

1 Introduction

Areas of the retail arches on Water Lane and Hawley Quay of the Camden Lock Village (CLV) development approved under planning permission ref: 2018/1715/P and amended under NMA ref: 2019/2927/P will have a speaker system installed to improve the atmosphere and shopping environment of specific areas of the site. This application seeks planning permission to install speakers along Water Lane and Hawley Quay which will play music at a controlled level during normal retail hours.

We have assessed noise emission to neighbouring noise sensitive properties in line with the latest guidance from Camden Council, and with consideration to Condition 54 of the original Planning Permission.

Camden Council have published their Local Plan in 2017. The Local Plan has been supplemented with the Amenity Camden Planning Guidance document (March 2018). It is considered prudent to carry out any activity noise assessment in line with these latest documents.

The Camden Local Plan (Appendix 3 – Noise Thresholds) presents guidance on the assessment of “noise from entertainment and leisure premises”, which is considered applicable to this assessment. This is inclusive of noise from amplified and unamplified music, human voices, footfall and other general activity. Limits are provided for entertainment noise, which can be summarised as follows, and are considered applicable as an internal room-reverberant level:

- Bedrooms at night (23:00-07:00) \leq NR25 (L_{eq})
- All habitable rooms during the day end evening (07:00-23:00) \leq NR35 (L_{eq})

In addition, Condition 54 of the original Planning Permission for the site stipulated the following internal noise limits within habitable rooms in dwellings:

- Habitable rooms at night (23:00-07:00) \leq 30 dB $L_{Aeq,8hrs}$
 \leq 45 dB L_{AFmax}
- Habitable rooms during the day end evening (07:00-23:00) \leq 35 dB $L_{Aeq,16hrs}$

The speaker system will be entirely controlled by the Landlord, managed through a centralised system in Camden Market. The speakers will be set to only operate from 10:00-21:00 Monday to Sunday (including Public/Bank Holidays). The limits considered applicable would therefore be for the music noise to not exceed a level within neighbouring residential properties of either NR35 (L_{eq}) or 35 dB $L_{Aeq,16hrs}$, whichever is the more onerous. The level at which individual speakers are played can be higher than this, and guidance is provided on suitable levels later in this document.

The author of this assessment is Jason Clouston (BEng MSc MIOA), who is a Corporate Member of the Institute of Acoustics and has been practising acoustic consultancy for over 16 years.

2 Proposals

The speaker layout is shown in Figure 2-1 on the following page.

