

30 March 2023

Mr. Lawrence BenBassett
PN Restaurants
301 Route 17 North, Suite 802
Rutherford, New Jersey 07070
LB@pnrestaurants.com

Re: Acoustical Evaluation of Proposed Outdoor Equipment
Proposed Popeye's and Sonic Restaurants, West Orange, New Jersey
LSG&A File 2023031

Dear Mr. BenBassett:

Lewis S. Goodfriend & Associates (LSG&A) has completed an evaluation of the expected outdoor sound pressure levels due to the mechanical equipment and drive-thru intercom loudspeakers for the proposed Popeye's and Sonic restaurants to be located in West Orange, New Jersey. This letter summarizes the results of our evaluation, including a summary of the applicable noise regulations and expected sound levels at the nearest property lines due to the proposed equipment. With the recommendations provided in this letter, the sound levels due to the proposed intercom loudspeakers and rooftop mechanical equipment are expected to meet the applicable limits of the state and local noise regulations at the adjacent property lines.

1.0 SITE LAYOUT

The proposed Popeye's and Sonic restaurants are to be located at 470 Eagle Rock Avenue in West Orange, New Jersey. Residential properties are located to the south and west of the site. Commercial properties are located to the east and north across Eagle Rock Avenue. Figure 1, at the end of this letter, shows an aerial view of the site and surrounding areas.

2.0 AMBIENT SOUND PRESSURE LEVEL MEASUREMENTS

2.1 Proposed Site

On Thursday, 16 March 2023, Jack Zybura, P.E., of LSG&A visited the proposed site to measure the existing ambient sound pressure levels between 1:27 P.M. and 2:44 P.M. Figure 1, at the end of this letter, shows an aerial view of the site with the acoustical

measurement location identified. The results of these measurements indicated an L_{eq} ¹ sound level of 52 dB(A)² at the south side of the site. Sound sources that contributed to the ambient sound pressure levels at the proposed site during the measurement included traffic, wildlife, and aircraft.

2.2 Data Acquisition and Analysis

The measurements at the proposed site were performed using a Brüel & Kjær Type 2250 precision sound level meter, equipped with a Brüel & Kjær Type 4189 microphone. The analyzer automatically recorded statistical A-weighted and one-third octave band sound pressure levels and stored the results in memory for later retrieval. The analyzer was mounted on a tripod at a height of approximately 5 feet above grade, and a windscreen was placed over the microphone for all measurements. The system's calibration was verified in the field before and after the measurements using a Brüel & Kjær Type 4231 acoustical calibrator. The stored data was later downloaded and transferred to a spreadsheet for evaluation. Copies of the NIST traceable calibration certificates for the sound level measurement equipment are available upon request.

3.0 REQUIREMENTS OF THE APPLICABLE NOISE REGULATIONS

The New Jersey Department of Environmental Protection (NJDEP) maintains a statewide noise regulation, and the Township of West Orange code also includes regulations regarding sound.

3.1 NJDEP Noise Regulation

The NJDEP noise regulation is set forth in N.J.A.C. 7:29 and limits the A-weighted sound levels produced by a commercial facility, when measured at a residential property line, to the following sound levels.

Daytime	(7:00 A.M. -to- 10:00 P.M.)	–	65 dB(A)
Nighttime	(10:00 P.M. -to- 7:00 A.M.)	–	50 dB(A)

When the sound from the source is constant in level and in character, the NJDEP regulation also provides limits for sound pressure levels in the preferred octave bands with center frequencies between 31.5 and 8000 Hz, as summarized in Table 1.

¹ The L_{eq} represents the energy-averaged continuous sound pressure level during the measurement period.

² A-Weighting, noted as dB(A), is a standardized sound level meter setting having a frequency characteristic similar to the human ear/brain frequency sensitivity.

Table 1 – Daytime and Nighttime Sound Pressure Level Limits [dB re: 20μPa] of the NJDEP Noise Regulation for Residential Property Receivers (N.J.A.C. 7:29)									
	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Daytime Limits	96	82	74	67	63	60	57	55	53
Nighttime Limits	86	71	61	53	48	45	42	40	38

For commercial receiving property lines, the limits are the same as the daytime limits listed above and are applicable 24 hours a day.

