



WHATLEY MANOR HOTEL

AHU PLANNING NOISE REPORT

Acoustics Report A2440 R01

21st April 2026

Report for: Whatley Manor Hotel

Report to: E3 Engineers
Attention: Sam Clarke

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1 Introduction

Ion Acoustics is appointed by Whatley Manor Hotel to assist them and the design team in respect of planning for proposed changes to their current plant. They are proposing modernising the Air Handling Units ("AHUs") and an extract fan currently located in basement plant rooms close to the spa. These will be replaced on an essentially like-for-like basis. This report sets out the findings of a noise impact assessment of the AHUs and the extract fan as follows:

- A description and the findings of a baseline noise survey.
- Planning noise criteria for plant including local authority requirements.
- Derivation of plant noise limits.
- Assessment of the noise of the proposed new AHU and extract fan plant and demonstration of compliance with planning noise criteria.

On this basis, the report indicates that the change of plant is acceptable for planning purposes in respect of noise emissions.

2 Scheme Details

Whatley Manor Hotel is a high end hotel with extensive grounds near Malmesbury in Wiltshire. As part of updating works it is proposed to change the existing four AHUs and one extract fan in a basement plant room for new plant. These new items will be located in nominally equivalent locations within the plant rooms and ducted to the exterior through the existing duct and grille arrangement. This plant currently operates effectively continuously, and that is expected to also be the case for the new plant.

The basement plant room is served by a ventilation trench adjacent to it, through which the exhaust is ducted via large circular ducting to three exhaust cowls. These will be retained and the new plant connect to these ducts. The inlet fresh air intake is through wall grilles into the plant room from the ventilation trench, with each grille connect to a duct internally.

The site context is shown in Figure 1, which indicates that location of the plant and existing third party housing to the east of the scheme, beyond the hotel car park. The car park has a stone wall to the perimeter, with the housing beyond this. This housing comprises two storey properties with noise sensitive residential accommodation on ground and first floor. The ground floor is essentially shielded from hotel car park and operations, but the first floor has line of sight to the car park. The housing is around 77m from the plant enclosure.



Figure 1: Location plan showing the measurement positions and AHU location.

The local authority, Wiltshire Council, has guidance which indicates that a plant noise assessment is required to assess the impact to third party housing.

3 Guidance on Planning Noise for Plant

3.1 National Planning Policy Framework (NPPF)

In 2012 the National Planning Policy Framework (NPPF) replaced a number of Planning Policy Statements with a single document which is intended to promote sustainable development. The NPPF was revised in December 2024¹, when certain aspects of the guidance changed. A minor update was published in February 2025.

The NPPF sets out the Government's planning policies for England. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities to develop their own local plans and policies. Sections of the NPPF relating to noise are stated below.

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

187. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

3.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE)² sets out the 'Government's policy on environmental, neighbourhood and neighbour noise for England. The policy has three aims:

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

The NPSE introduces the following terms, which are also used in the NPPF:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur".

However, neither the NPSE nor the NPPF Planning Practice Guidance defines numeric bounds for NOEL, LOAEL or SOAEL. The boundary of each effect level should be defined for each situation and location.

² Noise Policy Statement for England:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

3.3 Online Planning Practice Guidance

Further Government planning advice is available online³. The online noise section "*advises on how planning can manage potential noise impacts in new development*" and refers to the adverse effect levels set out in the NPSE. It states:

"Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

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

...this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

The guidance also presents a noise exposure hierarchy table to provide further information on the boundaries between the NOEL, LOAEL and SOAEL. The hierarchy table is shown below in Table 1.

Table 1: Noise Exposure Hierarchy Table

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

³ See <https://www.gov.uk/guidance/noise--2>

Perception	Examples of Outcomes	Increasing Effect Level	Action
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g., avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

3.4 Wiltshire Council Guidance

Wiltshire council has published a document "Planning Consultation Guidance Note: Noise and Vibration" dated 31/10/23 which sets out their standard requirements for plant noise emissions assessments.

This states that for most industrial and commercial noise sources and assessment of noise according to BS 4142 should be carried out. BS 4142:2014 sets out how a typical background sound level (L_{A90}) and the plant rating noise level (L_{Ar}) can be derived. It says that where the rating level does not exceed the background level, this is an indication of the source having a low impact.

It further says that new developments should, where possible, prevent noise creep and that the standard design objective to prevent creep should be:

"The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

The context here is that existing plant is simply being replaced and (as our assessment indicates) the new plant is quieter than the existing plant. So, the issue of creep is not relevant to this scheme as it is already reducing plant noise emissions. So, in principle limiting the rating level of the plant to not exceed the typical background level would meet Wiltshire's requirements, and that of BS 4142 (low impact). However, we have also considered the noise against the criterion proposed. We presume that the intent is that the rating level would be the L_{Ar} , as set out in BS 4142:2104, rather than the L_{Aeq} as stated in their guidance.

3.5 BS 4142:2014

As is typical for new building services plant installations, and as discussed in Section 3.4, a BS 4142 assessment is expected to be required to assess noise to residential receptors.

A BS 4142 assessment is typically made by calculating the difference between the noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the new commercial noise. (Existing commercial noise would normally be considered to part of the background sound level). The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.

The noise under consideration is assessed in terms of the ambient noise level, L_{Aeq} , but a character correction penalty can be applied where the noise exhibits acoustic characteristics such as distinguishable tones, impulsiveness, intermittency or other acoustically significant characteristics. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The new commercial noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar} , and the difference between the background noise and the rating level is determined to make the BS 4142 assessment.

