Shiner Acoustics, LLC
Acoustical Engineers
225 W Washington St. - Suite 1625, Chicago, Illinois 60606
Phone 312 849 3340 Fax 312 849 3344 www.shineracoustics.com

BTB Energies
26413 W. South St.
Ingleside, IL 60041

September 14, 2023

Attn: Mr. Tony Grilo

Re: Bondville Solar Farm Noise Study
Bondville, IL

Dear Mr. Grilo:

The purpose of this report is to evaluate the noise impact of a proposed solar farm to be located at approximately 510 Chestnut Street in Bondville, IL based on sound level measurements conducted on site and analysis of the data.

The solar farm will occupy roughly 726,000 sqft. The nearest residential property is approximately 1000 feet east/northeast of the nearest noise generating equipment. There will be a data center located at the north end of the of the lot with a dry cooler south of the data center and one bank of inverters located among the solar panels in the middle-north area of the site. The expected noise from the site will be from the dry cooler and the inverter bank.

To evaluate the noise impact of the solar farm, we conducted a sound survey on the site to establish existing sound levels. We then created an acoustic model to predict the solar farm's sound levels at the nearby residential properties based on sound emanating from the equipment.

Criteria

Bondville is a village in Champaign County, Illinois which does not have a noise ordinance with numeric limits, but defers to state regulations. Our analysis and recommendations will be based on meeting the Illinois Pollution Control Board (IPCB) Noise Regulations for sound emitting from Class C land to Class A land during evening hours (10pm to 7am), which are the most stringent.

As part of our evaluation, we used data from the sound study to compare against the IPCB noise regulations to set a design goal for octave band sound levels. The design goal is set as the IPCB noise regulations or ambient sound levels, whichever is higher. The octave band levels of the noise regulations, ambient sound levels, and design goal are shown in Table 2 below.

Sound Survey

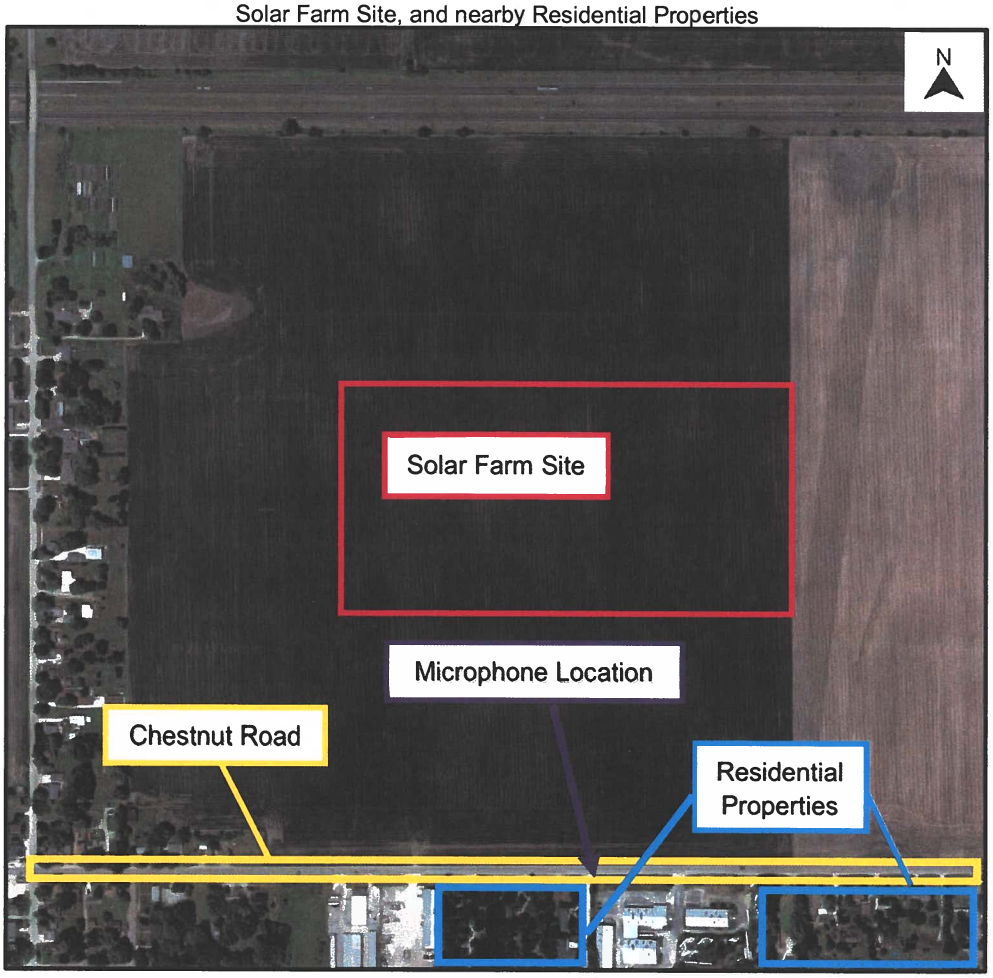
Long term acoustical measurements were conducted along Chestnut Road near one of the closer residential properties. The measurements ran from the morning of Tuesday 8/29/23 to the morning of Friday 9/1/23. An aerial photograph showing the approximate location of the sound level meter is shown in Figure 1.