3.2 Township of West Orange Noise Regulation

The local noise regulation is set forth in Chapter 4 of the Code of the Township of West Orange. Section 4-4 (*Noise*) provides language that subjectively prohibits “excessively loud and disturbing noise which injures or endangers the health, comfort or safety of others within the limits of the Township.” As the local noise regulation does not provide any quantitative sound level limits, the results of the evaluation were evaluated with respect to the NJDEP noise regulation.

4.0 ACOUSTICAL EVALUATION AND RECOMMENDATIONS

The evaluation of the sound pressure levels due to the operation of the proposed equipment was based on the manufacturers’ sound pressure level data for the typical restaurant mechanical equipment and drive-thru intercom systems. LSG&A calculated the expected sound pressure levels utilizing SoundPLAN 3D acoustical modeling software, using ISO Standard 9613-2 methodology. The acoustical model considered the propagation of sound over distance, the shielding and reflection of sound due to buildings, the effect of topography, and the effect of air absorption.

4.1 Intercom System

LSG&A recommends that the intercom system include automatic volume control (AVC) which restricts the output to 15 dB above the ambient sound level, such as those by HME. Based upon the measured ambient sound levels and typical sound levels from idling cars, LSG&A estimated the intercom loudspeakers to have a sound output of up to 74 dB(A) at 1 foot from each loudspeaker.

4.2 Rooftop HVAC

The following rooftop equipment and associated manufacturers' sound data was included in the acoustical model for each building, assumed to be located towards the middle of each roof. A 3 foot tall parapet was included for each roof.

- Two Rooftop Units (RTU) – 82 dB(A) sound power level
- Two Kitchen Exhaust Fans (KEF) – 76 dB(A) sound power level
- One Bathroom Exhaust Fan – 65 dB(A) sound power level

If louder equipment is selected, equipment is located toward the south of the roof, or a lower parapet is used, additional noise control measures may be required such as roof screening or equipment reselection with low-noise options.

5.0 RESULTS

Table 2, below, shows the expected A-weighted sound levels due to the simultaneous operation of the proposed mechanical equipment and the drive-thru intercom loudspeakers. The results are compared to the average ambient sound levels measured on site, and to the applicable limits of the NJDEP noise regulation.

Table 2 – Expected A-weighted Sound Levels due to Mechanical Equipment and Drive-Thru Intercoms, 470 Eagle Rock Avenue, West Orange, New Jersey.		
Location	Sound Level, dB(A)	
	Expected	Limit
1	43	50
2	48	50
3	47	50
Average Measured Ambient	Sound Level, dB(A)	
	52	

Figure 2, at the end of this letter, shows the expected octave band sound pressure levels at the nearest residential property lines due to the proposed mechanical equipment and intercom loudspeakers, compared to the applicable limits of the NJDEP noise regulation. The results of the evaluation indicate that the sound levels due to the mechanical equipment and intercom loudspeakers are expected to meet the applicable limits of the NJDEP noise regulation at the nearest property lines with the recommended maximum equipment sound levels.

Please note that all recommendations included in this report are acoustical in nature and should be reviewed by the appropriate licensed design professionals. Alternative products should be submitted for review. I trust that this information is sufficient for your present needs. Please call if you have any questions regarding this letter.