The standard states:

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

BS 4142 also stresses the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the character of the area should be considered when assessing the noise impact.

The standard states that the objective of a noise survey *"is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*. A typical background sound level is usually derived by means of statistical analysis as opposed to, for example, simply selecting a mean average or the lowest. This is typically achieved by creating a frequency distribution histogram of the background sound levels measured, rounded to the nearest whole number.

The absolute sound level is of particular importance where the measured background sound levels are low, which is typically taken as around L_{A90} 30dB or below. In regard to low sound levels, the standard states:

"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

Therefore, amenity can be protected with a fixed limit at low levels. We would generally not expect to set the rating level any lower than L_{AR} 32dB to protect amenity, regardless of the background level.

4 Noise Survey

A noise survey was carried out at the site to determine the baseline background noise levels in line with BS 4142 and also to assess existing baseline noise levels from the current plant.

A logging survey was undertaken to determine the background sound levels at a position representing the nearest housing.

4.1 Logging Noise Survey

A baseline logging noise survey was carried out between Tuesday 31st March – Wednesday 1st April 2026 using one logging sound level meter. The meter at position MP1, as shown in Figure 1, and a photo in Figure 2, had the microphone mounted on a tripod and placed in a free field location close to the perimeter of the site adjacent to the housing to the east. This position is representative of the baseline noise level affecting the closest third party housing.

At position MP1 a Rion NL52 sound level meter with a Type WS15 wind shield was used and successfully calibrated with a Brüel & Kjær Type 4231 calibrator at the start and end of the survey. No significant drift in calibration was noted on collection. The meter was set up to log various noise indices (L_{Aeq} , $L_{Amax,F}$, L_{A90} , L_{A01} , L_{A10}) in consecutive 15-minute periods.

Weather conditions on set up were dry and slightly overcast at a temperature of 12°C and low winds, with conditions clearing to be sunny during the day. There was a low breeze from the south west, there was some small amount of branch movement, but no noise from leaves was audible. On collection, the weather conditions were again dry with clear skies at a temperature of 9°C with light winds. The forecast throughout the survey suggested the weather conditions were suitable for monitoring and this period was selected as it had a forecast of suitable conditions for the full survey.



Figure 2: MP1 in the south-east corner of the car park taken facing east with residential windows behind.

5 Noise Survey Results

5.1 Logging Noise Levels Measured

Noise levels measured at MP1 are shown graphically in Figure 3 for the period recorded between set up on the morning of Tuesday 31st March and the following morning of Wednesday 1st April in terms of the 15-minute L_{Aeq} , L_{AFmax} and L_{A90} noise levels. The data from the full survey period is tabulated in Appendix A.

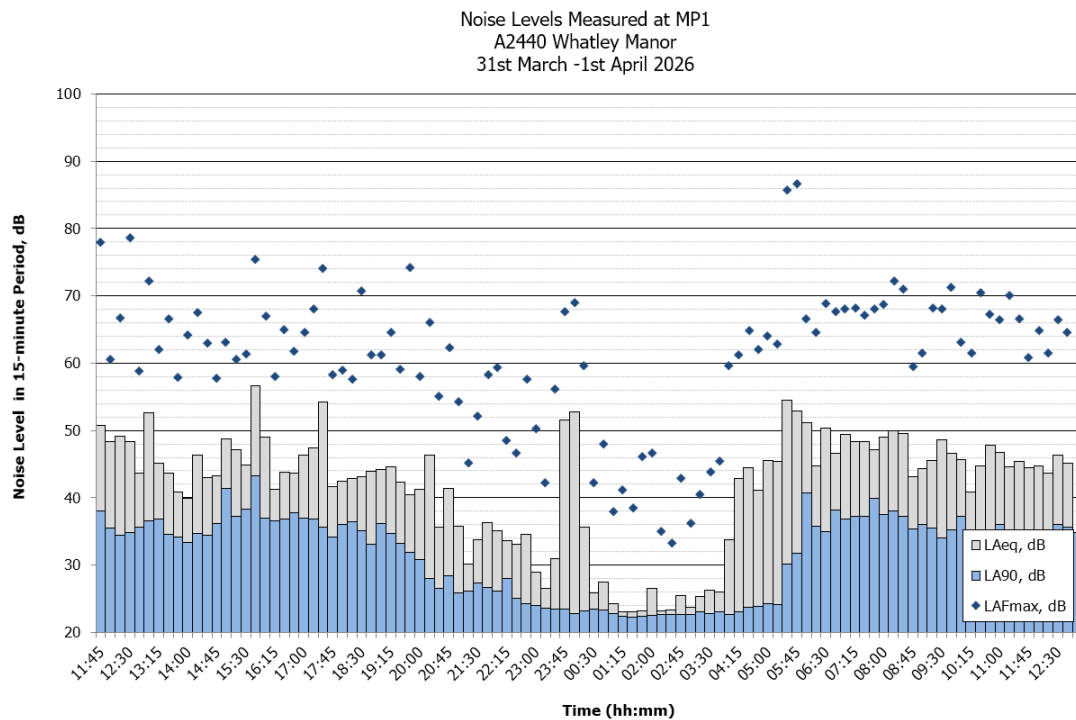


Figure 3: Time History Graph for MP1

Noise levels are varied throughout the survey with the L_{A90} ranging from 22-43 dB, levels start to drop at 19:00 hrs on the 31st before starting to gradually increase at 05:30 hrs on the 1st. The increase is from a combination of road traffic flows to the north starting to increase and morning bird song. There is a high peak which is from activity either nearby in the car park or potentially outside the house. In general, the daytime background levels are fairly consistent, giving values around L_{A90} 33-34dB, the typical night value is 23dB. The L_{Aeq} is more variable and is increased by activity nearby from time to time

Table 2 shows the results in terms of the 16-hour daytime and 8-hour night-time values as measured. We note that this is shown for completeness only, and these values do not represent the commercial noise alone, which is then discussed further below.

