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10 February 2025

Mr. Ryan Curley
Town of Berlin Manager
240 Kensington Road
Berlin, CT 06037

RE: Bright Feeds Noise Compliance
Acoustic Evaluation Report

Dear Ryan,

SH Acoustics (SHA) is pleased to provide the findings of our acoustic evaluation of the Bright Feeds operations property located at 76 Fuller Way, Berlin, CT. It is our understanding that Bright Feeds was previously operating 24/7, causing multiple nearby residents to submit noise complaints, but has recently changed their operating hours to 7:30am – 7:30pm, Monday through Friday. The nearby residents have testified to hear low humming and pulsing noises coming from the Bright Feeds facility throughout the day and evening prior to this change.

SHA was retained by the Town of Berlin to perform a study on Bright Feeds' internal and external equipment to measure the noise impact on neighboring residential properties. The main goals of these measurements are to determine if the receiving noise level achieves objective noise code limits and to identify peak frequency tones that are not being attenuated by previously applied acoustic measures.

This report contains a summary of our analysis, our recommendations, and information on the relevant noise regulations, sound pressure levels of the equipment and more.

Executive Summary

SHA has found that the existing conditions of Bright Feeds' operating noise level, at the closest residential property line, is within the Town of Berlin Noise Ordinance; however, there are strong low frequency components that are not taken into account by the Town Ordinance that need to be addressed.

Town of Berlin Noise Ordinance

The exact limits of the noise ordinance depend on the class of the zone that the noise emitter and receiver are in. In this case, Bright Feeds would fall in

Class C Zone (Industrial) and the neighboring properties would fall in Class A Zone (Residential). Since the operation of Bright Feeds has changed to fall within Daytime code hours, Bright Feeds would not be required to meet the Nighttime Noise Regulations, as section 7-61 (Definitions) defines daytime as the hours between 7:00AM and 9:00PM.

Section 7-63 dictates: *No Person shall emit or cause to be emitted sound beyond the boundaries of his/her/its premises exceeding the levels stated in the table below and applicable to adjacent residential (Zone A), commercial measured on a receptor's premises:*

	Receptor			
	Class C	Class B	Class A (Day)	Class A (Night)
Class C Emitter to	70 dB(A)	66 dB(A)	61 dB(A)	51 dB(A)

Figure 2 – Berlin Municipal Code Book – Noise Ordinance, Class C Zone to Class A Zone

Berlin's Noise Ordinance is written in terms of A-weighted decibels (dBA). The A-weighted decibel is a common standard metric used to characterize noise. It weighs more heavily to frequencies in the middle of the human hearing range to replicate how the human ear perceived noise across the frequency spectrum. Since the human ear is less sensitive to lower and higher frequencies, dBA underestimates the decibel exposure by 20 to 30 decibels.

Testing Procedures

The live ambient and frequency dependent measurements were recorded by an Apple iPad Air running the RTA (Real Time Analyzer) and FFT (Fast Fourier Transform) modules of the Studio Six Digital AudioTools software, and an Earthworks QC2020 omnidirectional microphone with exterior rated windscreen. The system has been laboratory certified to be accurate according to a Type 1 classification and was calibrated before and after measurements using an IEC942 Class I NC9 Calibrator. Using this set up, we took measurements of four different sources at Bright Feeds, including a main drying unit, motor, and food filter systems inside the factory, as well as an exterior exhaust fan.

The closest residential property, 180 Christian Lane, is located approximately 1,400ft west of Bright Feeds. This is on the opposite side of the exterior exhaust fan. The other residential measurements were taken approximately 2,500ft southwest, 2,000ft east, and 3,200ft southeast of the facility.

On Site Observations

We began our evaluation at each measurement location by visually and aurally inspecting the site. From this inspection, we identified the following:

- Inside and outside Bright Feeds, significant vibrational transfer was seen, felt, and heard.
- The equipment installed in the Bright Feeds facility is generating substantial broadband noise with specific low frequency tonal components.
- At Bright Feeds' exterior exhaust fan, a current barrier seemed to be composed of a single layer of ½" plywood with old batt insulation filling some of the stud bays.

Figure 1: Exterior Exhaust 2-Sided Barrier

- One of the residential properties is within sight of both the Bright Feeds facility and a primary roadway (339 Worthington Ridge).
- There is consistent traffic and road noise from all residential areas.