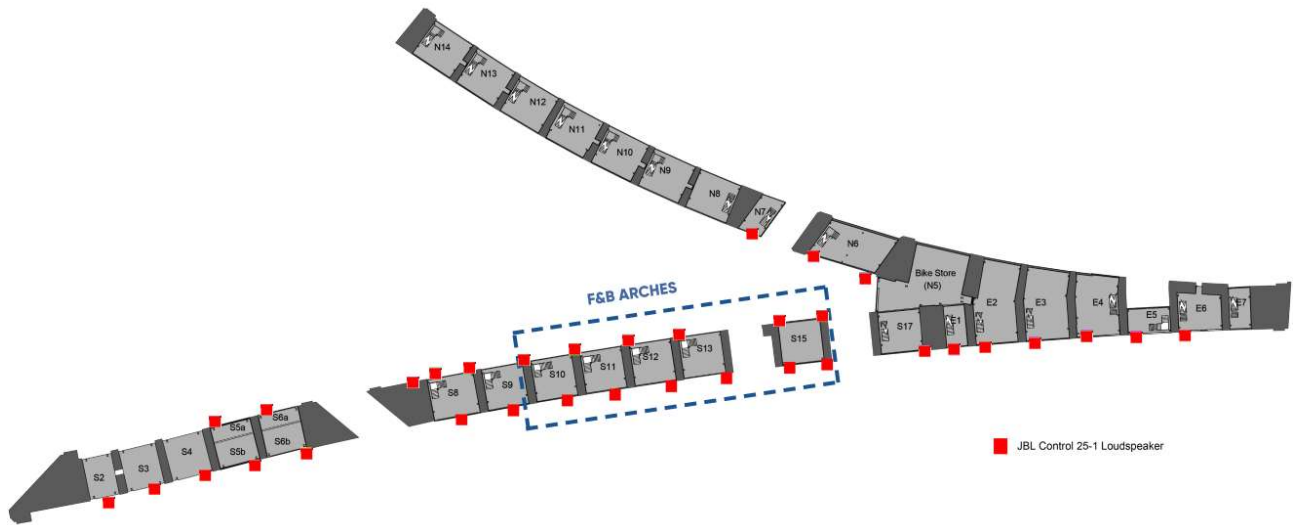


Figure 2-1: Proposed speaker positions

The speakers will be JBL's Control 25-1, which are compact full-range speakers measuring 243mm tall, 188mm wide and 145mm deep. Whilst they are full-range speakers, the sound power emitted at the lower frequencies is naturally of a reduced level owing to the compact nature. From the datasheet (within Appendix A), the low-frequency roll off starts at around 100Hz with a sharp decline in noise level to a level of about -10 dB at 63 Hz. A picture of the speaker is shown in Figure 2-2.



Figure 2-2: The proposed speaker, the JBL Control 25-1

Whilst the speakers are capable of producing relatively high levels of music noise, they will be hard limited so that they will not produce their maximum output. The level of music played will be controlled so that the limits presented in Section 1 are not exceeded.

The intention is to provide background music to just outside the retail areas where they are installed, and not to play out music at a high level. The level of music noise emitted is not expected to result in guests walking past having to raise their voices to hold a normal conversation.

3 High-level noise assessment

The nearest offsite noise sensitive buildings are about 50m away from the closest speaker location and will benefit from the effects of acoustic screening, owing to surrounding buildings and the railway. The nearest onsite new residential flats are about 6m away from the closest speaker location and will have a direct line-of-sight. The locations of the nearby noise sensitive receivers in relation to the restaurant buildings are presented in Figure 3-1.