Table 2: External Noise Levels

Position	Period	Total Duration	L_{Aeq} , dB
MP1	Day (07:00 to 23:00)	16 hrs	46.7
	Night (23:00 to 07:00)	8 hrs	46.0

5.2 Attended Measurement Results

Various attended measurements were carried out to assess the noise of existing plant currently operating on the site. This included noise from the existing AHUs, the standby generator and the chiller. With respect to this AHU assessment the key data is noise from the existing AHUs. During the survey the AHUs were running continuously, and are assumed to have run at night, but they were not audible at the northern boundary nor at MP1. And intentionally MP1 was chosen to ensure it was distant from the AHUs and fully shielded by the bothy building so it was not affected by AHU noise and allowed an appropriate baseline background level to be measured.

To determine the noise levels from the AHU we measured closer to the units, including a position in the roadway by the greenhouses (MP5) at 16m from the central exhaust cowl. *The level from AHU noise measured here was L_{A90} 42.8dB.* The L_{A90} is used as there was other distant activity around the site which contributed to the L_{Aeq} , but the underlying background noise was from the AHU plant alone.

The form of the exhaust cowls, emerging from the plant trench (in which the inlet grilles are located) is shown in the photo in Figure 4.



Figure 4: Photo of three exhaust cowls above the AHU ventilation trench (looking north).

5.3 Derivation of Background Noise Levels

BS 4142 requires an assessment by comparing the noise emissions from operational plant against the typical background sound levels (L_{A90}), not the lowest value. This has been determined by plotting the frequency distribution of the integer L_{A90} values as discussed in BS 4142. The operational period for the plant is expected to be over the full 24 hours period potentially so will need to meet night time noise limits as well as during the day.

The frequency distribution histogram for the measurement period are provided in Figures 5 and 6. These can be used to derive the “typical” background sound levels, L_{A90} , which in this case based on the distributions to cover the operational range of the plant. Based on this the daytime typical L_{A90} is taken as L_{A90} 33dB, the level falls below this only 20% of the time. The levels are lower at night and typical level is taken as L_{A90} 23dB, levels are below this only about 9% of the time and this is also the modal value.