Measurement and Analysis

Noise Ordinance Testing

Noise compliance in the Town of Berlin is dependent on the receiving noise level to the closest residential property line in dBA. The following data shows the overall noise levels of the facility compared to the received noise levels on each residential property line.

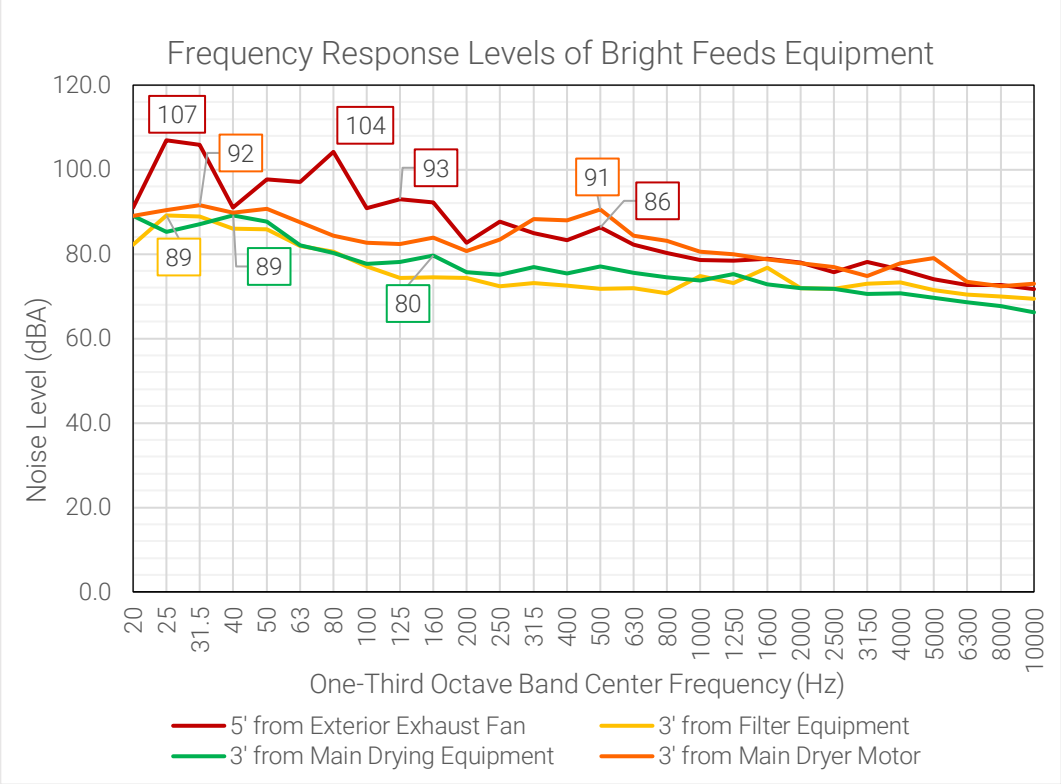
Measurement Location	Measured Noise Level (dBA)
Bright Feeds Interior Equipment	89 dBA
Bright Feeds Exterior Equipment	103 dBA
180 Christian Lane	55 dBA
339 Worthington Ridge	61 dBA
84 Juniper Lane	55 dBA
61 Massirio Drive	58 dBA
Ambient (facility non-operative)	45 dBA

From the data above, it is determined that Bright Feeds is within the Town of Berlin Daytime Noise Ordinance. Each of these properties are located within 700ft of a major roadway (Route 5 or Route 9), and traffic noise is audible at all locations. This road noise can act as sound masking for the output noise from the Bright Feeds Facility.

As stated previously, even though Bright Feeds is operating within Berlin's Noise Ordinance, there are specific audible and feelable low frequency components which can directly impact the surrounding neighborhoods.

