# 81 WASHINGTON AVENUE – LE JARDIN BOUCHERIE – ACOUSTIC ANALYSIS & RECOMMENDATIONS

V1 – 3/27/2023

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(5 PAGES TOTAL)

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LOCATION OF PROJECT


PROJECT NAME:
81 WASHINGTON AVENUE – LE JARDIN BOUCHERIE

PROJECT ADDRESS:
81 WASHINGTON AVENUE
MIAMI BEACH, FL 33139

DATE: 3/27/2023

AUTHOR: ANDY SWERDLOW

VERSION: 1


Criterion Acoustics
ARCHITECTURAL ACOUSTIC & SYSTEMS DESIGN
705 CENTRAL AVE – UNIT 4
NEW PROVIDENCE, NJ 07974
908-464-1116
INFO@CRITERIONACOUSTICS.COM


SHEET SIZE: 11" X 17"

PAGE: 1

# 1. OVERVIEW AND SUMMARY OF MODEL

## OVERVIEW

Criterion Acoustics (CA) was contracted to provide an acoustical analysis and study regarding the outdoor area of the proposed "Le Jardin Boucherie" restaurant location in Miami Beach. The site is on the corner lot, 81 Washington Avenue at 1st Street. The restaurant will have reduced or "ambient" level music playback in the garden (70dBA / 75 dBC).

## SUMMARY

A preliminary sound system provided by Support305 was analyzed. Ownership and the designers will do the following to optimize the outdoor sound system:

- Loudspeakers for audio playback will use 6" bass drivers or smaller, downward facing, mounted as low as possible and distributed to keep individual sound levels low.
- Cardioid-pattern loudspeakers will be used if possible.
- The subwoofers will be removed from the design in the outdoor area.
- Speakers close in proximity to the residential 75 Washington Ave. location will be moved, removed from the design, or lowered in level significantly (10 dB or more).
- **A digital tamper-resistant sound level input limiter will be installed and configured after on-site sound level calibration to ensure the calibrated level is never exceeded. This limiter and output gain settings will only be accessible by corporate management and will have no local operational access.**

## CONCLUSION

The modeling summary is as follows:

- **The outdoor restaurant sound will be low in level, approximately 70-75 dBA / 75-80 dBC in seating areas.**
- **The ambient, environmental background sound level on Washington Ave. is 65 dBA.**
- **The sound system design will be optimized to reduce sound egress toward the 75 Washington Ave. residences.**
- **Sound will be reduced by approximately 7dBA (compared to the model) to comply with the above. No sound will impact the 75 Washington Ave. residences if these conditions are met.**

