

**Date:** December 12, 2022

**To:** Ryan Lloyd – Iron Bridge Consulting

**From:** David Kotch & Andy Swerdlow – Criterion Acoustics

**Re:** GAIA Miami Beach – Schematic Design Acoustic Study and Report

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## 1) Overview

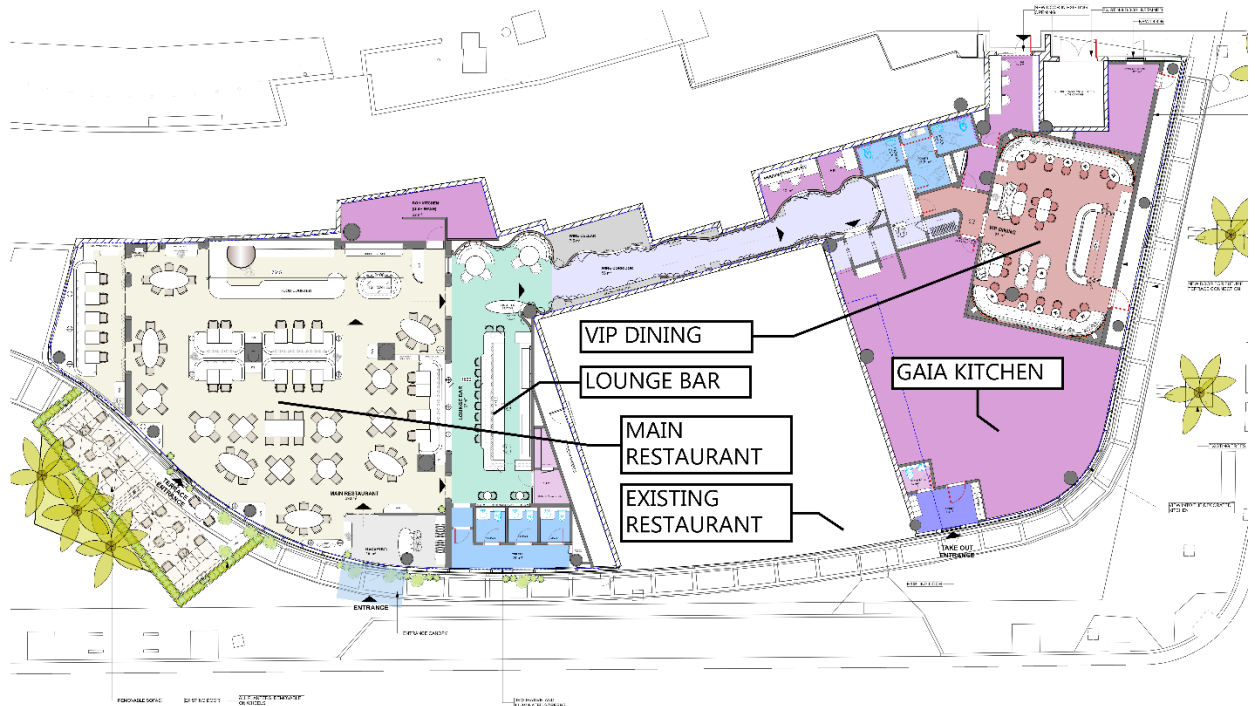
Iron Bridge Consulting and GAIA Restaurants hired Criterion Acoustics (CA) to perform an acoustical analysis of the proposed location at 801 S Pointe Drive in Miami Beach. The project is in the Schematic Design phase.

On December 2, 2022, CA performed a series of acoustical measurements and a physical site inspection at the location. CA returned on December 8, 2022, to perform environmental noise measurements of the surrounding areas.



*Figure 1 – Aerial view [Google Maps] of GAIA Restaurant Location, 801 S Pointe Drive*

The proposed restaurant occupies the eastern half of the ground floor of the building site.

