



Noise Impact Assessment

Premier Inn Merthyr Tydfil

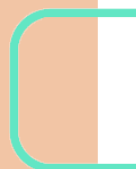
Whitbread PLC

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1 Introduction

- 1.1 Proposals are in place to extend the existing Premier Inn Merthyr Tydfil hotel, located at Duffryn, Pentrebach, Merthyr Tydfil CF48 4BB, in order to add additional guestrooms. The new guestrooms will be located off of the south façade of the hotel, where part of the existing car park is situated. 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 Merthyr Tydfil County Borough 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 is presented in Chapter 4. External environmental noise intrusion into new hotel guestrooms is assessed in Chapter 5. Conclusions have been provided in Chapter 6.
- 1.4 The full measurement data are available on request. Definitions of some of the terminology used throughout the report have been included in the Appendix.

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 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

- Merthyr Tydfil County Borough Council, *Merthyr Tydfil Replacement Development Plan 2016 - 2031* (adopted December 2018)

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 (April 2025 – Edition Rev O)

2.2 Local Authority

- 2.2.1 The Merthyr Tydfil County Borough Council set out their requirements regarding noise within their Local Development Plan, adopted December 2018. Noise is addressed within Policy EnW4. This policy has been reproduced below for reference:

“Policy EnW4: Environmental Protection

Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and / or the natural environment from either:

- *Pollution of land, surface water, ground water and the air;*
- *Land contamination;*
- *Hazardous substances;*
- *Land stability;*
- **Noise**, *vibration, dust, odour nuisance and light pollution; or (FC35)*
- *Any other identified risk to public health and safety.*

Where impacts are identified the Council will require applicants to demonstrate that appropriate measures can be taken to minimise the impact identified to an acceptable level.”

2.3 British Standard 4142:2014 +A1:2019

- 2.3.1 BS 4142:2014+A1 2019 *Methods for rating and assessing industrial and commercial sound* presents a method for predicting noise impact on noise-sensitive neighbours. This is done by comparing the noise level of a source (the *specific* sound level) with the existing background noise level in the area, in the absence of the source (the *background* sound level).
- 2.3.2 The methodology requires consideration be given to all aspects of the assessment process and it must also account for any unusual acoustic features, such as tonal, impulsive, and intermittency characteristics. These are accounted for by the addition of various decibel corrections to the specific sound level. This corrected level is the *rating* level.
- 2.3.3 The greater the positive difference between the rating level and the background level, the greater the magnitude of the impact. BS 4142:2014 gives the following descriptions with regards to the potential impact:
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
 - A difference of around +5dB 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.

2.4 Premier Inn Generic Specification for a Turnkey Development

- 2.4.1 All new Premier Inn developments and extensions are required 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 “PI Spec”. Revision O (April 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 hrs)	$L_{Aeq,1hour} \leq 35 \text{ dB}$
Night-time (23:00 – 07:00 hrs)	$L_{Aeq,1hour} \leq 30 \text{ dB}$ $L_{AFmax} \leq 42 \text{ dB (*)}$

**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.

2.5 Conclusions

- 2.5.1 The Merthyr Tydfil County Borough Council has no specific guidance regarding noise emission, and only specifies that it should be “minimised to an acceptable level”. If this is interpreted using the guidance provided in BS 4142, then it is suggested that if the rating level does not exceed the background level, it is likely to be an indication of a “low impact” depending on context. The PI Spec requires a rating level of 5 dB below the background level. It is assumed that meeting the PI Spec would be seen as acceptable to the Merthyr Tydfil County Borough Council regarding noise emission.
- 2.5.2 Likewise, Merthyr Tydfil County Borough Council are not believed to have any specific guidance regarding noise intrusion into hotel guestrooms. By meeting the PI Spec, and consequently good practice guidance, it is likely that the levels of noise intrusion into the proposed hotel guestrooms will be seen as acceptable to the Merthyr Tydfil County Borough Council.

3 External noise survey

3.1 Site description

- 3.1.1 The site is located to the south of Merthyr Tydfil, in Duffryn, Pentrebach, CF48 4BB. To the west of the site is the A4060, the main road running along the western edge of Merthyr Tydfil.
- 3.1.2 The main source of noise affecting the site and neighbouring properties was observed to be road traffic noise from the A4060. Noise at the site from existing building services was imperceptible against the road traffic noise, although may become audible during lulls in traffic flows.
- 3.1.3 The immediate neighbours to the north-east and east of the site are understood to be residential properties.