The following instrumentation was used:

- Norsonic 140 sound analyzer
- Norsonic Nor 1209 preamplifier
- Norsonic Nor 1225 ½" condenser microphone
- Norsonic 1255 sound calibrator
- Microphone extension cable
- Microphone windscreen
- Tripod

The exterior microphone and preamplifier were connected to the analyzer. The microphone was protected with a windscreen and attached to the tripod, which was secured to a utility pole. The analyzer and battery were contained in a weathertight case. The sound level meter was calibrated before and after the measurements.

Figure 1
Aerial Photo Showing Microphone Location, Chestnut Road,
Solar Farm Site, and nearby Residential Properties



The analyzer was configured to measure A-weighted and one-third octave band sound pressure levels. Data were sampled continuously. The L_{eq} (time-average) spectrum and other statistics were stored for each hour and one-minute intervals. We used the data to calculate the average sound level (L_{eq}) for the entire measurement as well as for daytime (7:00 a.m. to 10:00

p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours. The average sound level for the whole measurement period was 68 dBA. The day/night sound level results are summarized in Table 1 below.

The primary source contributing to the measured sound levels at the site was traffic from Chestnut Road. A graph of the sound pressure levels over the duration of the study is shown in Figure 2.

Table 1
Results of Aug 31 – Sep 1, 2023 Acoustical Study
Day/Night Average Sound Levels, dB re 20μPa, A-weighted

Date	Day	Daytime L_{eq}, dBA	Nighttime L_{eq}, dBA
8/29/23*	Tue	69	
8/29/23 – 8/30/23	Tue – Wed		64
8/30/23	Wed	70	
8/30/23 – 8/31/23	Wed – Thur		64
8/31/23	Thur	69	
8/31/23 – 9/1/23	Thur – Fri		63
9/1/23*	Fri	70	

*Measurements did not include the full extent of "daytime" hours.

Figure 2
Measured Sound Levels (Leq) during
Measurement Period of 8/29/23 – 9/1/23