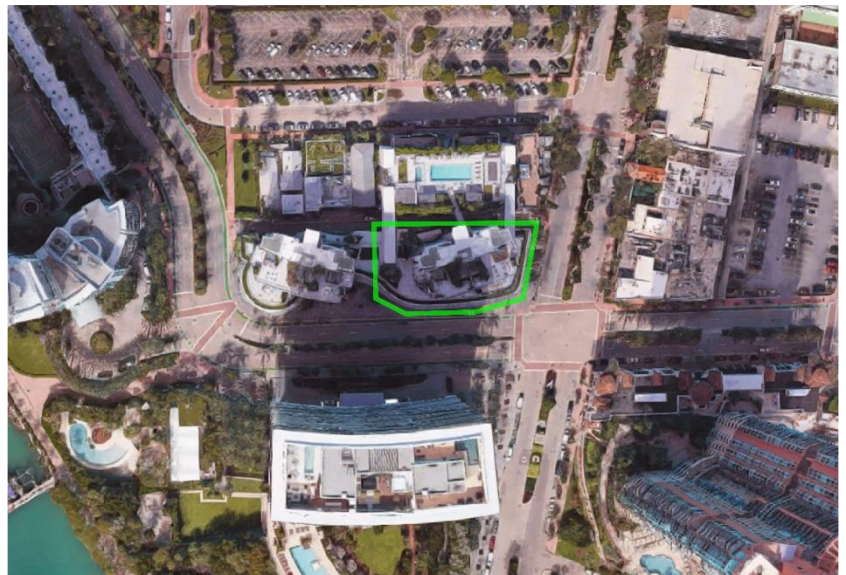


*Figure 2 - GAIA Miami Beach preliminary architectural layout (the existing restaurant, Kosushi, is not part of the GAIA project)*

The key areas of study are as follows:

1. The "Main Restaurant" and "Lounge Bar" (west of Kosushi)
2. The "VIP Dining" area (east of Kosushi)
3. The outdoor "Terrace" Patio

Restaurant background music will be broadcast through a permanently installed, distributed sound system in the Main Restaurant, Lounge Bar, and VIP dining.



*Figure 3 – Site Key Map (GAIA outlined in green)*

The major concerns are sound transmission from background music and restaurant activity into the residential dwellings above, the lobby, and the environment.

## 2) Summary and Recommendations

With appropriately designed sound isolation construction and audio reinforcement systems, GAIA will operate within the Miami noise code. The challenge for this project will be restaurant operation with background music vertically adjacent with a dwelling.

The key points and recommendations are as follows:

### 1. Sound Isolation:

- a. During testing, no sound was audible in the 801 S Pointe Ave lobby.
- b. For a “lively” restaurant atmosphere\* with background music, CA recommends the following construction methods:
  - i. A (2) layer 5/8” type X gypsum board (GWB) ceiling on 1” deflection spring isolation hangers with 6” sound attenuating batts infilled in the cavity with a minimum 12” airspace.
  - ii. The ceiling may be increased from (2) layers of 5/8” type X gypsum board to (4) layers if the structural loading and budget permits.
  - iii. The acoustic ceiling cannot be penetrated in any manner except for sprinklers. A secondary “finish” ceiling would need to be installed below to conceal the MEP and incorporate interior design.
  - iv. The ceiling should not be penetrated by loudspeakers or light fixtures (minimize and seal penetrations).
  - v. Existing structural walls and columns shall be covered with two layers of 5/8” GWB (with insulation) connected via an approved, non-rigid mounting system such as:
    1. Stud wall connected via isolated sway braces
    2. Isolated hat channel clip such as Kinetics ISOMAX
  - vi. The storefront glazing does not need additional treatment since second level residences are set back from the edge of the building.
  - vii. The plumbing penetrating the second level slab may need to be wrapped with a sound isolation lagging in addition to the acoustic ceiling.
  - viii. A corridor or secondary wall shall be utilized along the demising wall between the Lounge Bar and Kosushi.
- c. The dwelling CA visited, unit 204, has an ambient sound level of NC 30 with no HVAC running. This is typical for an urban dwelling.

### 2. Audio Reinforcement Systems:

- a. The design shall be a permanently installed, “distributed” system.
- b. The loudspeakers shall be wall-mounted on isolated mounts; ceiling-mounted loudspeakers and speakers close to the ceiling shall be avoided or limited.
- c. Audio coverage in egress points shall be avoided or limited.
- d. Audio sound levels shall not exceed 85 dBA (preliminary estimate, to be confirmed during the design process).