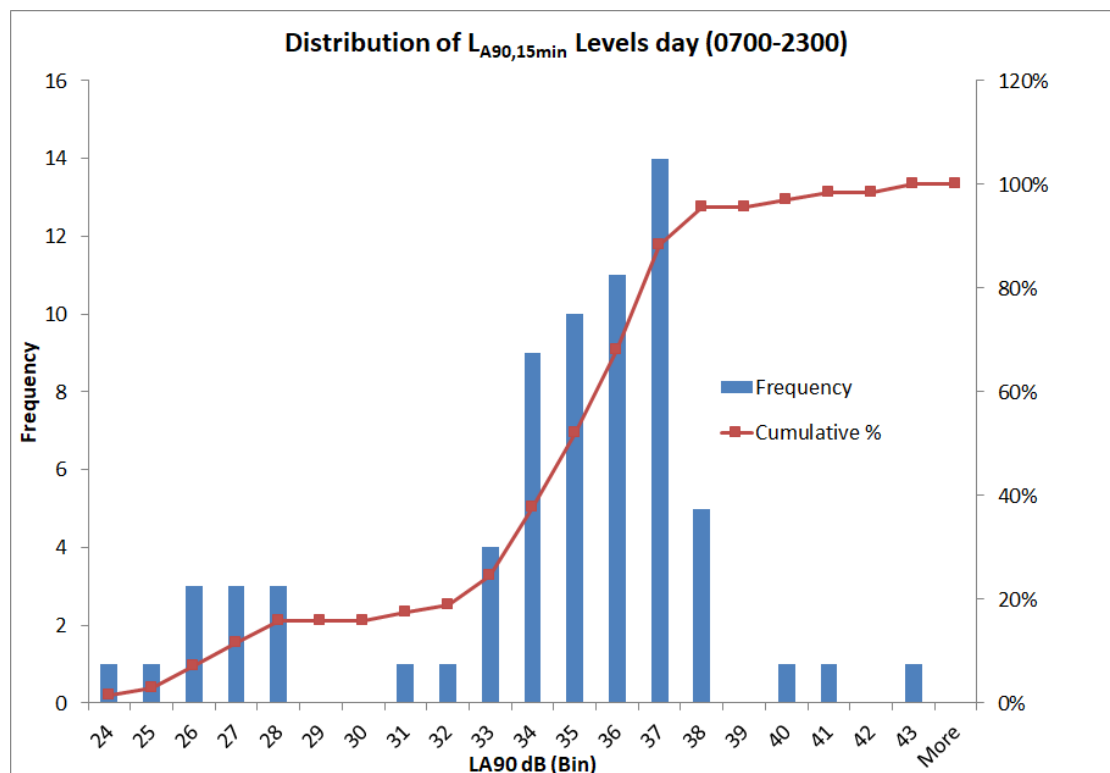


Figure 5: Daytime L_{A90} distribution

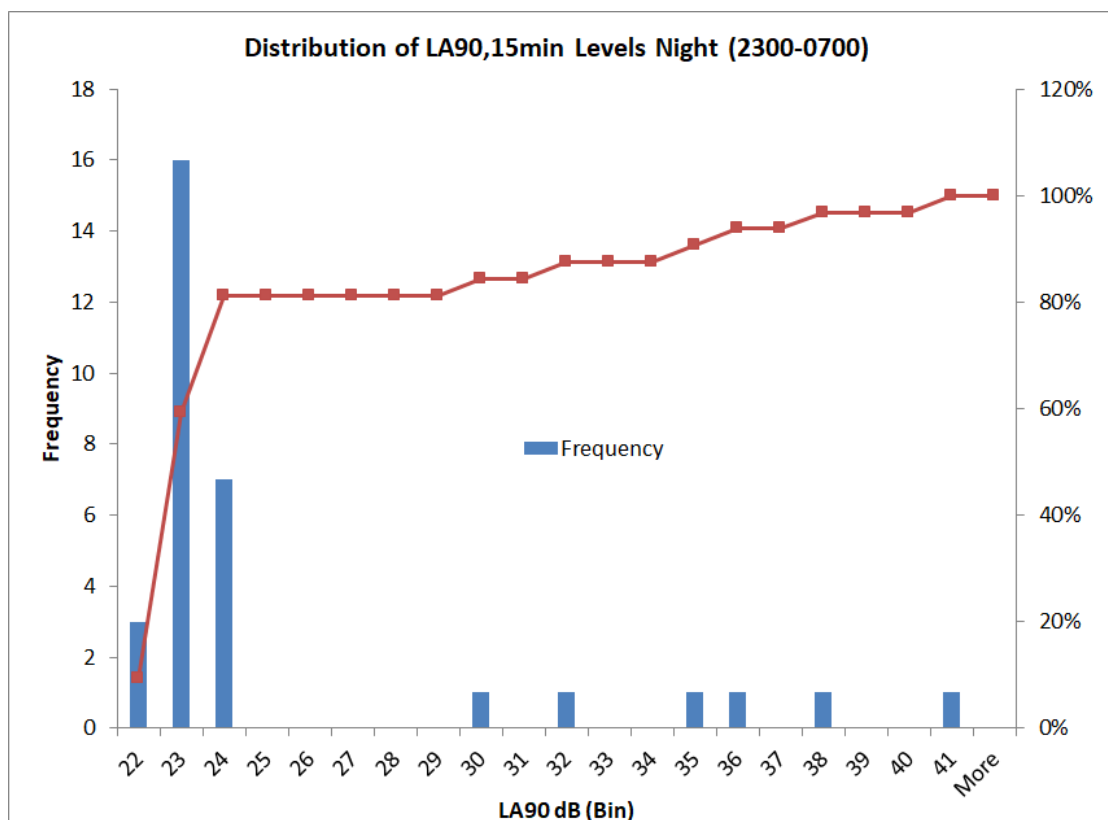


Figure 6: Night L_{A90} distribution

5.4 Proposed Noise Emissions Limits

Plant noise emission limits at residential receptors have been set following BS 4142 and on the basis of Wiltshire Guidance. A limit no higher than the derived typical background noise has been set to obtain a “low impact” according to BS 4142, with a preference for 5dB below to control creep. The noise rating level limits are set out in Table 3. For clarity, the rating level is the specific noise level (dB L_{Aeq}) with any correction for character applied when assessed according to BS 4142. This applies at the windows of residential receptors. In this case, the levels are set as a free field limit, so if measured, the levels 1m from the façade would be around 3dB higher.

As the levels are low at night, the proposed night value is given as a fixed limit. During the day, as there is already AHU noise and the new noise is actually lower, the issue of noise creep is not a factor and therefore the low impact criterion from BS 4142 and the Wiltshire Guidance is taken, specifically the L_{Ar} not exceeding the background L_{A90} . Hence the proposed limits are given in the final column.

Table 3: Noise Rating Level Limits (free field level)

Period	Typical, L_{A90} dB	Level 5dB below L_{A90}	Level at Parity with L_{A90}	Proposed limit L_{Ar} dB
Day (07:00 - 00:00)	33	28dB	33dB	33dB
Night (00:00-07:00)	23	18dB	23dB	32dB

6 Plant Noise Emissions Assessment

6.1 Plant

The proposed plant details have been provided by E3 the mechanical engineers for the scheme. They have provided sound power data in duct for the four AHUs. For the extract fan, the supplier does not have in duct sound power, simply an overall sound pressure level at a distance. This does not permit a standard in duct calculation, so we have made a conservative assessment of this.

The proposed plant items are set out below in Table 4, along with the attenuator lengths. This is the current attenuator and it is proposed to replace them with new attenuators of the same length. We have prepared the calculations based on typical conservative performance for generic attenuators of that length (based on around 50% free area). The attenuation assumptions are given in the calculations.

