THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

SEC DOCKET NO. 2019-02

APPLICATION OF CHINOOK SOLAR, LLC FOR A CERTIFICATE OF SITE AND FACILITY FOR THE CHINOOK SOLAR PROJECT IN FITZWILLIAM, NEW HAMPSHIRE

PREFILED SUPPLEMENTAL TESTIMONY OF MARC C. WALLACE
ON BEHALF OF
CHINOOK SOLAR, LLC
August 31, 2020

Q. Please state your name and business address.

A. My name is Marc C. Wallace. My business address is Tech Environmental, 303 Wyman Street, Suite 295, Waltham, Massachusetts 02451.

Q. Who is your current employer and what position do you hold?

A. I am the Vice President of Tech Environmental. Tech Environmental is a company with over 30 years of experience addressing air quality and noise concerns in New England. Our staff is a mixture of scientists, engineers and technicians, many of whom hold advanced degrees in support of a specialized professional focus. Since 1984, Tech Environmental has provided expert air quality and sound services and studies in the form of hundreds of environmental impact statements, environmental notification forms, and environmental impact reports for commercial real estate development.

Q. Have you testified previously in this docket?

A. Yes. On October 18, 2019, I submitted pre-filed direct testimony which provided the Committee with the results of the Acoustic Study for the Project, which included both baseline sound monitoring and acoustic modeling of the Project's sound impacts. The

Sound Study was included as Appendix 16B to the Application.

Q. Since you filed your direct testimony in this docket is there any additional information relevant to your direct pre-filed testimony that you want to bring to the Committee's attention?

A. Yes. Since that time I have conducted additional sound monitoring and drafted an additional report at the direction of Chinook Solar, LLC. A copy of that report was provided to the Town of Fitzwilliam and Counsel for the Public on May 15, 2020 and it is included as Attachment A to this testimony. As a follow up to concerns expressed during the public information sessions and the public hearing in this docket, as well as conversations Chinook representatives had with parties to the docket, Chinook asked Tech Environmental to conduct some additional ambient baseline sound monitoring from different locations that could be helpful in determining whether there could be any subsequent sound impacts once the Project is completed and operating. This study included additional baseline sound monitoring performed along the northeastern property line of the Project site, near the electrical transmission line easement, and the approximate location of the proposed transformer. The monitoring measured current ambient conditions along the existing transmission lines, near the proposed transformer location, and near the closest residential receptors. The results of this additional study showed that existing ambient sound levels along the northeastern property line, near the electrical transmission line easement, were louder than the ambient sound condition Tech Environmental measured in May of 2019 near the center of the Project site. In combination with additional sound monitoring that may be done after the Project is built, this study will help in determining the acoustic impact of the Project and compliance with the Town and SEC sound limits. We submit that this additional study will give the Committee, the parties to the docket, the Applicant and the general public a more accurate basis for determining any future sound impacts resulting from the Project, should that become necessary.

Q. Have acoustic issues been the subject of negotiations with the Town of Fitzwilliam?

A. It is my understanding that Chinook and the Town have been discussing acoustic issues related to concerns about noise from the proposed transformer and construction noise and vibration. Those discussion resulted in Tech Environmental performing additional sound monitoring of a similar transformer at a similar NextEra solar farm. We performed sound source measurements of NextEra's Coolidge Solar PV substation transformer in Ludlow, Vermont. The goal of the sound level measurements was to estimate the total sound power of the transformer and compare them to the broadband and one-third octave band sound levels used in Tech's June 2019 sound study.

Tech updated our June 2019 acoustic model with the Coolidge Solar transformer sound power data and the revised modeling results reveal that sound impacts from the Chinook Solar Project will be imperceptible and will not generate tonal sound impacts at the nearest residences to the Project site. A copy of that report was provided to the Town of Fitzwilliam and Counsel for the Public on August 3, 2020 and it is included as Attachment B to this testimony. .

Tech also performed additional acoustic modeling for the Project to investigate the effectiveness of the following sound mitigation alternatives:

1. Replacing the proposed transformer with a quieter unit;

2. Installing a twelve (12) foot tall sound barrier wall around three (3) sides of the substation, including the transformer;

3. Installing a twelve (12) foot tall sound barrier wall with a cantilever top around three (3) sides of the substation, including the transformer, and

4. Installing a twenty five (25) foot tall sound barrier wall with a cantilever top around three (3) sides of the substation, including the transformer.