Very truly yours,

LEWIS S. GOODFRIEND & ASSOCIATES



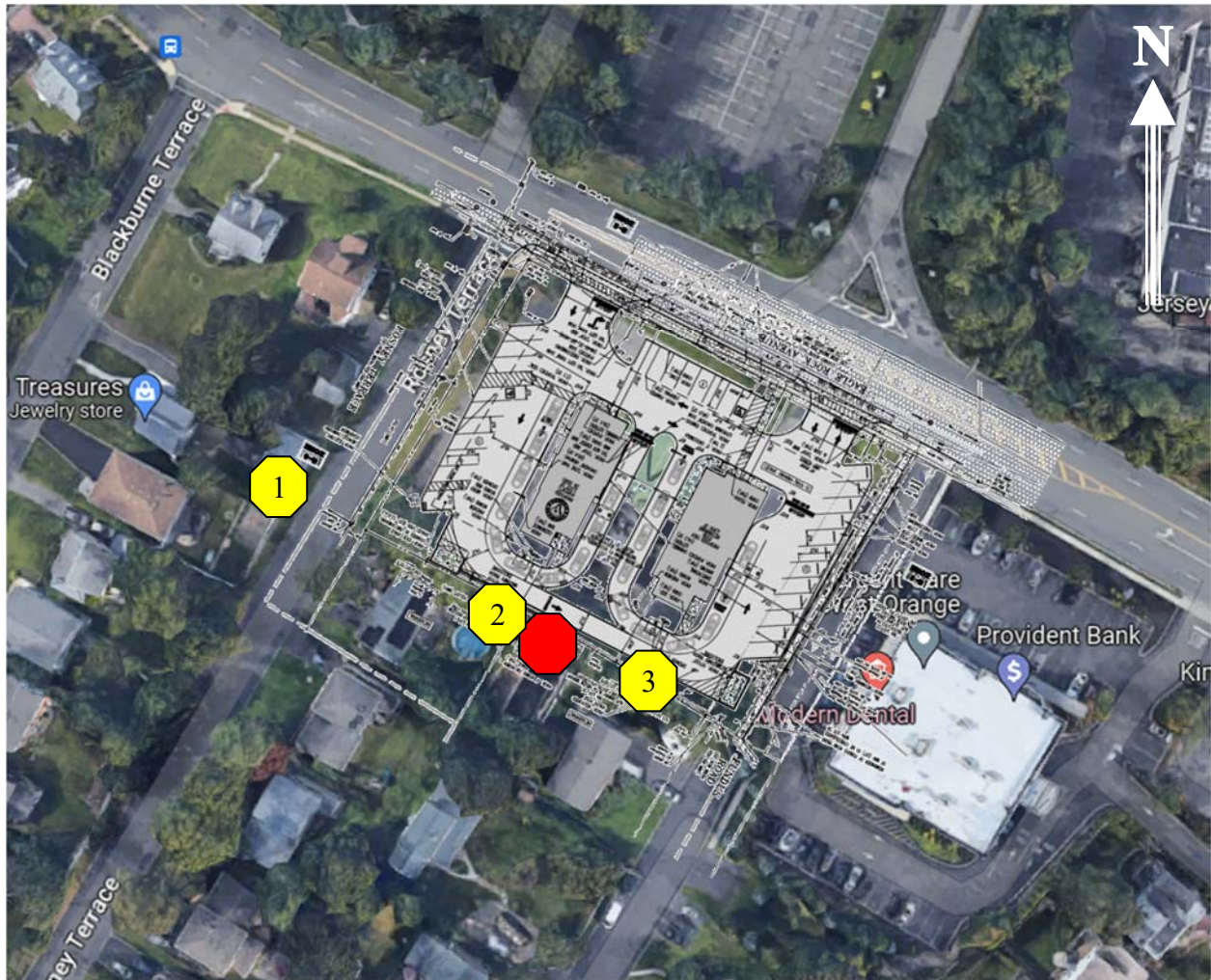
Michael J. Dick, INCE Bd. Cert.
Senior Engineer

MJD:mjd

Enclosures

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Figure 1 – Aerial View Showing the Proposed Site, Ambient Measurement Location, and Acoustical Evaluation Locations, 470 Eagle Rock Avenue, West Orange, New Jersey.



NOTES: All Locations Approximate
Not to Scale
Not for Construction

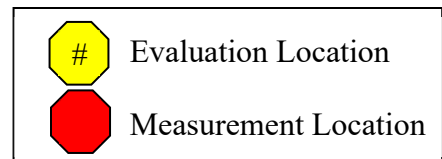


Figure 2 – Expected Sound Pressure Levels (Lp) due to Proposed Rooftop Mechanical Equipment and Intercom Loudspeakers, Compared to the Nighttime Residential Limits of the Noise Regulations, 470 Eagle Rock Avenue, West Orange, New Jersey.