Table 4: AHU Sound Power Data (atmosphere side)

AHU	In-duct sound power level (dB) at Octave Centre Bands (Hz)						
	63	125	250	500	1000	2000	4000
AHU01 Lounge Bar							
FAI	65.0	68.0	67.0	67.0	58.0	54.0	44.0
Exhaust	70.0	79.0	77.0	78.0	76.0	72.0	67.0
AHU02 Changing Rooms							
FAI	68.0	69.0	66.0	64.0	56.0	51.0	43.0
Exhaust	71.0	78.0	80.0	79.0	77.0	73.0	68.0
AHU03 Pool hall							
FAI	63.0	64.0	64.0	64.0	54.0	47.0	35.0
Exhaust	69.0	73.0	74.0	74.0	70.0	63.0	54.0
AHU04 Tepidarium							
FAI	56.0	65.0	58.0	58.0	48.0	41.0	28.0
Exhaust	65.0	78.0	71.0	71.0	70.0	68.0	63.0

Extract Fan

The manufacturer's extract fan data just gives 48dBA at 2m distance. There is no spectral data nor any specific in-duct sound power level data.

Existing Attenuators

The existing attenuator sizes are as follows, which gives the available dimensions for the new attenuators:

AHU 1:

Intake - 1425mm (W) x 755mm (D) x 900 mm (L)

Exhaust - 1425mm (W) x 755mm (D) x 900 mm (L)

AHU 2:

Intake - 1425mm (W) x 755mm (D) x 900mm (L)

Exhaust - 1425mm (W) x 755mm (D) x 1200mm (L)

AHU 3:

Intake - 1630mm (W) x 840mm (D) x 1200mm (L)

Exhaust - 1630mm (W) x 840mm (D) x 1200mm (L)

AHU 4:

Intake - 1325mm (W) x 755 (D) x 900 (L)

Exhaust - 1325mm (W) x 755 (D) x 900 (L)

Extract Fan:

Exhaust – 600mm (W) x 350mm (D) x 1200mm (L)

The attenuator performance assumed is given in the calculations in Appendix B. This is based on moderately performing generic attenuators of the lengths given above (typically assumed to be 50% free area). For the extract, which has a 1200mm attenuator, we have assumed a simple 5dBA reduction for the attenuator, which is very conservative for an attenuator of that size.

6.2 Plant Noise Calculations

Plant noise emissions calculations have been prepared to assess noise levels to the most affected dwellings, NSR1 (see Figure 1). This is around 77m from the AHU enclosure, and is fully shielded (i.e. no line of sight). From inspection on site, all of the residential properties to the east are fully shielded from the AHU cowls and trench by buildings. So NSR1, being the closest, is the most affected.

The full calculation is given in Appendix B. The summary BS 4142:2014 assessment is given in Table 5. This is given for night only as that has the lowest background levels and potentially the most impact.

Table 5: BS4142:2014 assessment – Night only

Item	Description	Value
Specific Level (L_{Aeq})	Total level of 4 x AHU and 1 x extract fan at receptor NSR1	10dB
BS4142 character correction	No character correction applicable for fan noise	0dB
Rating Level (L_{AR})	Specific level + Character Correction	10dB
Night Background (L_{A90})	Typical background level night	23dB
Difference	L_{AR} minus L_{A90}	-13dB

Therefore the plant rating level is very low indeed at the housing, it is substantially below the fixed plant limit of 32dB L_{AR} . It is also significantly below the existing background noise. It would not be expected to be perceived at the housing. Therefore, it complies comfortably with all noise limits.

The margin of compliance during the day, with higher background sound levels, would be even larger.

6.3 Noise Levels on the Hotel Site

We have also predicted noise levels to the measurement position MP5 on the roadway by the greenhouses. This area could potentially be used by guests and therefore, whilst not a planning issue, may be of interest to the operators of the hotel. The measured level here from the current plant was around 43dB and that was clearly audible. We now predict a level of around 33dBA from the proposed plant. Therefore, that indicates the new plant is quieter than currently, so that is beneficial for the guests and also indicates no plant noise creep will occur.

6.4 Context and Uncertainty

BS 4142 requires an assessment of uncertainty and the assessment also depends on context. In this case the calculations have been carried out using data published for the plant at full duty and with all plant operating all through the night, although it is not expected that the plant will necessarily always operate generally at full duty. So that provides a level of conservatism to the calculations.

The site already has significant plant, including that which is being replaced with the new plant, so the context is that there is no change in the type of noise from the plant.

The background noise measurements are also subject to uncertainty. However, to allow for a conservative assessment a full 24-hour period has been undertaken and the typical values have been set conservatively at the lower end of the measured values.

Furthermore, the predicted plant levels are very low, and well below the background levels, so any uncertainty would have no impact on the outcome of the assessment.

7 Summary

Ion Acoustics has carried out a noise assessment of the impact of proposed new AHU and extract plant to replace existing plant in a plant room at Whatley Manor Hotel. A baseline noise survey was carried out to determine the existing noise levels, and in particular determine the background sound levels in terms of the L_{A90} . This is then used to determine plant noise emissions limits in line with BS414:2014 and taking account of Wiltshire Council's standard guidance.

The noise of the proposed plant has been calculated to the sensitive receptors and found to be comfortably compliant with the noise limits with a good margin. The plant is also demonstrated to be quieter than the existing plant which is to be replaced. Therefore, there is no significant noise impact from the proposed replacement scheme.