The results of the sound mitigation modeling demonstrate that installing a quieter transformer or installing sound barrier walls will likely not achieve a significant change in sound level impacts from the Project at residential uses compared to the modeling results in the June 2019 sound study. Furthermore, the Coolidge transformer acoustic modeling demonstrated that the sound levels are noticeably less than the manufacturer's NEMA rating. A copy of that report was provided to the Town of Fitzwilliam and Counsel for the Public on August 12 and 13, 2020 respectively, and it is included as Attachment C to this testimony.

It is also my understanding that Chinook provided a construction schedule and noise mitigation plan for the Project to address the concerns related construction noise and vibration.

Q. Does this conclude your supplemental testimony?

A. Yes.

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April 28, 2020

Mr. Dana Valleau
Environmental Specialist
TRC Environmental Corporation
6 Ashley Drive
Scarborough, Maine 04074

Re: Chinook Solar PV Farm, Fitzwilliam, NH – Additional Sound Monitoring Ref. 4447

Dear Dana:

This report presents the results of additional baseline sound monitoring collected along the northeastern site property line of the Chinook Solar PV Farm in Fitzwilliam, New Hampshire, including along the electrical transmission line easement. Those additional ambient sound levels were louder than those collected in May, 2019, and near the center of the site. The increase in sound levels along the northeastern site property line, including along the electrical transmission line easement, is likely due the close proximity to the transmission lines and/or more exposure to local traffic in the area.

THE DECIBEL SCALE FOR SOUND

All sounds originate with a source – a human voice, vehicles on a roadway, or an airplane overhead. The sound energy moves from the source to a person's ears as sound waves, which are minute variations of air pressure. The loudness of a sound depends on the measured sound pressure level, which has units of decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. On this scale, the quietest sound we can hear is 0 dB, while the loudest is 120 dB. Every 10-dB increase is perceived as a doubling of loudness. Most sounds we hear in our daily lives have sound pressure levels in the range of 30 dB to 90 dB.

Community noise studies and regulations use an A-weighting scale (dBA) when measuring sound pressure levels as this approximates the response of the human ear to sounds, we experience in everyday life. Typical sound levels associated with various activities and environments are presented in **Figure 1**. Here are examples of sound levels we all encounter. A quiet suburban area at night without any traffic typically has an average sound level of 40 to 45 dBA. The freight train you hear in the distance may be 50 dBA, and crickets and tree frogs in the summer sing a sound level of 55 dBA. Two people having a conversation in a normal tone of voice will hear each other speak at 65 dBA. Standing near a road, a car passing by can produce 75 dBA, and a truck passing by is louder at 80 dBA.

There are various measures of sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. The L_{10} metric, which is the sound level exceeded 10 percent of the time is