3.2 Measurement methodology

- 3.2.1 Continuous, unattended noise level measurements were conducted at a single position towards the southern end of the site. The microphone was positioned c. 2m above the local ground level and is therefore considered to have been placed in a reasonable approximation of free-field conditions.
- 3.2.2 The measurement position is shown on the satellite image in Figure 3-1.



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

- 3.2.3 Statistical and spectral octave-band data were recorded in 15-minute samples between 14:45 on Friday 25th July and 10:00 on Monday 28th July 2025. 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 the 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:

Equipment	Manufacturer/model	Serial no.
Class 1 sound level meter	Norsonic 131	1312766
Environmental microphone	Norsonic 1227	170606
Portable calibrator	Norsonic 1251	34926

Table 3-1 Equipment used for noise survey

- 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 survey¹ are believed to have been dry with average wind speeds of approximately ≤ 5 m/s. 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 upon 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.
- 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.

¹ <https://www.wunderground.com/dashboard/pws/IMERTH5/graph/2025-07-25/2025-07-25/weekly>

Time	Typical background sound levels
Daytime (07:00 – 23:00)	35 dB $L_{AF90,15mins}$
Night-time (23:00 – 07:00)	24 dB $L_{AF90,15mins}$

Table 3-2 Background sound levels established from unattended noise 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.