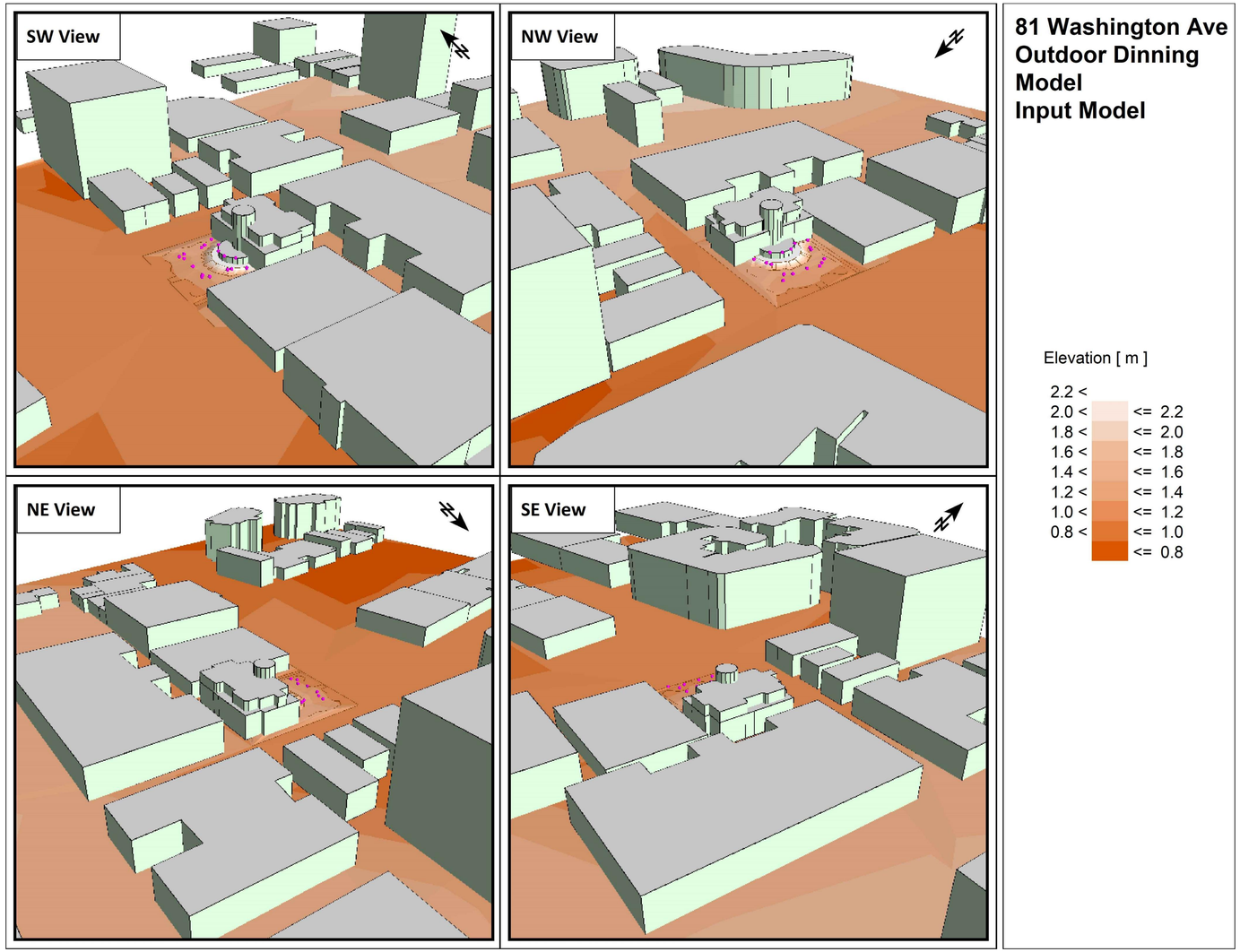
The following actions will be taken to limit audible sound at 75 Washington:

- Based on experience, this is attainable with sound system design optimization; no barrier wall will need to be built. The overall level will be reduced from what was modeled by 5-10 dB.
- During calibration on site, the speakers closest to the perimeter may need to be further reduced to achieve compliance in 75 Washington Ave.

## SUMMARY OF MODEL

- The environmental acoustic model was created with the software package SoundPLAN (Version 8.2). SoundPLAN is widely accepted in the industry for environmental noise modeling.
- When conducting acoustical modeling there is often variation. Typically, +/- 3 to 5dB is not uncommon and this is a consideration with this type of predictive modeling.
- Reflections from the surrounding buildings and structures are accounted for in the model.