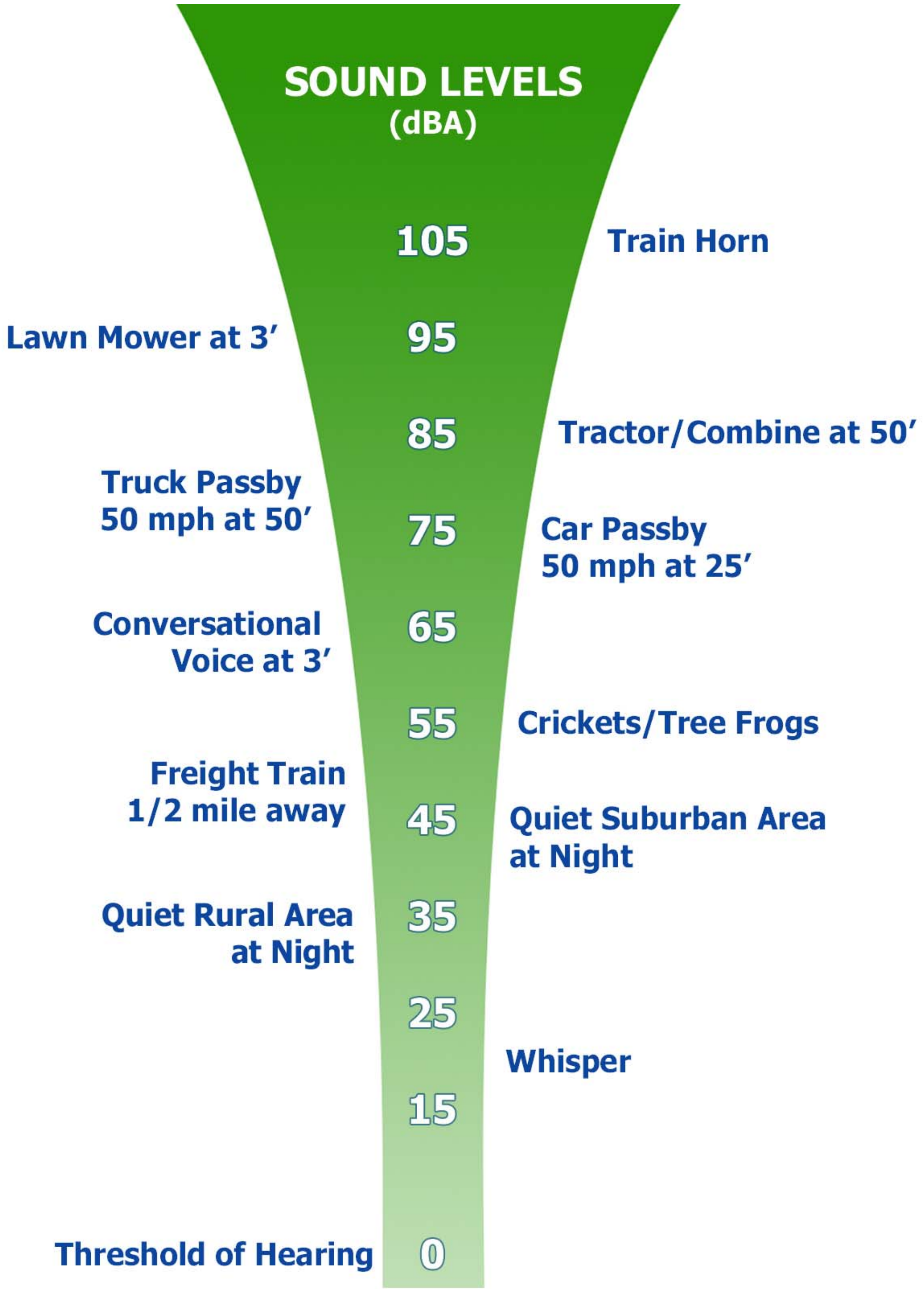

FIGURE 1.
Common Outdoor Sound Levels

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typically used to assess transient noise highway or rail activities. The L_{eq}, or equivalent sound level, is the steady-state sound level over a period of time that has the same acoustic energy as the fluctuating sounds that actually occurred during that same period. It is commonly referred to as the average sound level. The L_{max}, or maximum sound level, represents the one second peak level experienced during a given time period. These are a broadband sound pressure measure, i.e., it includes sounds at all frequencies.

Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines eleven octave bands from 16 to 16,000 Hz.

APPLICABLE NOISE REGULATIONS

New Hampshire Site Evaluation Committee

The New Hampshire Site Evaluation Committee (NHSEC), Chapter Site 300 Certificates of Site and Facility, Part 301.08(d) for all energy facilities, except for wind energy facilities, requires that the SEC application include "an assessment of operational sound associated with the proposed facility, if the facility would involve use of equipment that might reasonably be expected to increase sound by 10 decibel A-weighted (dBA) or more over background levels, measured at the L_{90} sound level, at the property boundary of the proposed facility site or, in the case of an electric transmission line or an energy transmission pipeline, at the edge of the right-of-way or the edge of the property boundary if the proposed facility, or portion thereof, will be located on land owned, leased or otherwise controlled by the applicant or an affiliate of the applicant."