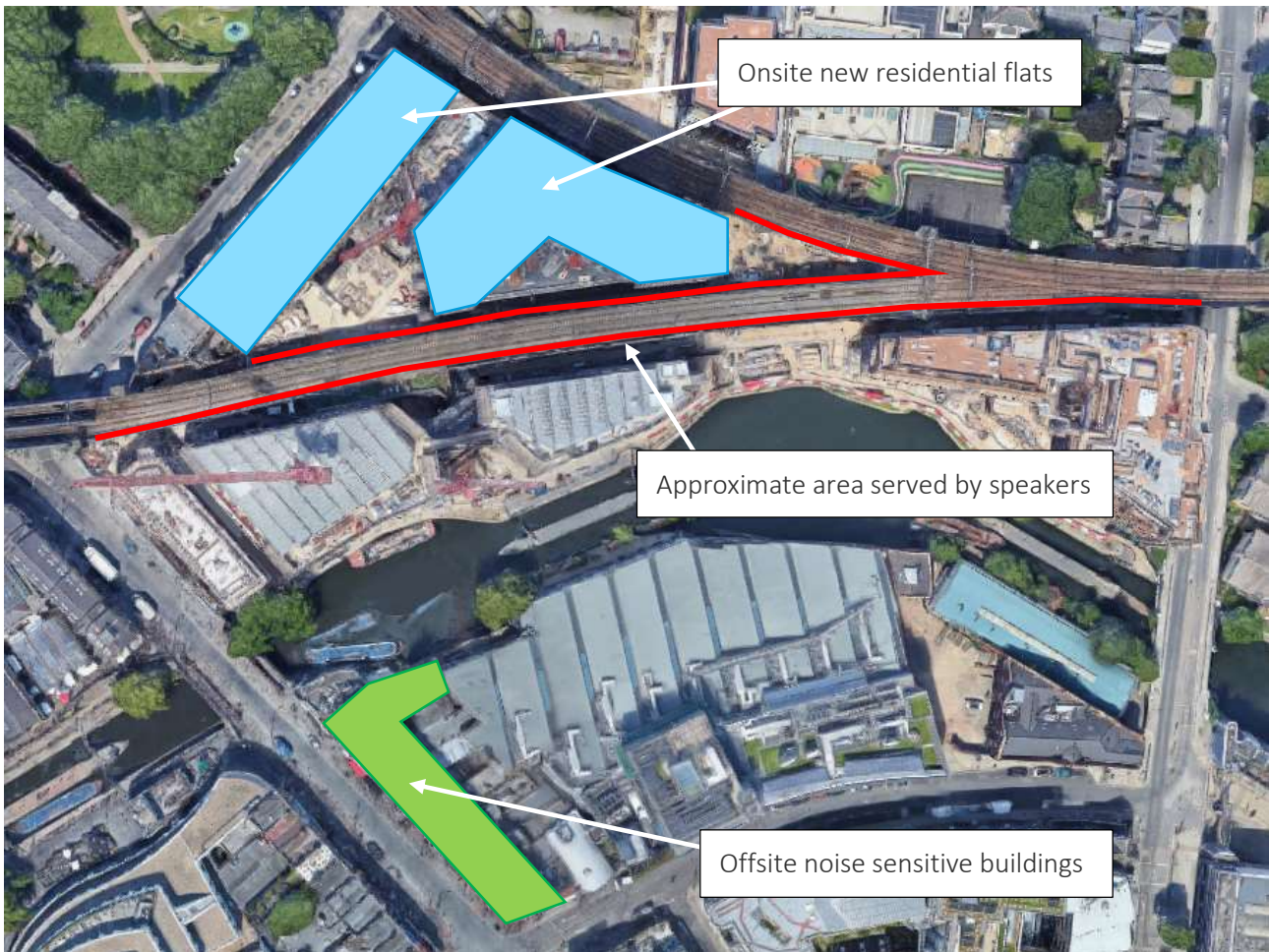


Figure 3-1: Nearby noise sensitive receivers in relation to the new speaker locations

Controlling noise to the onsite new residential flats is therefore expected to be the most onerous situation, such that satisfying the Council's noise limits there will also enable compliant noise levels at the offsite noise sensitive buildings.

The amount of attenuation owing to distance propagation between the closest speaker and nearest new residential flat has been estimated as 16 dB. This is based on the assumption that noise will radiate from each speaker following an approximation of point-source propagation. An allowance should also be made to account for multiple speakers affecting a single dwelling, which would usually follow the mathematical rule of $10 \cdot \log(N)$ where N is the number of individual point sources. An allowance of +5 dB is considered appropriate to account for the effects of multiple speakers affecting a single dwelling.

Assuming residents have windows open would result in a level difference between inside and just outside their window of between 10 dB and 15 dB¹ (based on industry recognised data for openable windows).

A feasibility check of the level of noise from each speaker has therefore been carried out, based on the above and Camden Council's guidance limit of NR35 within any habitable spaces during the day / evening, and the day / evening limits as stipulated within Condition 54 of the original Planning Permission.

- Target limit within all habitable rooms NR35
- Limit converted to just outside an opened window NR45
- Limit adjusted to account for multiple speakers NR40
- Limit adjusted for distance propagation NR56
 - This equates to a level of about 62 dB L_{Aeq} at a distance of 1m from each speaker

- Target limit within all habitable rooms 35 dB $L_{Aeq,16hrs}$
- Limit converted to just outside an opened window 45 dB $L_{Aeq,16hrs}$
- Limit adjusted to account for multiple speakers 40 dB $L_{Aeq,16hrs}$
- Limit adjusted for distance propagation 56 dB $L_{Aeq,16hrs}$
 - This is the equivalent noise limit (L_{Aeq}) at a distance of 1m from each speaker

The result of the feasibility check presented above indicates that satisfying the limits stipulated within Condition 54 of the original Planning Permission would be more onerous than the limits recommended by the Camden Local Plan. The music system will be controlled by the Landlord to whichever requirement is stipulated by the Council. The music levels calculated are considered to be a reasonable level of background music, as they are just below what normal levels of speech are. It would therefore be reasonable to conclude that it is feasible for the speakers to be played at a level to meet the objective of providing background music to the areas served, without exceeding noise limits as may be expected by Camden Council.

Should any adjustments need to be made once the speakers are installed, then this will be entirely possible owing to the centralised management of the proposed system, via a limiter.

4 Conclusions

The music to be played over the proposed speaker system is to provide an enjoyable background level of music for guests using the arches retail areas only. The level of music noise is not expected to be above the normal ambient level of noise of other sources in the area (including guests of the retail areas) and will be controlled with restrictions on hours of operation and maximum volume levels.

Guidance has been provided on suitable noise limits within neighbouring habitable spaces, based on the Camden Local Plan, and limits stipulated within Condition 54 of the original Planning Permission. A feasibility check against these limits indicates that the speakers can be played at the desired level whilst complying with the limits.