## GRAPHIC INPUT OF MODEL

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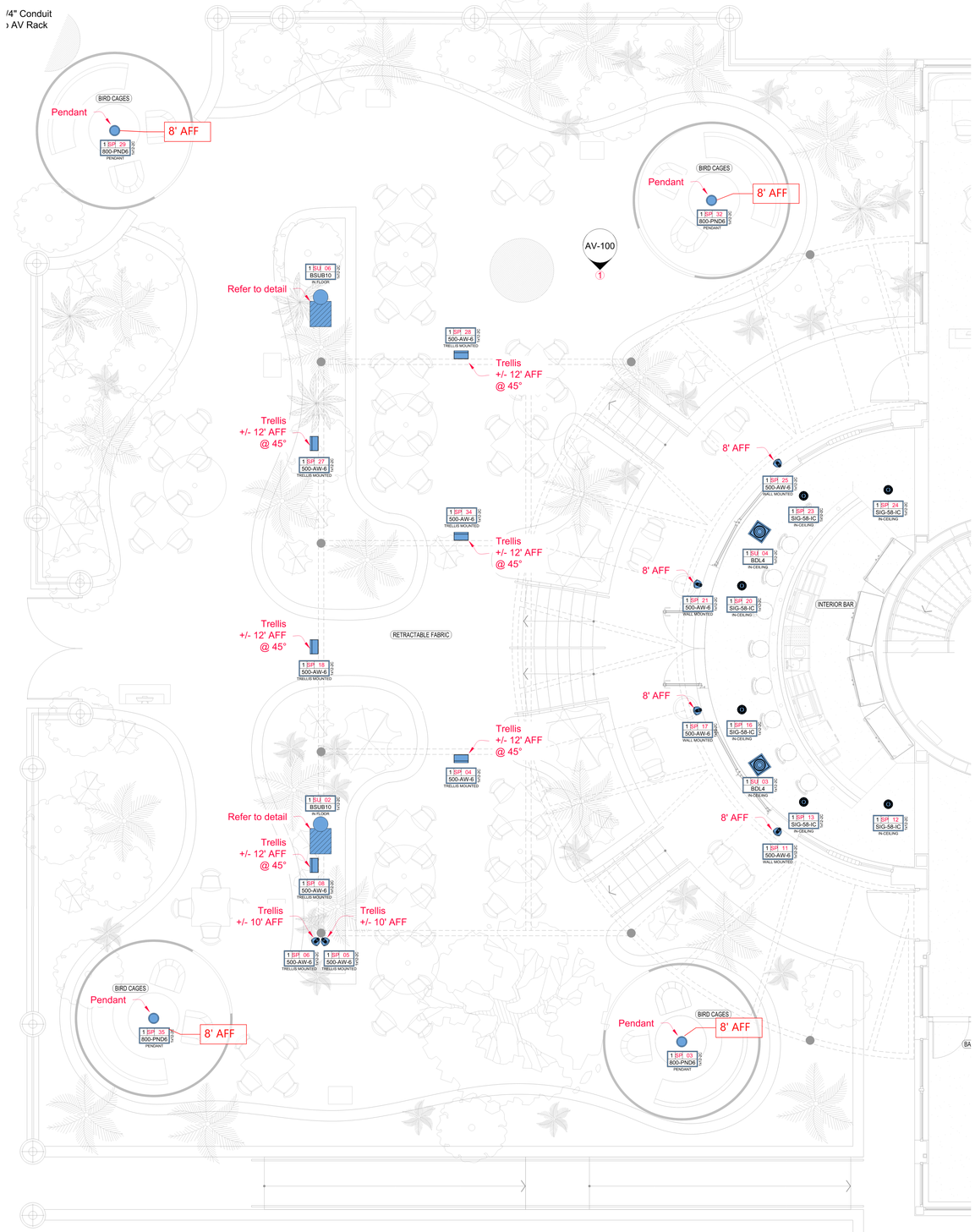
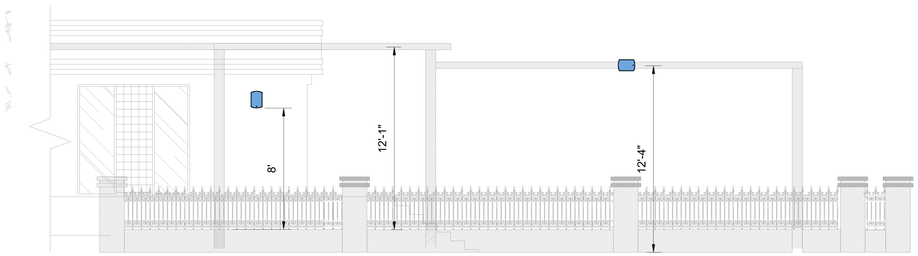
# 2. PRELIMINARY LOUDSPEAKER SYSTEM DESIGN




## DESCRIPTION

- Design by SUPPORT 305
- All full-range loudspeakers have 8″ bass drivers.
- The two subwoofers have 10″ bass drivers.