- e. CA recommends sound level testing after construction to determine operating levels and to set system input and output limiters.
- f. Patio (outdoor seating):
  - i. Because of the proximity of the Apogee Condominium, CA recommends a separately controlled, very small, distributed audio system installed with directional sound sources facing away from the Apogee. Specialized, direction-controlled (cardioid pattern) loudspeakers reduce the amount of sound traveling from the rear of the enclosure.
  - ii. The ambient environmental sound level is 65 dBA on the street level.
  - iii. A preliminary value of 75 dBA shall not be exceeded on the Patio.
  - iv. Using direction-controlled loudspeakers this level will not significantly impact the environment. A covered terrace design will be considered.

\*85 dBA (95 dBC) "background music" sound level measured in similar restaurant/lounge establishments.



### 3) Testing Methods and Procedure

#### A) Measurement Equipment:

Two (2) B&K 2270 handheld analyzer “meters” were used for the acoustical measurements. Both meters have the following software packages installed:

- BZ-7223 - Frequency analyzer software
- BZ-7224 - Logging software
- BZ-7225 - Enhanced logging software
- BZ-7226 - Sound recording option

A B&K 2250 handheld analyzer was used for environmental noise measurements.

All meters were calibrated by B&K in the past year, in addition to daily calibration with a B&K 4231 ½” microphone calibrator. All B&K meters are equipped with a 4189 pre-polarized microphone and microphone preamplifier ZC-0032.

#### B) Measurement Procedure:

A portable PA speaker with an 18” subwoofer was used as the sound source. Pink noise (98 dBA / 103 dBC) was used as source testing. The speaker was set up on the ground floor, which will be occupied by GAIA. The sound system’s pink noise was measured in the “send room” using a B&K 2270 handheld analyzer in two locations. “Receive” sound level measurements were taken one floor above in the unit 204 dwelling. No testing was performed above the VIP lounge (east side of the project) since access to the corresponding unit was not possible. Because of similarities to the second-floor units and the building structure between east and west, the measurement results apply to all areas of the project.

The following data was acquired during site measurements performed by Andy Swerdlow:

1. Airborne transmission loss and subsequent Noise Isolation Class (NIC) of existing floor/ceiling assembly to the dwelling space above.
2. Ambient sound levels of the dwelling unit 204 (west side).
3. Environmental sound levels of the surrounding areas during evening hours. These measurements were performed by David Molho of WSDG.

#### C) Sound Isolation Performance Predictions:

Sound isolation performance of future constructions was predicted using Insul v.9 software.

D) Measurement Setup:



Photo 1 [Top Left] – Source speaker testing location

Photo 2 [Top Right] – Unit 204 Receiver position

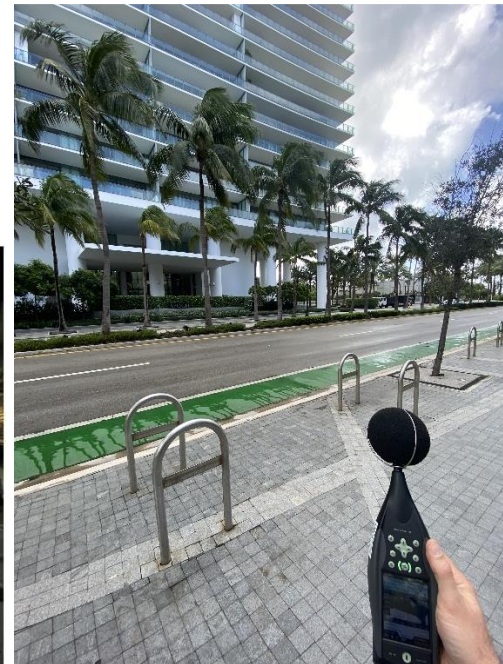


Photo 2 [Bottom Left] – Environmental testing Dec 8, 2022 (Location M6)

Photo 3 [Bottom Left] – Environmental testing Dec 2, 2022 (Location M2)

## 4) Measurement Results and Analysis

### A) Sound Isolation:

The measured sound isolation from the proposed GAIA restaurant space to the residences above is Noise Isolation Class (NIC) 53. This is an expected value commensurate with the existing concrete structure. The NIC measurement is common in field measurement techniques and is widely accepted method for classifying transmission loss.