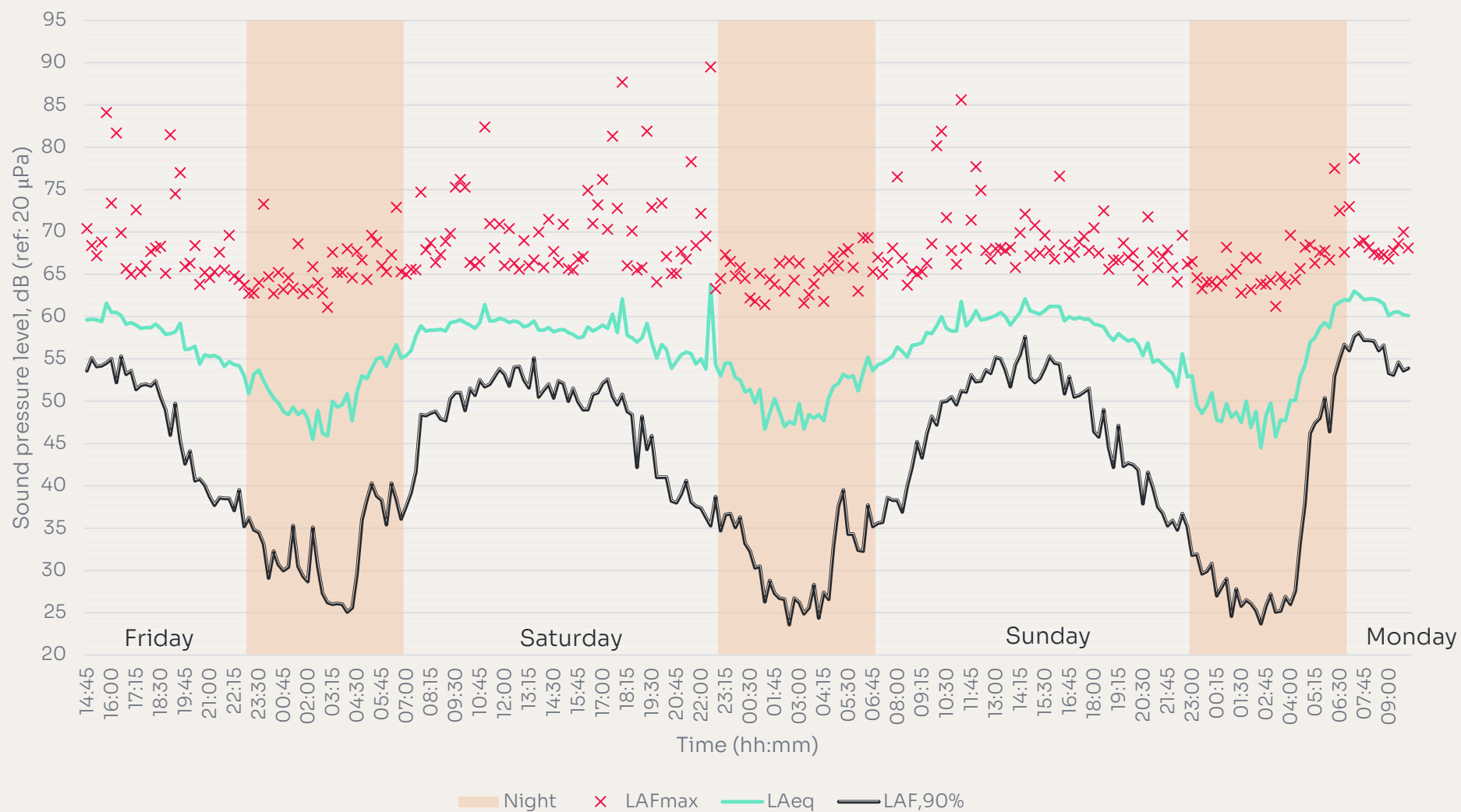


Figure 3-2 Level-history graph for noise survey period

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 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 will be 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, as well as the PI Spec:

Time	Plant noise emission limits at nearest NSRs
Daytime (07:00 – 23:00)	35 dB L_{Ar}
Night-time (23:00 – 07:00)	24 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 new hotel extension will serve air conditioning to the new bedrooms using new external equipment to provide heat / coolth. These have been intentionally located away from the nearest noise-sensitive neighbours. The location of the proposed new external equipment is shown overleaf.
- 4.2.2 The plant will comprise 2 No. Mitsubishi PURY EP200 units. These are able to be controlled to 70% during the daytime (07:00-23:00) and 50% overnight (23:00-07:00). Operating them this way reduces the noise they emit, and they can be hardware controlled to do so. The manufacturer’s noise level data for the units operating in heating mode (noisiest compared to cooling) are presented below.

Item	Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
EP200 at 70% duty	79	74	69	67	65	62	64	60	72
EP200 at 50% duty	75	68	60	59	56	53	57	55	63

Table 4-2 Manufacturers’ noise level data for the proposed plant

- 4.2.3 Currently no additional noise mitigations (other than limiting duties) is considered necessary. There is scope to allow for some during the detailed design stage, should the selections change.

