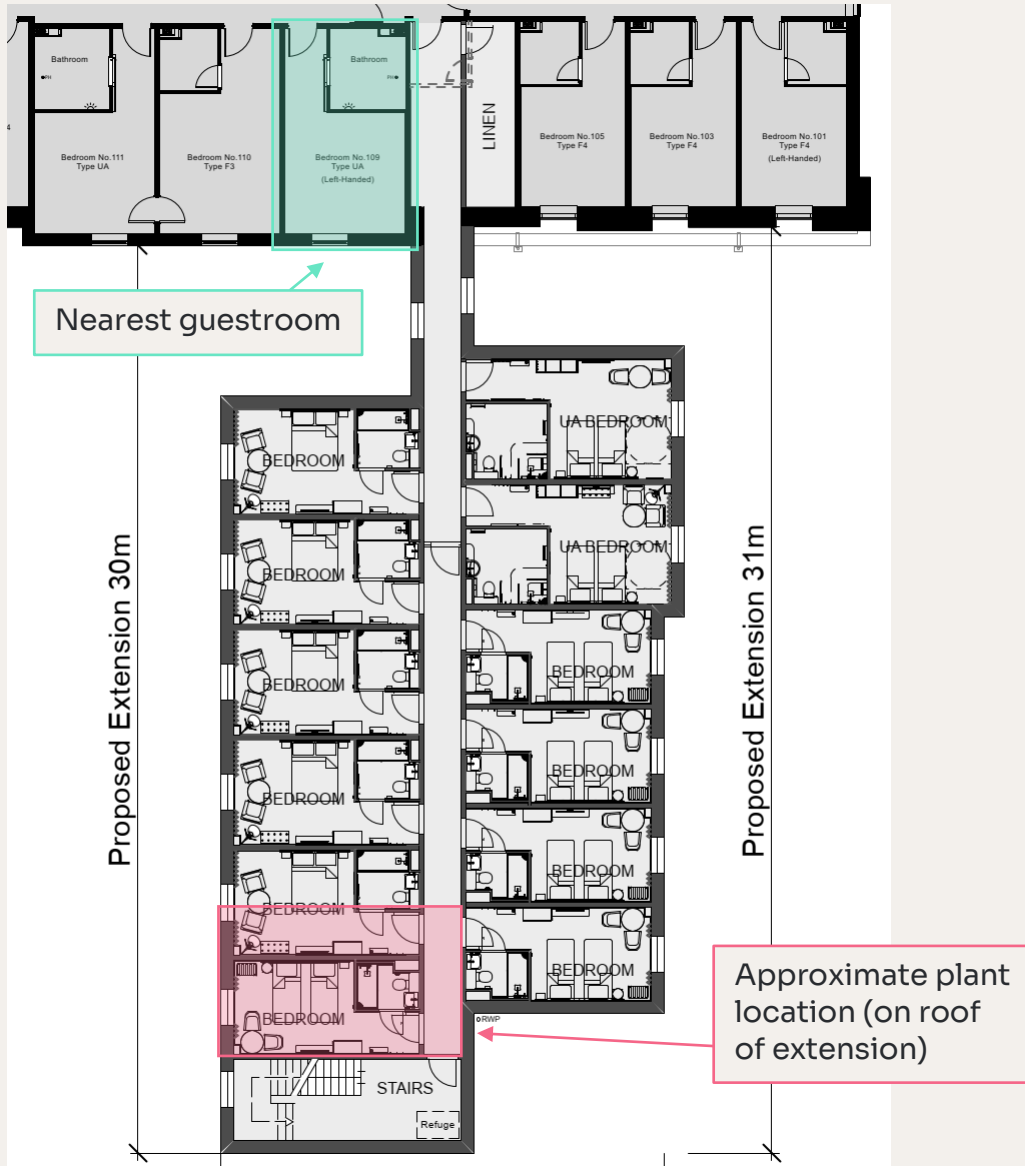


Figure 5-1: Location of existing guestrooms in relation to proposed plant

5.2 The distance between the nearest item of plant and the façade of the nearest guestroom is approximately 24m; this equates to about 28 dB of distance attenuation, based on point-source propagation, and relative to a 1m propagation distance.