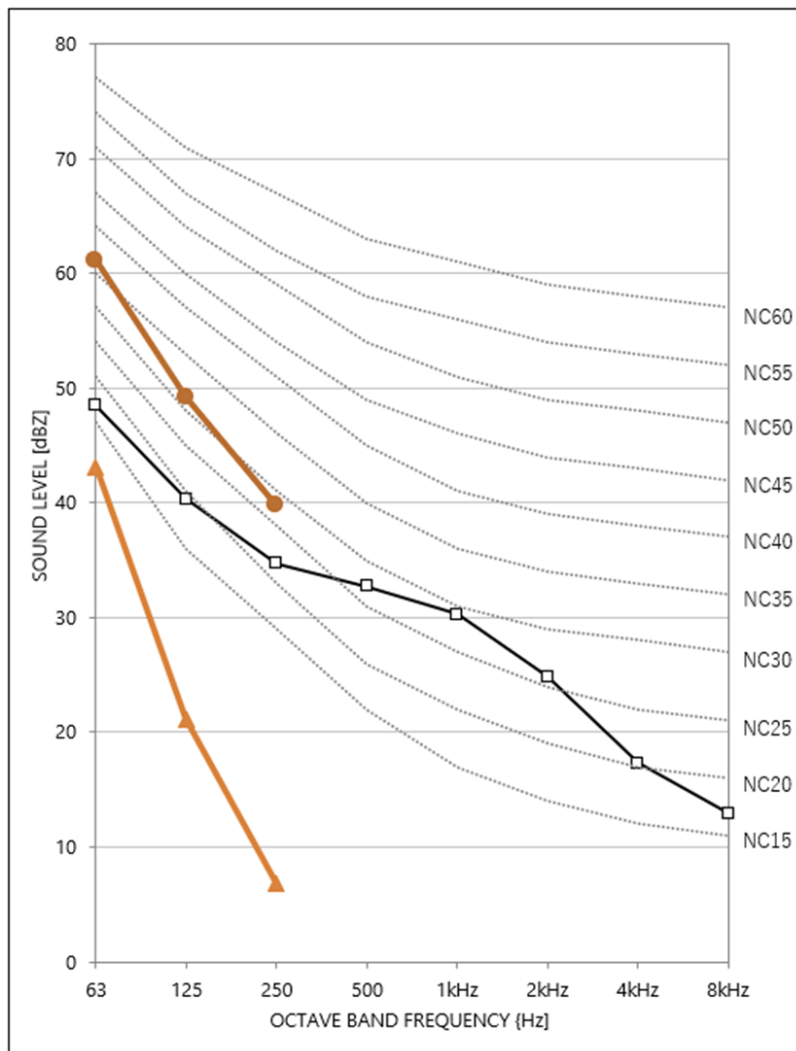


Figure 4 – Sound level in unit 204, measured and predicted

- **RED LINE** – Existing Construction – Predicted sound level in unit 204 with 85 dBA / 95 dBC restaurant music
- **ORANGE LINE** – Spring-hung GWB Ceiling – Predicted sound level in unit 204 with 85 dBA / 95 dBC restaurant music
- **BLACK LINE** – Measured ambient sound level in unit 204

**Sound Isolation Notes and Analysis:**

1. Flanking sound is not included in the predicted sound levels.
2. Flanking noise was noted along the east wall, which is close to the GWB demising wall separating Kosushi on the ground floor. Therefore, it is recommended that a corridor or secondary wall be utilized along the demising wall between the Lounge Bar and Kosushi.
3. The dwellings are offset from the ground floor storefront windows. This is good for sound isolation; the offset reduces flanking noise from the glass into the dwelling.
4. A 5 dB sound level penalty factor was applied to the prediction results.

**B) Environmental Ambient Noise:**



Measurement #	Time	MEASURED SOUND LEVEL (LAeq)	NOTES
<b>M1</b>	9:00 PM	63.9 dBA	
<b>M2</b>	9:15 PM	64.1 dBA	61.3 dBA*
<b>M3</b>	9:30 PM	65.0 dBA	
<b>M4</b>	9:45 PM	67.2 dBA	
<b>M5</b>	10:00 PM	64.0 dBA	
<b>M6</b>	10:15 PM	61.5 dBA	

\*On December 2, 2022, M2 location was measured for 10 minutes at 2:15 PM. The result: 61.3 dBA.



## 5) Noise Code

The applicable section of the Miami Beach noise code is excerpted below in italics. Unfortunately, the Miami Beach noise code does not utilize explicit sound levels in decibels or specific measurement procedures. Therefore, the interpretation of the code is subjective.