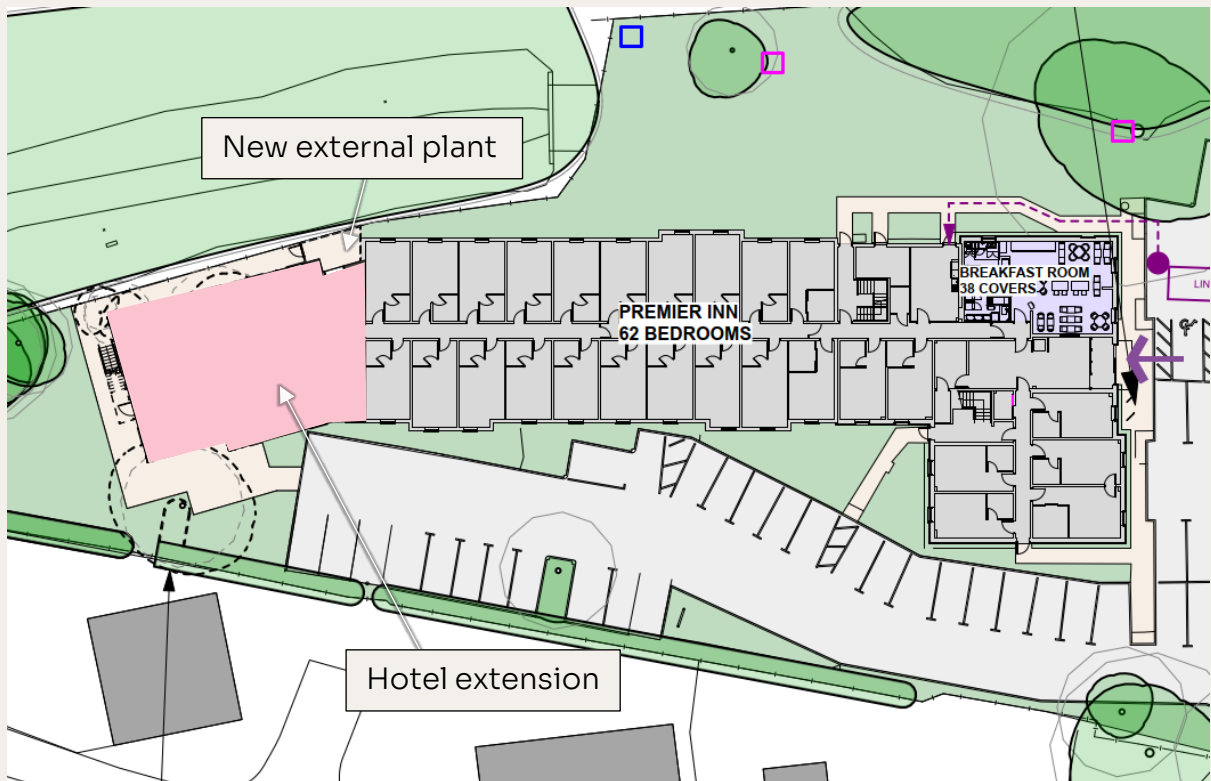


Figure 4-1 Proposed location for new external plant

4.3 Calculation of noise propagation

4.3.1 The site is surrounded by residential properties. Those to the east are nearest to the proposed extension, and those to the west are farther away and are adjacent to the A4060 road, which will shore up noise levels there. The assumed noise-sensitive neighbours are shown below.



Figure 4-2 Assumed nearest noise-sensitive receivers

4.3.2 The distances to the nearest of these, at a point 1m in front of their most affected window, are as follows:

- Nearest dwelling to the west c. 33m
- Nearest dwelling to the east c. 29m

4.3.3 The dwellings to the east will benefit from being fully shielded from noise emitted by the new external plant, as the new hotel extension will fully obscure the noise path.

4.3.4 There is a solid wooden fence along the site boundary, which will effectively provide acoustic screening to plant noise emitted to the dwellings to the west. The amount of screening has been calculated to be in the order of 7 dBA.

4.3.5 The calculated propagation corrections are as follows:

- Nearest dwelling to the west
 - Point-source propagation - 30 dBA
 - Screening -7 dBA
 - Local reflections + 3 dBA
 - Total 34 dBA of losses
- Nearest dwelling to the east
 - Point-source propagation - 29 dBA
 - Screening - 15 dBA (minimum)
 - Local reflections + 3 dBA
 - Total > 41 dBA

4.4 Predicted specific sound levels

4.4.1 The specific sound levels have been calculated, and are as follows:

Location	Time	Predicted specific level	Background sound level	Difference
Nearest dwelling to the west	Daytime	26 dB L_{Aeq}	35 dB $L_{AF90,15mins}$	-9
	Night-time	18 dB L_{Aeq}	24 dB $L_{AF90,15mins}$	-6
Nearest dwelling to the east	Daytime	14 dB L_{Aeq}	35 dB $L_{AF90,15mins}$	-21
	Night-time	7 dB L_{Aeq}	24 dB $L_{AF90,15mins}$	-17

Table 4-3 Summary of specific sound levels

4.4.2 The results demonstrate that the specific noise levels are below the lowest background sound levels at all times.

4.5 Predicted rating levels

- 4.5.1 The specific sound levels should be corrected for any unusual character to obtain the BS 4142 “rating level”. It is important to note that this applies at the assessment location. The character of noise when stood directly next to the units can differ significantly once it is propagated across a main road towards the assessment location in proximity to the nearest dwelling; the underlying background sound level can mask any obvious character emitted by the units.
- 4.5.2 From experience with the proposed units at other Premier Inn sites, it is considered prudent to allow a precautionary 5 dB of character corrections (2 dB for tonality and 3 dB for intermittency). Whether these will be realised (i.e. perceived by the neighbouring residents) is unknown; hence this precautionary measure is intentionally mean to represent a worst-case.
- 4.5.3 The BS 4142 rating levels will therefore be 5 dB higher than the calculated specific noise levels, as below.

Location	Time	Predicted rating level	Background sound level	Difference
Nearest dwelling to the west	Daytime	31 dB L_{Ar}	35 dB $L_{AF90,15mins}$	-4
	Night-time	23 dB L_{Ar}	24 dB $L_{AF90,15mins}$	-1
Nearest dwelling to the east	Daytime	19 dB L_{Ar}	35 dB $L_{AF90,15mins}$	-16
	Night-time	12 dB L_{Ar}	24 dB $L_{AF90,15mins}$	-12

Table 4-4 Summary of rating levels during typical worst-case ASHP operation

4.6 Context

- 4.6.1 There is existing plant on site affecting neighbouring properties. The new plant is of a similar type (air conditioning) to the existing plant, albeit in a different location. The new plant is therefore unlikely to be considered particularly characterful compared to the existing plant.
- 4.6.2 Noise from the main roads passing the site is the dominant source of noise affecting neighbouring properties. Vehicles passing will mask the sound of plant, and it is only in the very quietest periods of the night when the predicted levels of plant noise are comparable to the underlying background sound levels.