Whatley Manor Hotel
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Appendix A: Measured Noise Data: Logging



Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB	Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB
31/03/2026 13:45	40.9	57.9	34.1	01/04/2026 01:45	23.2	46.0	22.4
31/03/2026 14:00	39.9	64.1	33.3	01/04/2026 02:00	26.6	46.6	22.5
31/03/2026 14:15	46.3	67.5	34.7	01/04/2026 02:15	23.2	35.0	22.6
31/03/2026 14:30	43.0	63.0	34.4	01/04/2026 02:30	23.3	33.2	22.7
31/03/2026 14:45	43.3	57.7	36.2	01/04/2026 02:45	25.5	42.9	22.6
31/03/2026 15:00	48.7	63.2	41.4	01/04/2026 03:00	23.7	36.2	22.7
31/03/2026 15:15	47.1	60.6	37.2	01/04/2026 03:15	25.4	40.5	23.1
31/03/2026 15:30	44.9	61.4	38.3	01/04/2026 03:30	26.3	43.9	22.8
31/03/2026 15:45	56.7	75.5	43.3	01/04/2026 03:45	26.0	45.4	23.0
31/03/2026 16:00	49.0	66.9	37.0	01/04/2026 04:00	33.8	59.7	22.7
31/03/2026 16:15	41.3	58.0	36.6	01/04/2026 04:15	42.9	61.3	23.1
31/03/2026 16:30	43.8	65.1	36.8	01/04/2026 04:30	44.5	64.9	23.7
31/03/2026 16:45	43.7	61.8	37.8	01/04/2026 04:45	41.1	62.0	23.9
31/03/2026 17:00	46.4	64.6	37.0	01/04/2026 05:00	45.6	64.0	24.2
31/03/2026 17:15	47.4	68.0	36.8	01/04/2026 05:15	45.4	62.7	24.1
31/03/2026 17:30	54.2	74.1	35.6	01/04/2026 05:30	54.5	85.8	30.2
31/03/2026 17:45	41.6	58.2	34.1	01/04/2026 05:45	52.9	86.6	31.7
31/03/2026 18:00	42.5	58.9	36.1	01/04/2026 06:00	51.2	66.6	40.7
31/03/2026 18:15	42.9	57.5	36.5	01/04/2026 06:15	44.8	64.5	35.8
31/03/2026 18:30	43.1	70.8	35.1	01/04/2026 06:30	50.4	68.9	35.0
31/03/2026 18:45	43.9	61.2	33.1	01/04/2026 06:45	46.6	67.7	38.2
31/03/2026 19:00	44.2	61.3	36.2	01/04/2026 07:00	49.4	68.0	36.8
31/03/2026 19:15	44.6	64.5	34.7	01/04/2026 07:15	48.3	68.1	37.3
31/03/2026 19:30	42.3	59.2	33.2	01/04/2026 07:30	48.3	67.1	37.2
31/03/2026 19:45	40.5	74.3	31.9	01/04/2026 07:45	47.1	68.0	39.9
31/03/2026 20:00	41.2	58.0	30.8	01/04/2026 08:00	49.0	68.7	37.5
31/03/2026 20:15	46.4	66.0	28.0	01/04/2026 08:15	49.9	72.2	38.1
31/03/2026 20:30	35.6	55.2	26.5	01/04/2026 08:30	49.6	71.0	37.3
31/03/2026 20:45	41.4	62.2	28.4	01/04/2026 08:45	43.1	59.4	35.4
31/03/2026 21:00	35.8	54.3	25.9	01/04/2026 09:00	44.4	61.5	36.1
31/03/2026 21:15	30.2	45.2	26.2	01/04/2026 09:15	45.6	68.1	35.5
31/03/2026 21:30	33.7	52.2	27.4	01/04/2026 09:30	48.6	68.0	34.0
31/03/2026 21:45	36.3	58.3	26.7	01/04/2026 09:45	46.6	71.3	35.3
31/03/2026 22:00	35.1	59.3	26.1	01/04/2026 10:00	45.7	63.1	37.2
31/03/2026 22:15	33.6	48.6	28.0	01/04/2026 10:15	40.9	61.5	33.4
31/03/2026 22:30	33.1	46.6	25.1	01/04/2026 10:30	44.7	70.5	35.3
31/03/2026 22:45	34.6	57.5	24.3	01/04/2026 10:45	47.8	67.3	33.9
31/03/2026 23:00	29.0	50.2	24.0	01/04/2026 11:00	46.7	66.4	36.1
31/03/2026 23:15	26.5	42.2	23.6	01/04/2026 11:15	44.6	70.1	34.4
31/03/2026 23:30	30.9	56.2	23.5	01/04/2026 11:30	45.4	66.6	34.1
31/03/2026 23:45	51.5	67.7	23.4	01/04/2026 11:45	44.5	60.9	34.4
01/04/2026 00:00	52.7	69.1	22.8	01/04/2026 12:00	44.8	64.8	35.1
01/04/2026 00:15	35.7	59.6	23.2	01/04/2026 12:15	43.6	61.6	34.8
01/04/2026 00:30	25.9	42.3	23.4	01/04/2026 12:30	46.4	66.4	36.1
01/04/2026 00:45	27.5	48.0	23.3	01/04/2026 12:45	45.2	64.6	35.7
01/04/2026 01:00	24.2	37.9	22.8	01/04/2026 13:00	48.4	70.2	34.9
01/04/2026 01:15	23.1	41.2	22.4	01/04/2026 13:15	0.0	0.0	0.0
01/04/2026 01:30	23.1	38.4	22.3	01/04/2026 13:30	0.0	0.0	0.0