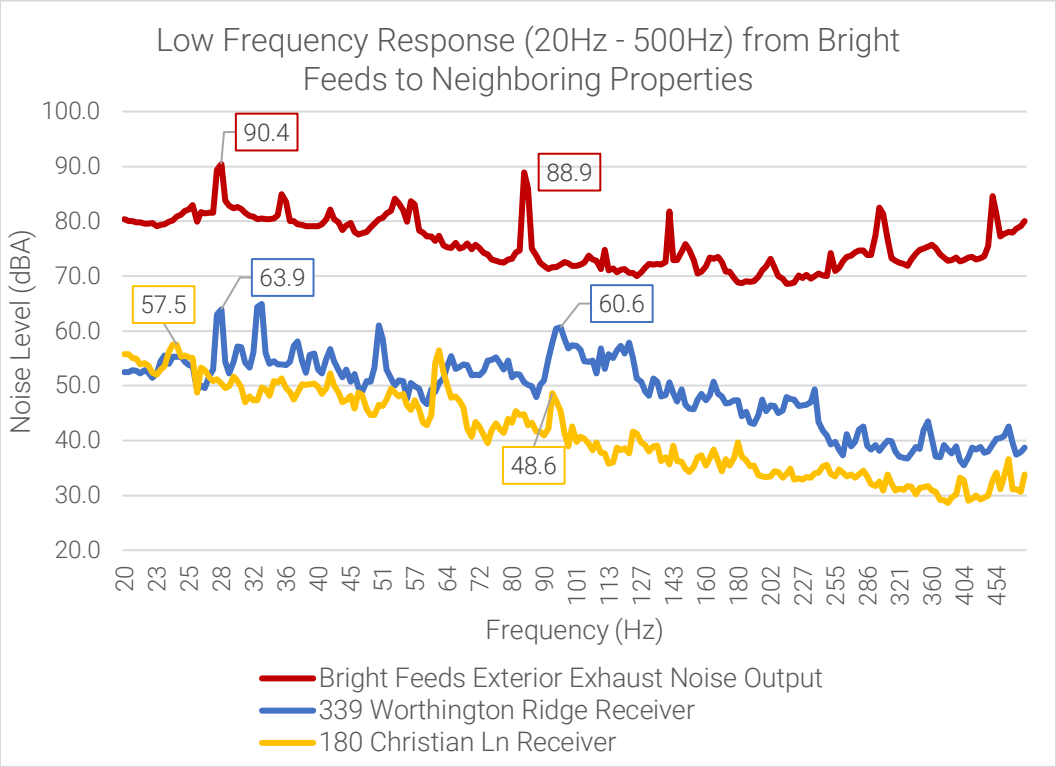
Frequency Spectrum Analysis

While at Bright Feeds, we took frequency-based measurements to evaluate all the equipment, individually. By analyzing the specific tonal output of each piece of equipment, we can rule out the indoor equipment sources and focus solely on the exterior exhaust fan and its tonal output as the primary factor affecting nearby residential properties.



The first graph, above, shows the overall peak level of the four pieces of equipment. The interior equipment, main drying unit, motor, and filter system equipment, are running relatively the same in the lower frequencies. A peak frequency is emitted by the main drying motor at 500Hz, but it is not a frequency that was transmitted to the neighboring properties (as seen in Graph 3, below). The exterior exhaust system is the loudest, producing specific tonal components in the low frequency range with peaks at 28Hz and 80 Hz.