Elevation 1 - Outside Area
Scale 3/16' = 1'-0"

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# 3. MODELED SOUND LEVELS - MUSIC


**81 Washington Ave**
**Outdoor Dinning**
**Model**
**Input Model**

Noise level
Leq
in dB(A)

| | |
|---|---|
| >= | 105 |
| 100 - | 105 |
| 95 - | 100 |
| 90 - | 95 |
| 85 - | 90 |
| 80 - | 85 |
| 75 - | 80 |
| 70 - | 75 |
| 65 - | 70 |
| 60 - | 65 |
| 55 - | 60 |
| 50 - | 55 |

## DESCRIPTION

- The graphic SoundPlan model output indicates the larger scale speaker models and projected sound levels.
- Predicted sound level per building floor is listed next to the nearest buildings.
- The preliminary loudspeaker system design presented on page 3 is used for this analysis.

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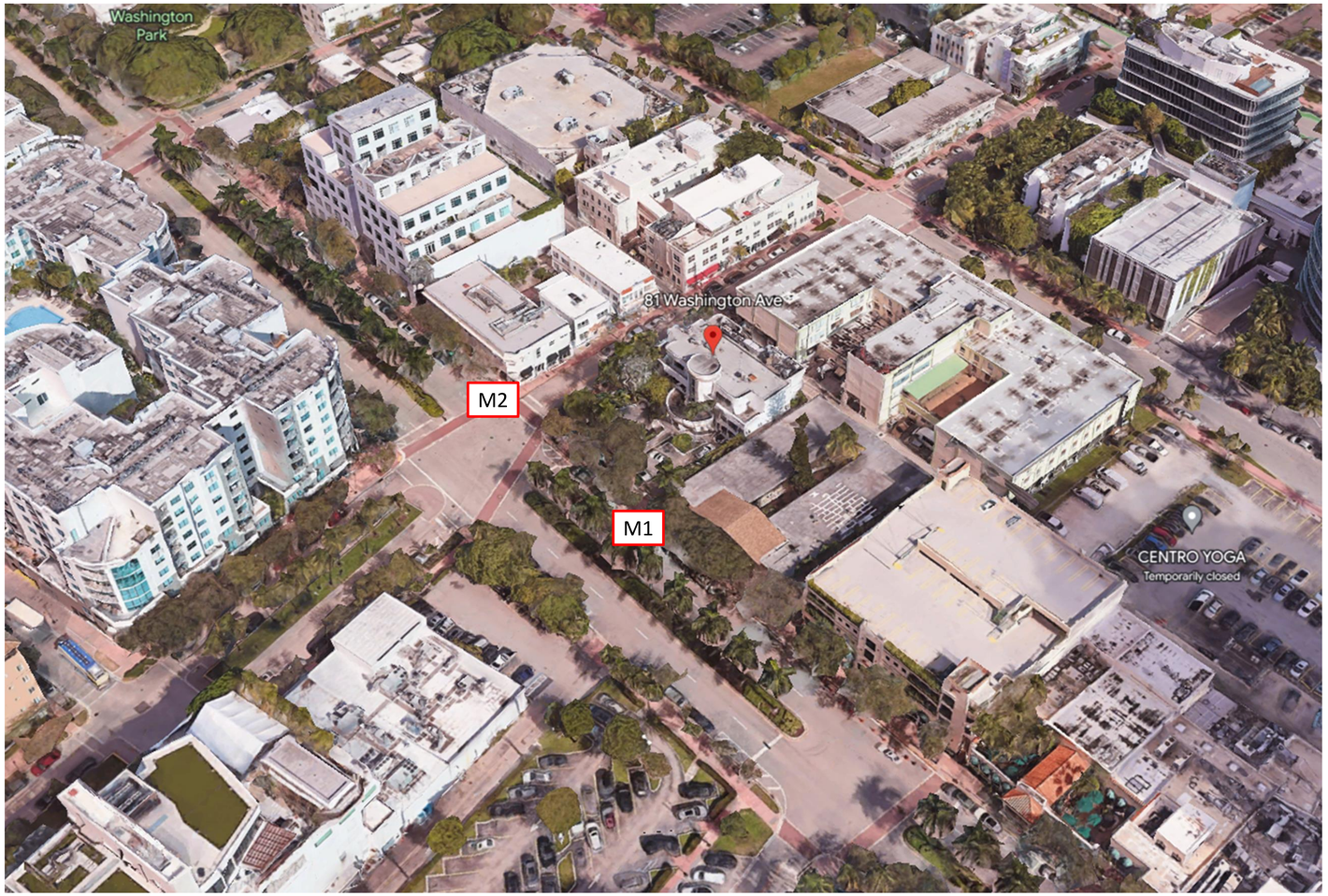
# 4. MEASURED SOUND LEVELS – AMBIENT NOISE