Whatley Manor Hotel - AHU replacement: Noise Emissions Assessment										
Receptor:	NSR1 most affected third party dwelling (building with tower to east)									
21 April 2026	Octave Band Centre Frequency, Hz									
	63	125	250	500	1000	2000	4000	dBAD		
total all AHU exhaust	13	17	10	03	-02	-02	-02	7.70		
total all AHU FAI	07	06	02	00	-11	-12	-18	-0.20		
extract								4.81		
								9.9		
background LA90 night								22.0		
difference								-12.1		
assumes all SWL from one cowl - have not split in three and then added 10 log 3!										
AHU01 lounge bar										
Exhaust										
SWL	70.0	79.0	77.0	78.0	76.0	72.0	67.0	80.0		
generic attenuator, 900mm, 50% free area	2.0	4.0	9.0	15.0	17.0	14.0	10.0			
mitred bend, 1425mm	2.0	8.0	6.0	3.0	3.0	3.0	3.0			
radiused bend, 1425mm	0.0	1.0	2.0	3.0	3.0	3.0	3.0			
ductwork split, 50%	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
circular duct, 2m, 800mm	0.1	0.2	0.2	0.2	0.2	0.2	0.2			
radiused bend, 800mm	0.0	0.0	1.0	2.0	3.0	3.0	3.0			
end reflection, 800mm, 800mm	2.0	0.5	0.0	0.0	0.0	0.0	0.0			
	Lw	60.9	62.3	55.8	51.8	46.8	45.8	44.8		
Atmosphere	distance 77.0m	48.7	48.7	48.7	48.7	48.7	48.7	48.7		
	directivity : 0°,45°, 800mm, 800mm	4.5	5.0	6.0	6.5	7.5	7.5	7.5		
	Lp	16.6	18.6	13.1	9.6	5.6	4.6	3.6		
shielding	-10	6.6	8.6	3.1	-0.4	-4.4	-5.4	-6.4		
								2.8 dB(A)		
FAI										
SWL	65.0	68.0	67.0	67.0	58.0	54.0	44.0			
generic attenuator, 900mm, 50% free area	2.0	4.0	9.0	15.0	17.0	14.0	10.0			
mitred bend, 1425mm	2.0	8.0	6.0	3.0	3.0	3.0	3.0			
rectangular duct, 4m, 1425mm, 755mm	2.4	1.2	0.8	0.4	0.4	0.4	0.4			
end reflection, 1425mm, 755mm	4.0	1.0	0.0	0.0	0.0	0.0	0.0			
	Lw	54.6	53.8	51.2	48.6	37.6	36.6	30.6		
Atmosphere	distance 79.0m	49.0	49.0	49.0	49.0	49.0	49.0	49.0		
	directivity : 30°,30°, 1425mm, 755mm	5.5	6.0	6.5	7.5	8.0	8.0	8.0		
	Lp	11.1	10.8	8.7	7.1	-3.4	-4.4	-10.4		
shielding	-10	1.1	0.8	-1.3	-2.9	-13.4	-14.4	-20.4		
								6.9 dB(A)		
Conservatively assume all sound radiates from grille with no loss in pit (shielding comes from buildings)										
AHU02 changing Rooms										
Exhaust										
SWL	71.0	78.0	80.0	79.0	77.0	73.0	68.0	82.0		
generic attenuator, 1200mm, 50% free area	2.0	6.0	11.0	20.0	23.0	19.0	12.0			
mitred bend, 1425mm	2.0	8.0	6.0	3.0	3.0	3.0	3.0			
radiused bend, 1425mm	0.0	1.0	2.0	3.0	3.0	3.0	3.0			
ductwork split, 50%	3.0	3.0	3.0	3.0	3.0	3.0	3.0	use split to pro		
circular duct, 2m, 800mm	0.1	0.2	0.2	0.2	0.2	0.2	0.2			
radiused bend, 800mm	0.0	0.0	1.0	2.0	3.0	3.0	3.0			
end reflection, 800mm, 800mm	2.0	0.5	0.0	0.0	0.0	0.0	0.0			
	Lw	61.9	59.3	56.8	47.8	41.8	41.8	43.8		
Atmosphere	distance 77.0m	48.7	48.7	48.7	48.7	48.7	48.7	48.7		
	directivity : 0°,45°, 800mm, 800mm	4.5	5.0	6.0	6.5	7.5	7.5	7.5		
	Lp	17.6	15.6	14.1	5.6	0.6	0.6	2.6		
shielding	-10	7.6	5.6	4.1	-4.4	-9.4	-9.4	-7.4		
								10.5 dB(A)		
FAI										
SWL	68.0	69.0	66.0	64.0	56.0	51.0	43.0	64.0		
generic attenuator, 900mm, 50% free area	2.0	4.0	9.0	15.0	17.0	14.0	10.0			
mitred bend, 1425mm	2.0	8.0	6.0	3.0	3.0	3.0	3.0			
rectangular duct, 4m, 1425mm, 755mm	2.4	1.2	0.8	0.4	0.4	0.4	0.4			
end reflection, 1425mm, 755mm	4.0	1.0	0.0	0.0	0.0	0.0	0.0			
	Lw	57.6	54.8	50.2	45.6	35.6	33.6	29.6		
Atmosphere	distance 79.0m	49.0	49.0	49.0	49.0	49.0	49.0	49.0		
	directivity : 30°,30°, 1425mm, 755mm	5.5	6.0	6.5	7.5	8.0	8.0	8.0		
	Lp	14.1	11.8	7.7	4.1	-5.4	-7.4	-11.4		
shielding	-10	4.1	1.8	-2.3	-5.9	-15.4	-17.4	-21.4		
								4.9 dB(A)		
Conservatively assume all sound radiates from grille with no loss in pit (shielding comes from buildings)										