***Sec. 46-152. - Noises; unnecessary and excessive prohibited.***

*It shall be unlawful for any person to make, continue or cause to be made or continued any unreasonably loud, excessive, unnecessary or unusual noise. The following acts, among others, are declared to be unreasonably loud, excessive, unnecessary or unusual noises in violation of this section, but this enumeration shall not be deemed to be exclusive, namely:*

- (b) *Radios, televisions, phonographs, etc. The using, operating, or permitting to be played, used or operated any radio receiving set, television set, musical instrument, phonograph, or other machine or device for the producing or reproducing of sound in such manner as to disturb the peace, quiet and comfort of the neighboring inhabitants, or at any time with louder volume than is necessary for convenient hearing for the person or persons who are in the room, vehicle or chamber in which such machine or device is operated and who are voluntary listeners thereto. The operation of any such set, instrument, phonograph, machine or device between the hours of 11:00 p.m. and 7:00 a.m. in such manner as to be plainly audible at a distance of 100 feet from the building, structure or vehicle in which it is located shall be prima facie evidence of a violation of this section.*

## 6) Conclusions

With CA's conceptual recommendations for sound isolation construction and audio reinforcement systems, GAIA will be able to operate their business in the 801 S Pointe Ave location while satisfying the Miami noise code. Considering that other restaurants are operating similar businesses within the same building,

Please call to further discuss.

Sincerely,



David Kotch, Andy Swerdlow

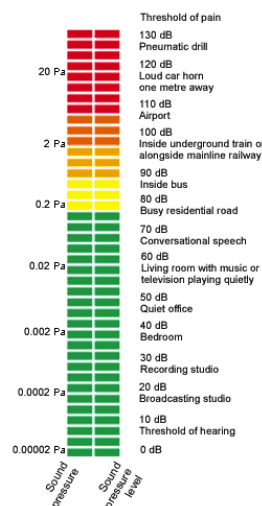
## **APPENDIX OF ACOUSTIC TERMS AND DEFINITIONS**

### Ambient:

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.

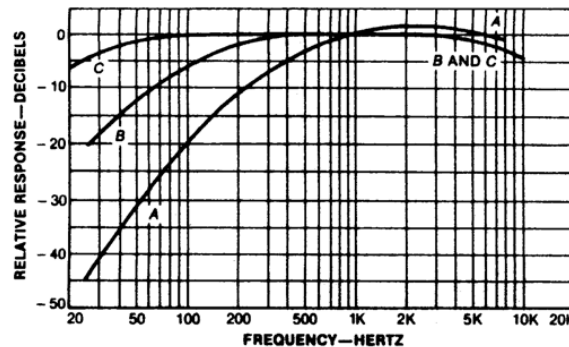


Figure B – A visual comparison of weighting curves.

L<sub>EQ</sub>:

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<sub>MAX</sub>:

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

L<sub>MIN</sub>:

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

L<sub>n</sub>:

L<sub>n</sub> 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).

L<sub>5.0</sub>:

L<sub>5.0</sub> is the level exceeded for 5% of the time. For 5% of the time, the sound or noise has a sound pressure level above L<sub>5.0</sub>. For the rest of the time, the sound or noise has a sound pressure level at or below L<sub>5.0</sub>. These higher sound pressure levels are due to sporadic or intermittent events. L<sub>5.0</sub> is often used when assessing environmental noise and in planning applications.

L<sub>95</sub>:

L<sub>95</sub> is the level exceeded 95% of the time. For 95% of the time, the noise level is above this level. It is generally considered to be representing the background or ambient level of an environment. L<sub>95</sub> is often used to quantify the background noise levels in assessments of noise pollution and nuisance noise from industrial sources.

Perception 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 to the ear. This is primarily due to the logarithmic measuring metric typically associated with decibels. See Chart 1 for perceived change in decibel levels.

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

*Chart 1 - Perceived change in decibel levels.*

Subtracting Sound Levels:

Sometimes it is necessary to subtract the background noise from the total SPL. The correction for background noise can be done by subtracting background noise from the total noise level using logarithmic subtraction.

If change is less than 3 dB(A), the background noise is too high for an accurate measurement and the correct noise level cannot be found until the background noise has been reduced. If the difference is more than 10 dB(A), the background noise can be ignored.