- 5.3 The combined level of plant noise during the daytime is expected to be 43 dB  $L_{Aeq,T}$  just outside the window of the nearest guestroom (in a theoretical free-field).
- 5.4 The façade of the nearest guestroom is expected to provide a sound insulation performance of c. 37 dB  $R'_w$ ; this has been calculated based on the ratio of glazing to solid façade and room sizes shown in the architectural drawings, and the expected performance of the individual opaque and glazed façade elements.
- 5.5 The background noise level inside the nearest guestroom (owing to the new building services plant) is expected to achieve NR1  $L_{eq}$ , which is consequently expected to satisfy the Premier Inn criterion of NR20  $L_{eq}$ . Additional 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.

| Time                                   | Highest noise levels (dB) in octave-band centre frequencies (Hz) |     |     |     |    |    |    |    |     |
|--|--|-----|-----|-----|----|----|----|----|-----|
|  | 63   | 125 | 250 | 500 | 1k | 2k | 4k | 8k | dBA |
| Daytime $L_{eq}$<br>(07:00-23:00)      | 70   | 66  | 58  | 57  | 55 | 58 | 49 | 43 | 61  |
| Night-time $L_{eq}$<br>(23:00-07:00)   | 63   | 55  | 51  | 51  | 51 | 45 | 47 | 44 | 54  |
| Night-time $L_{Fmax}$<br>(23:00-07:00) | 84   | 75  | 65  | 67  | 68 | 65 | 74 | 77 | 76  |

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.

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. The sound insulation performances in Table 6-2 are recommended for the façade (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        | 15  | 22     | 30     | 41    | 41    | 36    |

*Table 6-2: Recommended acoustic specifications for new guestrooms on all facades*

- 6.2.2 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.
- 6.2.3 The sound insulation performance for the windows is expected to be readily achieved by Abbey Glass’ “Rural” product.
- 6.2.4 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 (typically c. 2-3 dB).

## 7 Conclusions

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- 7.1 A noise emission assessment has been undertaken of proposed new building services plant associated with the extension of the existing Premier Inn Uxbridge hotel, located on Riverside Way in Uxbridge, UB8 2YF.
- 7.2 An external noise survey has been conducted at the site, and the measurement data have been used in conjunction with planning guidance from the London Borough of Hillingdon to establish noise emission limits at nearby neighbouring properties.
- 7.3 In order for the proposed plant to achieve the required noise emission limits, it is recommended that reductions in operating duty are implemented for the condenser units serving the new guestrooms (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 have a “low impact” on neighbouring properties, according to British Standard 4142. Noise from the proposals is therefore expected to satisfy Policy EM8 of the *Hillingdon Local Plan: Part 1 - Strategic Policies* (adopted November 2012).
- 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 the London Borough of Hillingdon’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.

|  |   |
|--|---|
| <b>A-weighting</b><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 $L_{WA}$ .  |
| $L_p$  | <i>The instantaneous sound pressure level (<math>L_p</math>)</i>  |
| $L_{pA}$ (or $L_A$ )   | <i>The A-weighted instantaneous sound pressure level (<math>L_{pA}</math> or <math>L_A</math>). 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).</i>  |
| $L_{AF}$ , $L_{AS}$  | 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.  |
| $L_{max}$  | <i>The maximum instantaneous sound pressure level (<math>L_{max}</math>),</i>   |
| $L_{Amax}$   | <i>The A-weighted maximum instantaneous sound pressure level (<math>L_{Amax}</math>)</i>  |
| $L_{AFmax}$  | <i>The A-weighted maximum instantaneous sound pressure level with a FAST time constant (<math>L_{AFmax}</math>).</i>  |
| $L_{N,T}$  | <i>The percentage exceedance sound pressure level (<math>L_{N,T}</math>),</i>   |
| $L_{AN,T}$ , $L_{AFN,T}$<br>$N$ = %age value, 0-100<br>$T$ = measurement time<br>e.g. $L_{A90}$ , $L_{A10}$ , $L_{AF90}$ , 5 min | <i>The A-weighted percentage exceedance sound pressure level (<math>L_{AN,T}</math>), the A-weighted percentage exceedance sound pressure level with a FAST time constant (<math>L_{AFN,T}</math>). This is the sound pressure level exceeded for <math>N\%</math> of time period <math>T</math>. e.g. If an A-weighted level of <math>x</math> dB is exceeded for a total of 6 minutes within one hour, the level will have been above <math>x</math> dB for 10% of the measurement period. This is written as <math>L_{A10,1hr} = x</math> dB. <math>L_{A0}</math> (the level exceeded for 0 % of the time) is equivalent to the <math>L_{Amax}</math> and <math>L_{A100}</math> (the level exceeded for 100 % of the time) is equivalent to the <math>L_{Amin}</math>. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.</i> |
| $L_{eq,T}$   | <i>The equivalent continuous sound pressure level over period <math>T</math> (<math>L_{eq,T}</math>),</i>   |
| $L_{Aeq,T}$<br>$T$ = measurement time<br>e.g. $L_{Aeq,5min}$   | <i>The A-weighted equivalent continuous sound pressure level over period <math>T</math> (<math>L_{Aeq,T}</math>). This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the <math>L_{eq}</math> is not a simple arithmetic mean value. The <math>L_{eq}</math> 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.</i>   |