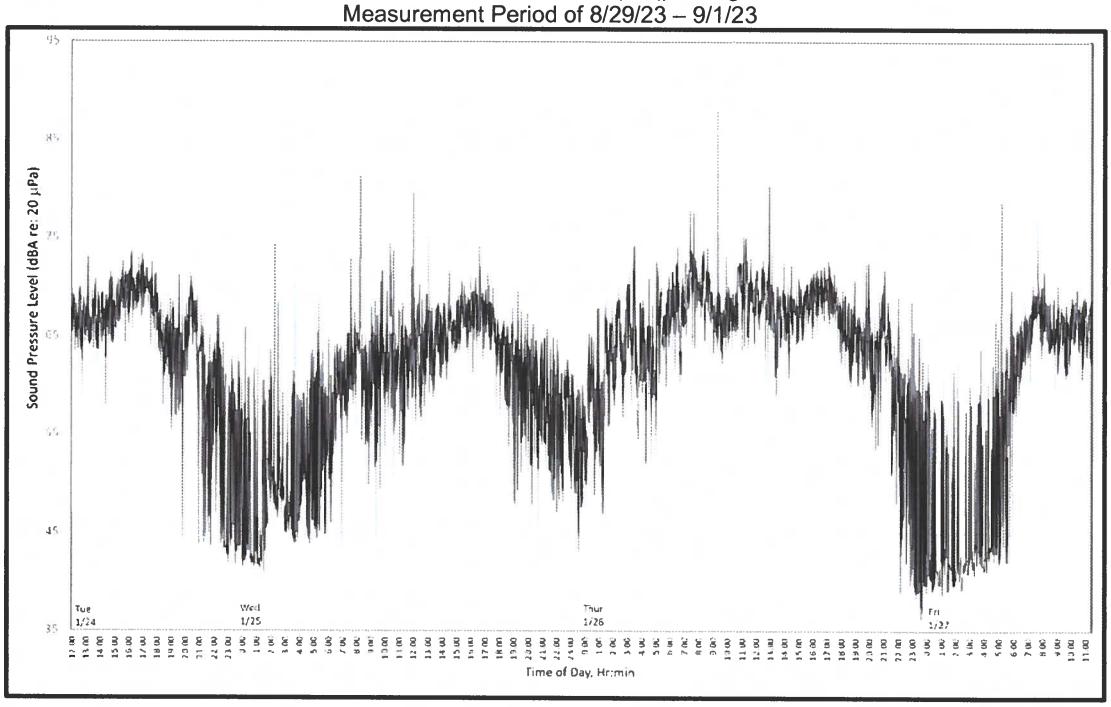


Table 2
IPCB Noise Regulations, Measured Ambient Sound Pressure Levels, and Sound Level Design Goal, dB re 20μPa

	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
IPCB Nighttime Class C to Class A Land	69	67	62	54	47	41	36	32	32	51
Site Ambient	55	61	63	59	58	60	54	50	39	63
Design Goal	69	67	63	59	58	60	54	50	39	63

The nighttime measurement period of 8/31/23 – 9/1/23 was selected for the site ambient levels in Table 2 because they were the lowest measured nighttime sound levels.

Modeling

We used CadnaA from DataKustik GmbH for our acoustic model. CadnaA is industry-accepted software used to calculate sound levels of multiple sources and propagation paths at multiple receiver points. The software considers the factors that influence sound propagation, such as distance, shielding by buildings, ground effect and atmospheric absorption, and source directivity.

The manufacturers of the proposed equipment were not able to provide octave band sound level data for the dry cooler or inverters. They were only able to provide an overall sound pressure level of 74 dBA for the dry cooler and 69 dBA for the inverters when measured at 1 meter from the equipment at nominal operating conditions. To evaluate octave band sound levels in our model for the equipment, we extrapolated the sound spectra from data that we have on file for a comparable pieces of equipment.

Figure 3 presents sound level contours superimposed on an aerial photograph of the site. The graphics show the predicted sound levels of the equipment of the solar farm. Sound levels at nearby residential properties shown are 6 feet above ground level. The predicted sound levels at the closest residential property are also summarized in Table 3 below.