Whatley Manor Hotel
AHU Planning Noise Report
Appendix B: Plant Calculations



AHU03 pool hall			Octave Band Centre Frequency, Hz								
Exhaust			63	125	250	500	1000	2000	4000	dBAD	
SWL			69.0	73.0	74.0	74.0	70.0	63.0	54.0	75.0	
generic attenuator, 1200mm, 50% free area			2.0	6.0	11.0	20.0	23.0	19.0	12.0		
radiused bend, 1425mm			0.0	1.0	2.0	3.0	3.0	3.0	3.0		
ductwork split, 50%			3.0	3.0	3.0	3.0	3.0	3.0	3.0	use split to pro	
circular duct, 2m, 800mm			0.1	0.2	0.2	0.2	0.2	0.2	0.2		
radiused bend, 800mm			0.0	0.0	1.0	2.0	3.0	3.0	3.0		
end reflection, 800mm, 800mm			2.0	0.5	0.0	0.0	0.0	0.0	0.0		
Lw			61.9	62.3	56.8	45.8	37.8	34.8	32.8		
Atmosphere											
distance		77.0m	48.7	48.7	48.7	48.7	48.7	48.7	48.7		
directivity : 0°,45°, 800mm, 800mm			4.5	5.0	6.0	6.5	7.5	7.5	7.5		
Lp			17.6	18.6	14.1	3.6	-3.4	-6.4	-8.4	8.7 dB(A)	
shielding			-10							-1.3 dB(A)	
FAI											
SWL			63.0	64.0	64.0	64.0	54.0	47.0	35.0	63.0	
generic attenuator, 1200mm, 50% free area			2.0	6.0	11.0	20.0	23.0	19.0	12.0		
mitred bend, 1425mm			2.0	8.0	6.0	3.0	3.0	3.0	3.0		
rectangular duct, 4m, 1425mm, 755mm			2.4	1.2	0.8	0.4	0.4	0.4	0.4		
end reflection, 1425mm, 755mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
Lw			52.6	47.8	46.2	40.6	27.6	24.6	19.6		
Atmosphere											
distance		79.0m	49.0	49.0	49.0	49.0	49.0	49.0	49.0		
directivity : 30°,30°, 1425mm, 755mm			5.5	6.0	6.5	7.5	8.0	8.0	8.0		
Lp			9.1	4.8	3.7	-0.9	-13.4	-16.4	-21.4	-0.5 dB(A)	
shielding			-10							-10.5 dB(A)	
Conservatively assume all sound radiates from grille with no loss in pit (shielding comes from buildings)											
AHU04 Tepidarium											
Exhaust											
SWL			65.0	78.0	71.0	71.0	70.0	68.0	63.0	75.0	
generic attenuator, 900mm, 50% free area			2.0	4.0	9.0	15.0	17.0	14.0	10.0		
radiused bend, 1425mm			0.0	1.0	2.0	3.0	3.0	3.0	3.0		
ductwork split, 50%			3.0	3.0	3.0	3.0	3.0	3.0	3.0	use split to pro	
circular duct, 2m, 800mm			0.1	0.2	0.2	0.2	0.2	0.2	0.2		
radiused bend, 800mm			0.0	0.0	1.0	2.0	3.0	3.0	3.0		
end reflection, 800mm, 800mm			2.0	0.5	0.0	0.0	0.0	0.0	0.0		
Lw			57.9	69.3	55.8	47.8	43.8	44.8	43.8		
Atmosphere											
distance		77.0m	48.7	48.7	48.7	48.7	48.7	48.7	48.7		
directivity : 0°,45°, 800mm, 800mm			4.5	5.0	6.0	6.5	7.5	7.5	7.5		
Lp			13.6	25.6	13.1	5.6	2.6	3.6	2.6	13.1 dB(A)	
shielding			-10							3.1 dB(A)	
FAI											
SWL			56.0	65.0	58.0	58.0	48.0	41.0	28.0	57.0	
generic attenuator, 900mm, 50% free area			2.0	4.0	9.0	15.0	17.0	14.0	10.0		
mitred bend, 1425mm			2.0	8.0	6.0	3.0	3.0	3.0	3.0		
rectangular duct, 4m, 1425mm, 755mm			2.4	1.2	0.8	0.4	0.4	0.4	0.4		
end reflection, 1425mm, 755mm			4.0	1.0	0.0	0.0	0.0	0.0	0.0		
Lw			45.6	50.8	42.2	39.6	27.6	23.6	14.6		
Atmosphere											
distance		79.0m	49.0	49.0	49.0	49.0	49.0	49.0	49.0		
directivity : 30°,30°, 1425mm, 755mm			5.5	6.0	6.5	7.5	8.0	8.0	8.0		
Lp			2.1	7.8	-0.3	-1.9	-13.4	-17.4	-26.4	-1.7 dB(A)	
shielding			-10							-11.7 dB(A)	
Conservatively assume all sound radiates from grille with no loss in pit (shielding comes from buildings)											
Extract											
no spectral, no induct - v conservative calc assume simple dist and shielding losses and no enclosure											
48dBa @ 3m											
SPL ref			48								
nominal attenuator			-5	assume that the atmosphere side attenuator (1200mm) will provide at least 5dBA benefit							
d ref			3								
d receptor			77								
20 log d/dref			-28.2								
shielding			-10								
Lp										4.8 dB(A)	