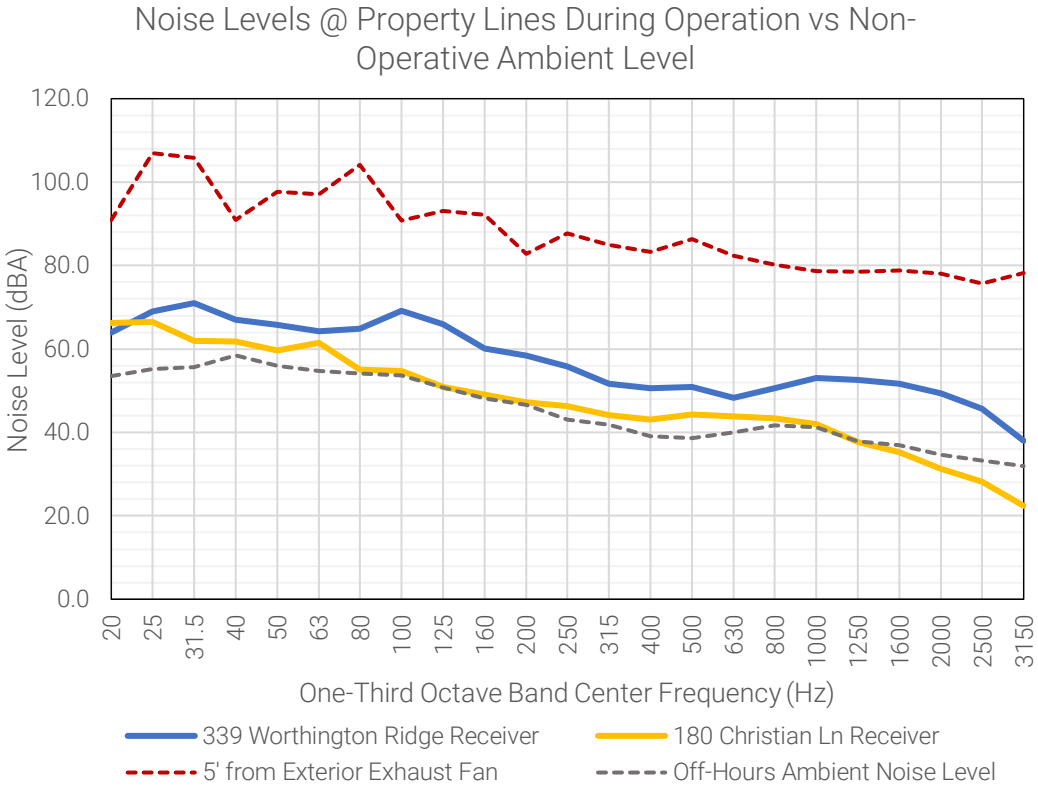
In the second graph, below, the lower frequencies have been accentuated and compared to the receiver levels at both the closest property line and 339 Worthington Ridge, where Bright Feeds is in direct line of sight. At 339 Worthington Ridge, the same 28Hz spike is evident from the exterior exhaust system. The 80Hz peak, however, was not measured at either 339 Worthington Ridge or 180 Christian Lane. Low frequency vibrations can travel far distances, especially through solid ground, and can be a contender for what the nearby residents are hearing, resonating their own homes. On both residential property lines, there was active traffic and wind noise that can contribute to low frequency noise, as seen from 98Hz spike, but the 28Hz peak is directly correlated to the machinery at Bright Feeds.



While on the surrounding properties, we were able to watch the change in frequency peaks when traffic would pass by, and the 28Hz peak remained present, even when there was no moving traffic. Car and truck tire-road noise occurs mainly in the frequency range of 100 – 300 Hz and 500 – 1200Hz.

To identify if the exterior exhaust fan was the main source of the problem frequencies, we compared its frequency spectrum noise levels to the receiving noise levels on neighboring properties when the equipment was operating, and the ambient noise level of Bright Feeds when was is not in operation.

During non-operational hours (after 8:30pm), the ambient measurement does not show a peak level at 28Hz, rather a smooth transition throughout the frequency spectrum. This concludes that Bright Feeds is emitting the peak frequency of 28Hz to neighboring residential properties.



Next Steps

Drawing on the insights from the testing results, a Phase 3 approach is proposed to address the acoustic tonalities systematically, taking into account effectiveness and cost considerations.

1. Have an experienced mechanical engineer/ repair company evaluate the exterior exhaust fan's operation and see if there is anything out of balance that is producing these uncommon tones. Verification testing will need to occur to determine that the 28Hz tone was diminished.

2. If adjustments do not eliminate the problem frequencies, define how the tones are getting out. Now that we know what the tones are, we can verify how they are transmitting to surrounding properties aside from through the air with additional vibration testing.

3. After this verification, work with Bright Feeds to develop an enclosure that can stop the sounds and vibrations, while not interfering with the performance of the unit. With frequencies this low, a simple barrier would not be effective by itself, especially with the potential for the

low frequencies to vibrate the ground, building, and then spreading from there.

4. If it is deemed a more cost-effective solution, evaluate a replacement unit that is well-balanced and will not produce the tones that are seen by this older unit in the first place.

We trust that you will find the information in this report to be useful. Should you have any questions or comments, please feel free to reach out to discuss with us.

Kind regards,

Tessa Wearne
Acoustic and Audio Consultant
SH Acoustics