| Table 1 – Ambient Noise Measurements | | | | |
|---|---|---|---|---|
| **Measurement** | **Location** | **LAeq [dB]** | **LCeq [dB]** | |
| Location 1 | Sidewalk at the property line of 81 and 75 Washington | 63.9 | 76.1 | |
| Location 2 | NE Corner of Washington Ave. and 1st St | 65.2 | 73.8 | |

## DESCRIPTION

- The graphic indicates the location of the measurements and *Table 1 – Ambient Noise Measurements* provides the measured levels.
- These measurements were performed by David Molho during 9:00 to 9:30 PM of Dec 8, 2023.
- During the measurements normal activities were occurring.
- The measurements were performed with a B&K 2270 meter with the windscreen on. They were logged for the duration of the measurement as indicated in Table 1.
- See appendix sheet for definitions and terms.

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# 5. APPENDIX

Ambient Noise:

Ambient noise includes all sounds present in an environment. The ambient noise level may be measured at any moment, but it will vary widely with time, e.g., with the coming and going of trucks, cars, aircraft, sirens, etc.

Decibel (dB):

A unit of the intensity of sound. The decibel (abbreviated dB) is a relational measure, expressing the relative intensity of the described sound to a reference sound. The decibel is a logarithmic measure, specifically 10 times the logarithm of the ratio of two voltages, currents, or sound pressures. Decibels are a logarithmic scale, so every 3dB increase is a doubling of sound pressure and subjectively it requires 10dB for a perceived doubling of loudness. See Figure A for a chart illustrating comparative dB & SPL values.

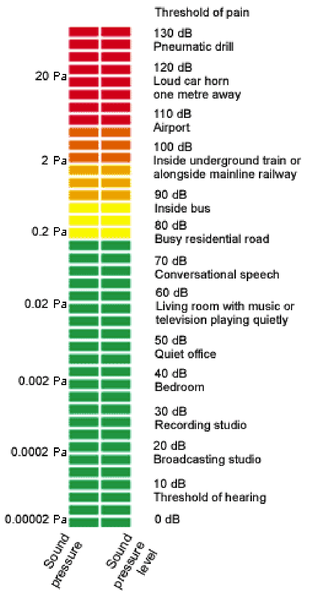


*Figure A – Chart illustrating comparative dB & SPL values.*

A-Weighting:

The A-contour filters out a significant amount of the bass in order to approximate the way humans hear at the 40 phon level. It is useful for eliminating inaudible low frequencies and is commonly used at SPLs below 70 dB. Sound pressure level values obtained using this weighting are referred to as A-weighted sound pressure levels and are signified by the identifier dBA. See Figure B for a visual comparison of weighting curves.