Should the level of music noise need to be adjusted when fully operational, or anytime in the future, then this will be possible but will be within the approved noise limits. The speakers will be controlled from a central location by the landlord, which includes the capability of setting the music noise level via a hard limiter.

¹ Ref: World Health Organisation's Environmental Noise Guidelines for the European Region 2018

Appendix A – Loudspeaker datasheet

The manufacturer’s datasheet for the proposed loudspeaker is presented on the following pages.

Control® 25-1

Professional Series – Compact Indoor/Outdoor Background/Foreground Speaker



Key Features:

- Components:
 - 5-1/4" woofer with woven fiberglass cone
 - 3/4" PEI diaphragm tweeter with fluid cooling
- Contemporary, high-design appearance
- Built-in InvisiBall® mounting hardware*, plus available U-bracket
- Weather resistant enclosure and transducers
- Wide 100° x 100° coverage
- 100 Watt power handling (200 Watt program) in direct 8Ω setting, plus built-in 30 Watt 70V/100V multi-tap transformer
- High fidelity sound character with broad frequency response of 60 Hz – 20 kHz



Description:

The Control 25-1 is a two-way 5" speaker with rich sonic character, wide coverage, consistent dispersion, versatile mounting, and a contemporary high-design look that fits into a wide range of decors. This makes Control 25-1 an excellent choice for a wide variety of applications, including retail stores, restaurants, health clubs, theme parks, educational facilities, hospitality, music cafes, leisure venues, and anywhere where a top quality high-output indoor/ outdoor foreground/background music (and/or paging) speaker is required.

The unique InvisiBall mounting hardware is included with each system, making short work of permanent installation. The InvisiBall mounting method provides a high degree of both vertical and horizontal rotation, and because InvisiBall adjustments are made through a hidden access behind the logo badge, the grille never needs to be removed, and there exists a high degree of theft deterrence as well. Integrated M6 mounting points for an optional U-bracket adds to the installation versatility.

The LF driver's woven fiberglass cone provides durability and weather capable performance. The light weight high temperature fiberglass voice coil former and high temperature voice coil wire ensure high sensitivity and high power handling, while also providing stable performance under long-term high-power working conditions. The pure butyl rubber surround delivers clean sound and robust operation. JBL's WeatherEdge™ is a seamless, rubberized extension of the woofer surround that provides added protection to critical transducer elements. Cone geometry is optimized for smooth frequency response and consistent off-axis performance, while an FEA-optimized motor construction and linear suspension spider helps to lower harmonic distortion.

The HF driver's low viscosity ferro-magnetic fluid increases voice coil cooling for higher long-term power handling. The softened PEI diaphragm delivers a smooth and pure high frequency sound quality. The light weight Kapton™ voice coil former increases durability while providing better high frequency response extension. All these factors also contribute toward making the driver especially rugged for outdoors and other stressful applications.

In addition to the driver designs contributing toward a high degree of weather resistance, the cabinet provides excellent endurance against sun, salt and moisture. Grilles are heavily zinc-plated and finished in a tough, high-grade powder coating for rust resistance. The optional MTC-25WMG WeatherMax™ grilles are available for especially difficult environments and to break up driving rain. Connection is made via weather-capable screw-down terminals. The optional MTC-PC2 and MTC-PC3 panel covers are available to protect the terminal compartment, providing a water-tight sealed gland-nut entrance (when used with round-jacketed cable within the specified diameter range).

The frequency response is extremely smooth, resulting in a very natural sound character, and the response extends down to 60 Hz, providing strong bass capability. The system is capable of handling 100 Watts continuous pink noise (200 Watts program) at its 8 ohm setting and is also equipped with a built-in 30 Watt 70V/100V multi-tap transformer for operation on distributed speaker lines. The combination of high sensitivity and power handling provides high Max SPL of 110 dB.

The Control 25-1 readily accepts a variety of paints and finishes to match any décor. Available in black or white (-WH).

