

Acoustic Impact Analysis: External Air Conditioning Condenser

Planning Reference: PL/2026/02530

Site: Unit D, Ridout Yard, High Street, Great Cheverell, SN10 5XZ

Proposed Aircon Unit: Fujitsu General AIRSTAGE (AOEH30KMTB)

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Executive Summary

- **Acoustic Impact: Negligible.** The conservative calculated noise level at the closest neighbouring window (18.7m away) is between **34.6 dB(A)** and **37.6 dB(A)**. This is equivalent to a quiet library interior and sits well within standard daytime ambient background noise.
- **Hours of Operation:** Primarily restricted to daytime. Core hours are **09:30 to 14:30, Monday to Friday**, with occasional extensions up to a maximum window of 08:00 to 19:00 and Saturday mornings. There will be no regular night-time operation.
- **Environmental Shielding:** The unit is heavily mitigated by a concrete outbuilding (acting as a solid acoustic barrier) and an intervening 0.8m thick hedge, breaking direct line-of-sight sound propagation.
- **Fallback Framework:** The building's current lawful **B2 (General Industrial) / B8 (Storage & Distribution)** use class permits high-intensity operations. The potential noise breakout from these legally permitted activities within the existing building would vastly exceed the minimal acoustic output of the proposed ultra-quiet heat pump.

1. Manufacturer Specifications

Acoustic data and physical dimensions have been sourced directly from the manufacturer's technical data sheets. For full context, please cross-reference the attached file: **Fujitsu General AOEH30KMTB Aircon Inverter.pdf**.

- **Model:** Fujitsu General AIRSTAGE AOEH30KMTB (8.0kW Outdoor Inverter)
- **Dimensions:** 788mm (H) x 940mm (W) x 320mm (D).
- **Sound Power Level (L_w):**
 - *Cooling Mode (High): 68 dB(A)*
 - *Heating Mode (High - Absolute Worst-Case): 69 dB(A)*

- **Sound Pressure Level (L_p) at Source (1m):**

- Cooling Mode (High): 53 dB(A)
- Heating Mode (High): 55 dB(A)

Note: Sound Power (L_w) represents the total acoustic energy emitted by the hardware at source. This absolute worst-case figure (69dB(A)) has been utilized as the baseline for all propagation calculations to ensure a rigorous and conservative assessment.

2. Hours of Operation & Maintenance Strategy

To protect residential amenity, the unit will be managed under a strict operational and maintenance framework:

- **Core Operational Hours: 09:30 to 14:30, Monday to Friday.**
- **Maximum Boundary Window:** Occasional operational needs may require the unit to run outside core hours, up to the absolute limits specified in the planning application (Mon-Fri 08:00 to 19:00, Sat 09:00 to 13:00). No regular overnight operation will occur.
- **Proactive Acoustic Maintenance:** The unit features an inherently quiet inverter system. To ensure it continues to operate at factory specification, it will undergo annual professional servicing. Additionally, it will be actively monitored throughout the year; if any unusual noise or vibration is detected, an ad-hoc engineering service will be booked immediately to rectify it.

3. Acoustic Attenuation & Neighbouring Receptor Calculations

To mathematically verify the impact on the nearest residential occupiers, distance attenuation calculations have been conducted using the standard hemispherical free-field inverse-square law:

$$L_p = L_w + 10 \log_{10} \left(\frac{Q}{4\pi r^2} \right)$$

Calculations assume the absolute maximum continuous sound power output ($L_w = 69\text{dB(A)}$). Calculations evaluate both a flat wall mount ($Q = 2$, hemispherical) and a ground mount adjacent to a wall ($Q = 4$, quarter-spherical) to provide a complete picture.

Receptor 1: Closest Ground Floor Neighbouring Window (18.7m Distance)

- **Distance (r):** 18.7m
- **Unmitigated Level range:** 35.6 dB(A) ($Q = 2$) to 38.6 dB(A) ($Q = 4$)
- **Hedge Mitigation:** Applying a conservative 1 dB attenuation for the physical mass of the intervening 0.8m thick hedge.
- **Net Realized Level:** 34.6 dB(A) to 37.6 dB(A)

Receptor 2: Closest First Floor Neighbouring Window (22.7m Distance)

- **Distance (r):** 18.7m + 4m vertical/diagonal displacement = 22.7m
- **Net Realized Level:** 33.9 dB(A) to 36.9 dB(A) (accounting for reduced vegetation line-of-sight at height).

Contextual Sound Comparison

To provide the planning team with real-world context, the calculated noise levels at the neighbouring windows are compared to common environmental sounds below:

Sound Level (dB(A))	Everyday Comparative Context
70	Standard domestic vacuum cleaner at 1m / Passenger car passing at 10m
68 – 69	Proposed Fujitsu Unit Maximum Sound Power (At Source)
60	Normal conversational speech at 1m
50	Quiet suburban residential area / Light rainfall
34 – 38	Calculated Noise Level at Nearest Neighbour Windows (18.7m – 22.7m)
30	Quiet library interior / Soft whisper in a bedroom

4. Physical Site Mitigations & Contextual Factors

The physical characteristics of the site offer substantial geometric attenuation that ensures actual real-world noise levels will be lower than the conservative estimates calculated above:

- **Structural Sound Barrier:** The condenser is positioned directly facing a solid concrete outbuilding located only 1.5m away. This outbuilding extends a minimum of 4m on either side of the unit. It acts as an effective, dense acoustic barrier that breaks the direct line of sight and prevents horizontal sound waves from traveling directly toward the property boundary.
- **Off-Axis Orientation:** The closest neighboring window sits at a sharp, glancing angle (15° to 30°) relative to the discharge face of the condenser. Because air-source units emit significantly less sound off-axis compared to their direct forward air-throw cone, the neighbor is inherently shielded from the primary acoustic path.
- **Permitted Fallback Position (B2/B8 Use):** The building holds an established lawful use class of B2 (General Industrial) / B8 (Storage & Distribution). Under this designation, high-intensity industrial or distribution processes can legally operate within the structure. The environmental noise breakout from standard industrial or loading activities fully allowed under this fallback use would be substantially louder than the highly controlled, low-noise external heat pump proposed in this application.

Appendix – Photographs



Figure 1 Location of proposed AC unit, adjacent to ladder rack.



Figure 1a AI-Generated impression of installed unit



Figure 2 From the front corner of the outbuilding. AC unit to be sited behind ladder rack.



Figure 3 View of house from AC position.



Figure 4 View of AC position (hidden behind outbuilding) from furthest limit of hedge masking house.