C-Weighting:

The C-contour is nearly flat, with only a slight reduction at the high and low frequencies. It approximates the way humans hear at very high sound levels and is commonly used for SPLs above 70 dB. Sound pressure level values obtained using this weighting are referred to as C-weighted sound pressure levels and are signified by the identifier dBC. See Figure B for a visual comparison of weighting curves.

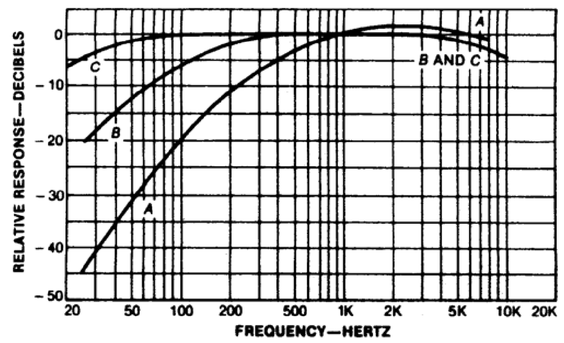


*Figure B – A visual comparison of weighting curves.*

$L_n$:

$L_n$ values are statistical noise levels (sometimes called percentiles) used to assess noise levels (sound pressure levels) from fluctuating noise sources over time. Any statistical value between 0.01% and 99.99% may be calculated where 'n' is the percent exceeded noise level over a timed measurement period (T). For example, a sample of fluctuating noise levels taken once a second every second for an hour gives us 3600 samples. These samples can give us some helpful statistics: if we add all the samples together and divide by 3600 (T) then we will get the average or L50% value of the noise over the hour. And if we do the same and all the samples together that exceeded a pre-determined noise level (e.g. 65dB(A)), then divide by total time (T) then we reach the n-Percent Exceeded Level, $L_n$.

$L_{EQ}$:

Equivalent continuous sound level. The steady level which would produce the same sound energy over the test period as the specified time-varying sound. This figure is useful for studying long-term trends in environmental noise.

$L_{MAX}$:

Highest, or loudest, Sound Pressure Level (in dBA, dBC, or dBZ) measured during the test period.

$L_{MIN}$:

Lowest, or quietest, Sound Pressure Level (in dBA, dBC, or dBZ) measured during the test period.

$L_{10}$:

$L_{10}$ is the level exceeded for 10% of the time. For 10% of the time, the sound or noise has a sound pressure level above $L_{10}$. For the rest of the time, the sound or noise has a sound pressure level at or below $L_{10}$. These higher sound pressure levels are probably due to sporadic or intermittent events. $L_{10}$ is often used when assessing traffic noise and in planning applications: $L_{10}$ is the level exceeded for 10% of the time and takes account of any annoying peaks in noise.

$L_{50}$:

$L_{50}$ is the level exceeded for 50% of the time. It is statistically the mid-point of the noise readings. It represents the median of the fluctuating noise levels.

$L_{90}$:

$L_{90}$ is the level exceeded for 90% of the time. For 90% of the time, the noise level is above this level. It is generally considered to be representing the background or ambient level of a noise environment. $L_{90}$ is often used to quantify the background noise levels in assessments of noise pollution and nuisance noise from industrial sources.

Perceived Loudness of Sound:

The threshold of perception of the human ear is approximately three decibels and a five-decibel change is considered to be clearly noticeable. This is primarily due to the logarithmic measuring metric typically associated with decibels. See Chart 1 for perceived change in decibel levels.

**Chart 1 - Perceived Change in Decibel Levels**

| Change in sound level | Perceived change to the human ear |
|---|---|
| ± 1dB | Not perceptible |
| ± 3dB | Threshold of perception |
| ± 5dB | Clearly noticeable |
| ±10dB | Twice (or half) as Loud |
| ± 20dB | Fourfold (4x) change |

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