Figure 3
CadnaA Model Aerial View of Bondville Solar Farm

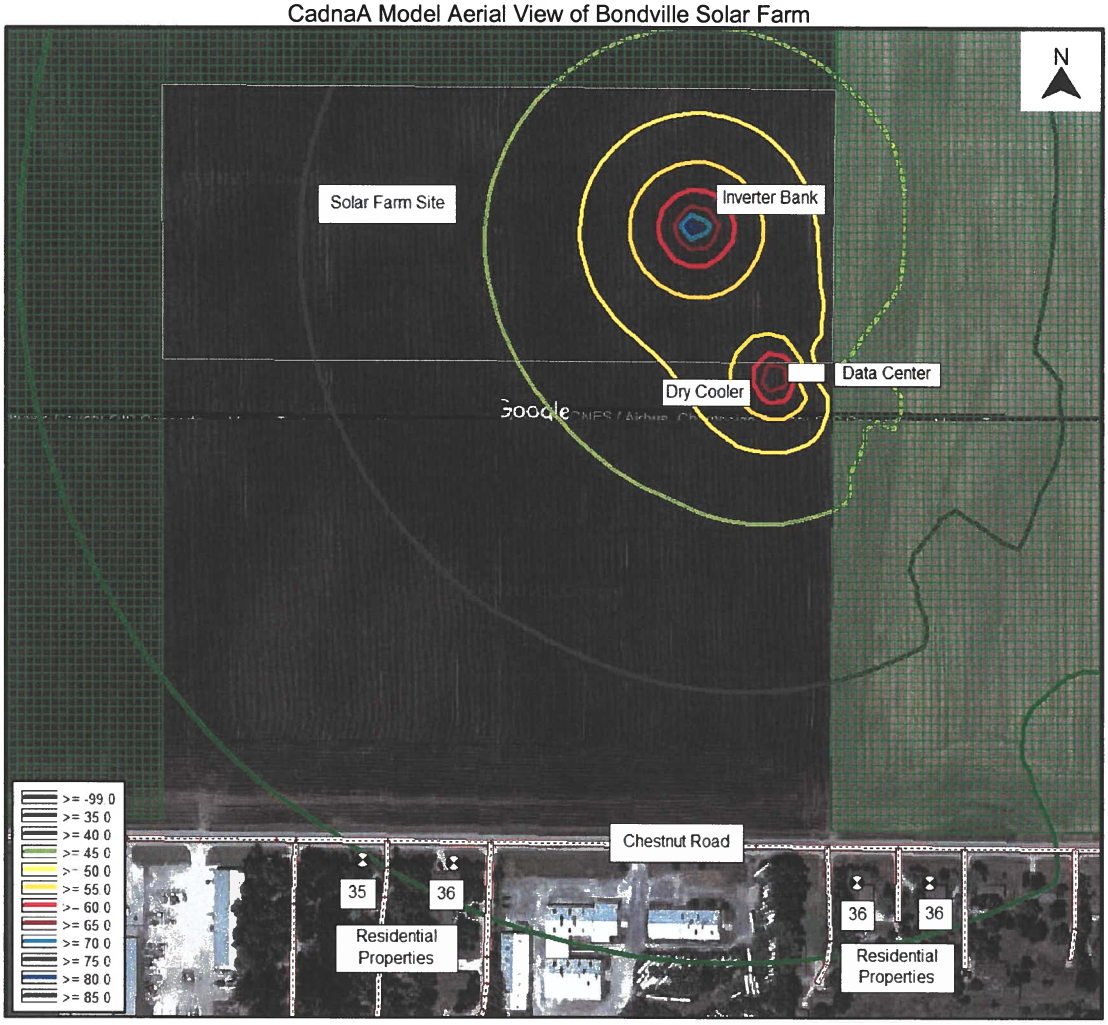


Table 3
Design Goal and Calculated Sound Levels at Adjacent Residential Property
From Solar Farm Noise Sources, dB re 20μPa

	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
IPCB Nighttime Class C to Class A Land	69	67	62	54	47	41	36	32	32	51
Design Goal	69	67	63	59	58	60	54	50	39	63
Calculated Adjacent Residential Property Line	27	39	44	29	29	33	28	17	10	36

Conclusion

Based on our model and calculations, the proposed solar farm would be expected to meet IPCB noise regulations at the nearby residential properties.

Note that if the noise generating equipment locations are changed and the equipment is located closer to the residential property, the solar farm may no longer meet the noise ordinance.

If you have questions concerning this report, please do not hesitate to contact us.

Respectfully submitted,

Shiner Acoustics, LLC

Ryan M Garner
RMG: 1230806