Control® 25.1

Professional Series – Compact Indoor/Outdoor Background/Foreground Speaker



PROFESSIONAL
HARMAN

Specifications:

System	
Frequency Range (-10 dB) ¹	60 Hz – 20 kHz
Frequency Response (+/-3 dB)	85 Hz – 17 kHz
Power Rating ²	200 W Continuous Program (2 hrs) 100 W (400W peak) Continuous Pink Noise (2 hrs) 75 W (300W peak) Continuous Pink Noise (100 hrs)
Maximum Input Voltage	25.3 V RMS (2 hrs), 50.6 V peak
Maximum SPL ³	110 dB average Continuous Pink Noise (116 dB peak)
Sensitivity ⁴	90 dB, 1W/1m (averaged 100 Hz – 10 kHz)
Coverage Angle ⁵	100° x 100°
Directivity Factor (Q)	6.04 (averaged 1 kHz – 16 kHz)
Directivity Index (DI)	7.6 dB (averaged 1 kHz – 16 kHz)
Nominal Impedance	8 ohms (THRU setting)
Crossover Type	2nd order low-pass, 3rd order high-pass
Circuitry	
Transformer Taps	70V: 30W, 15W, 7.5W, 3.7W 100V: 30W, 15W, 7.5W Insertion Loss <0.94 dB at any tap setting Thru Setting: 8Ω nominal
Recommended Protective High-Pass ⁶	60 Hz high-pass (24 dB/oct) (for 8Ω operation and for all 70V/100V tap settings)
Transducers	
Low Frequency	135 mm (5.25 in), woven-fiberglass cone with pure butyl rubber surround with Weather-Edge frame protection, high-temp fiberglass voice coil former, high-temp voice coil wire, optimized cone geometry, linear suspension spider, and FEA optimized motor structure.
High Frequency	19 mm (0.75 in) PEI diaphragm, low-viscosity ferro-magnetic fluid, and lightweight Kapton™ voice coil former.
Physical	
Enclosure Material	High Impact Polystyrene (HIPS), painted with highly-UV resistant paint on white (-WH) version for maximum UV fade resistance.
Grille	Highly zinc-plated, finished in durable TGIC polyester powder coating. MTC-25WMG-1 (-WH) available with Weather-Max™ multi-layer foam and tight-weave mesh vapor barrier backing.
Installation	InvisiBall wall-mounting system included. Two 6 mm attachment points (on top and bottom) for optional MTC-25UB-1 (-WH) U-bracket. Secondary safety attachment loop point on back panel.
Environmental	IP-44 per IEC529 (IP-55 when installed with the optional MTC-25WMG-1 WeatherMax™ grille and either MTC-PC2 or MTC-PC3 panel cover.) Exceeds MilSpec 810 for humidity, salt-spray, temperature & UV. Passes MilStd-202F for salt spray and ASTM G85 for acid-air plus salt spray. Optional MTC-25WMG-1 WeatherMax™ grille for breaking up driving rain and for especially difficult environments.
Termination	Screw-down terminal strip, zinc-plated copper based, nickel-plated metal screws and washers. Accepts up to 9 mm outside 4 mm inside open lugs (#6, #8, or #10 lug), plus bare wire (up to 12 AWG / 2.5 mm2). Optional MTC-PC2 and MTC-PC3 protective panel covers available to provide sealed entrance for additional weather protection.
Agency Rating	ROHS-compliant; Transformer UL Recognized per UL1876
Colors	Black (RAL9004) or white (-WH, RAL9016)
Dimensions (H x W x D) ⁷	243 x 188 x 145 mm (9.6 x 7.4 x 5.7 in); 203 mm (8.0 in) deep total when mounted on InvisiBall wall-mount bracket.
Net Weight (each)	3.4 kg (7.5 lb)
Shipping Weight (pair)	8.16 kg (18 lb)
Included Accessories	InvisiBall™ wall-mounting system), 6 mm x 100 mm hex key
Optional Accessories	» MTC-25UB-1 – Yolk-type U-bracket (-WH) » MTC-25WMG-1 – WeatherMax grille with backing (-WH) » MTC-28/25CM – Ceiling-Mount InvisiBall adapter (-WH)

¹ In half-space (on-wall, 2pi)

² At 8Ω setting. Continuous Pink Noise rating is IEC-shaped pink noise with a 6 dB crest factor. Continuous Program Power is defined as 3 dB above the Continuous Pink Noise Rating and is a conservative expression of the system's ability to handle normal speech and music program material.

³ Calculated from sensitivity and power handling, exclusive of power compression, at THRU setting

⁴ Half-space (on-wall), averaged 100 Hz – 10 kHz, 2.83V

⁵ Coverage angle (-6 dB), average between 1 kHz and 12 kHz

⁶ For protection against driving below resonant frequency and to keep transformer out of saturation

⁷ In vertical orientation