4.7 Uncertainty

- 4.7.1 The levels of background sound used in the assessment are the lowest 15 minutes measured over a 3 night period, which intentionally included a Sunday night. It should be noted that background sound levels are typically at least 5 dB higher than the lowest levels used in this assessment. This makes the assessment very pessimistic, and the impact is likely to be less than predicted here.
- 4.7.2 The assessment assumes all plant will operate at the set duties at the same time. In practice this is unlikely to happen as the equipment gently ramps up and down around set points and are shared across multiple bedrooms. The load overnight (when heat gains are at their lowest) is also reduced, along with the desire by guests to turn up their air conditioning. The assessed noise levels are therefore considered a worst-case.

4.8 Assessment of noise impact

- 4.8.1 Based on the above, the BS 4142 rating levels calculated are considered representative and do not need adjusting for context or any other reasons.
- 4.8.2 The BS 4142 assessment would therefore conclude that noise from the new plant would be a “low impact”.

5 External noise intrusion into new hotel guestrooms

5.1 Reference noise levels

- 5.1.1 The highest noise levels obtained during the unattended survey at each individual octave-band centre frequency are presented in the table below, alongside the highest A-weighted values obtained during the survey. These are considered to represent a reasonable worst-case.

Time	Highest noise levels in octave-band centre frequencies (dB)								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
Daytime (07:00-23:00) L_{eq}	67	62	61	64	61	56	53	47	64
Night-time (23:00-07:00) L_{eq}	63	58	56	58	60	53	44	48	62
Night-time (23:00-07:00) L_{Fmax}	84	80	77	79	71	68	67	67	78

Table 5-1: Highest noise levels obtained during the survey

- 5.1.2 Noise intrusion into the new guestrooms has been assessed using all of the measured data obtained during the external noise survey.
- 5.1.3 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.

5.2 Recommended façade constructions

- 5.2.1 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.
- 5.2.2 The location of the new guestrooms is presented in Figure 5-1, with the worst-case room highlighted.



Figure 5-1: Location of new guestrooms (ground floor) with worst case room highlighted

5.2.3 In order for the worst-case room to meet the requirements, the following sound insulation performance requirements 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 5-2: Recommended acoustic specifications for worst-case rooms

- 5.2.4 It should be noted that the values in Table 5-2 for glazing account for 3 dB in framing losses.
- 5.2.5 The sound insulation performance for external walls is expected to be achieved by typical masonry constructions, supplemented with internal plasterboard linings and insulation cavity. Alternatively, lightweight façade wall systems are considered viable, but may need some form of cementitious board within the build-up.
- 5.2.6 The sound insulation performance for the windows is expected to be readily achieved by Abbey Glass' "Urban" product.
- 5.2.7 Alternative façade constructions and glazing configurations may also be suitable, so long as they achieve the internal noise criteria presented in Table 2-1.

6 Conclusions

- 6.1 An external noise survey has been conducted at the site to establish the prevailing ambient, maximum and background sound levels affecting the site and surrounding properties.
- 6.2 An external noise emission assessment has been carried out for the proposed new external air conditioning units. The assessment was carried out in accordance with British Standard 4142 and concludes that plant noise will be a “low impact” at nearby neighbouring dwellings.
- 6.3 External noise intrusion into new hotel guestrooms has been assessed. The hotel operators brand standards (which are more onerous than industry standards) are expected to be readily met with modest glazing specifications.
- 6.4 The proposals are therefore expected to satisfy the noise requirements of Policy EnW4 of Merthyr Tydfil County Borough Council’s *Local Development Plan*.

7 Appendix

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

A-weighting 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 (L_p)</i>
L_{pA} (or L_A)	<i>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).</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 (L_{max}),</i>
L_{Amax}	<i>The A-weighted maximum instantaneous sound pressure level (L_{Amax})</i>
L_{AFmax}	<i>The A-weighted maximum instantaneous sound pressure level with a FAST time constant (L_{AFmax}).</i>
$L_{N,T}$	<i>The percentage exceedance sound pressure level ($L_{N,T}$),</i>
$L_{AN,T}$ $L_{AFN,T}$ N = %age value, 0-100 T = measurement time eg. L_{A90} , L_{A10} , $L_{AF90, 5 \text{ min}}$	<i>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.</i>
$L_{eq,T}$	<i>The equivalent continuous sound pressure level over period T ($L_{eq,T}$),</i>
$L_{Aeq,T}$ T = measurement time e.g. $L_{Aeq,5 \text{ min}}$	<i>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.</i>