Town of Fitzwilliam

Under the Town of Fitzwilliam Zoning Code, Commercial and Industrial Noise – Chapter 130, the Town has established a maximum allowable incremental noise increases of 10 dBA above ambient. Daytime is defined as 7:00 AM to 10:00 PM and nighttime is defined as 10:00 PM to 7:00 AM. The Town sound limits are applicable to the L_{10} sound metric. The applicable daytime background one-hour L_{90} sound levels are 30 dBA for Rural Residential Districts and 38 dBA for Town Center; thus, the maximum allowable one-hour L_{10} noise limit is 40 dBA and 48 dBA respectively. The applicable nighttime background one-hour L_{90} sound levels are 24 dBA for Rural Residential Districts and 25 dBA for Town Center; thus, the maximum allowable one-hour L_{10} noise limit is 34 dBA and 35 dBA respectively.

These noise limits may also be lowered by up to 5 dBA if the source is producing either a tonal, low frequency or infrasound sounds. These penalties are cumulative up to a maximum of 10 dBA. The ordinance also allows for the developer to perform 24-hour baseline monitoring to establish the lowest daytime and nighttime ambient L_{90} values.

Since both the New Hampshire Site Evaluation Committee and Town of Fitzwilliam noise ordinance sound limits are based on ambient L_{90} baseline level + 10 dBA, ambient sound monitoring was performed for the Project in May 2019, and additional ambient sound monitoring is presented herein.

ADDITIONAL AMBIENT SOUND MONITORING AND RESULTS

Tech set up a long-term sound analyzer and a weather station to collect an additional 24-hours of unattended ambient sound monitoring and meteorological data in the approximate location of the transformer. **Figure 2** shows the layout plan for the Project, the ambient monitoring location from May of 2019, and the additional long term ambient monitoring location in the approximate location of the transformer. Tech also performed 20-minute spot measurements at five (5) locations along the northern property line where the electrical transmission line easement is located, as shown in **Figure 2**.

Tech collected hourly sound measurements at the long term meter location, the approximate location of the transformer, over a more than 24-hour period starting from 12:00 PM on Wednesday, April 22, 2020 and ending at 4:00 PM on Thursday, April 23, 2020. Weather conditions were favorable for ambient monitoring with partly cloudy skies, light winds (0 to 5 mph) and temperatures ranged from 22°F to 54°F. As described above, the Fitzwilliam noise ordinance defines daytime as 7:00 AM to 10:00 PM and nighttime as 10:00 PM to 7:00 AM.

The lowest daytime L_{90} sound level measured was 29 dBA, which was measured during the 12:00 PM hour on Thursday, April 23, 2020. The lowest nighttime L_{90} sound level was 24 dBA, which was measured during the 4:00 AM hour on Thursday, April 23, 2020. **Table 1** presents a summary of the hourly sound measurements measured at the approximate location of the transformer. There were tonal sounds measured during the daytime and nighttime quietest hours centered about the 250 Hz and 315 Hz one-third octave bands. Tech observed during equipment set-up and collection that the additional ambient sound conditions were dominated by motor vehicles on the surrounding local roads.

Tech also collected 20-minute sound measurements at five (5) locations along the transmission line easement on the afternoon of Thursday, April 23, 2020. **Table 2** presents a summary of the lowest L_{90} sound level measured at each of those locations. The lowest L_{90} sound level out of the five (5) locations was 27 dBA which was measured at Location #5. Slight tonal sounds were measured at Location #1 and at Location #2 centered about the 630 Hz and 800 Hz one-third octave bands. Tech observed that the sound conditions were dominated by motor vehicles on the surrounding local roads. Tech also noted that the humming of the electrical transmission lines were audible at Location #5.

All sound level measurements were collected using a Larson Davis 831 real-time sound level analyzer. The Larson Davis 831 is equipped with a ½” precision condenser microphone and has an operating range of 5 dB to 140 dB and an overall frequency range of 3.5 Hz to 20,000 Hz. The sound analyzer was mounted at an elevation of five feet with a windscreen. This ANSI Type 1 (high precision) sound analyzer was programmed to measure continuous real-time peak (L_{max}), average (L_{eq}), background level (L_{90}), higher transient levels (L_{10}), and one-third octave bands, and measurements throughout the monitoring period. At the end of the monitoring periods, Tech collected the sound analyzers and downloaded the data for analysis.

Meteorological data (temperature, wind speed and direction and relative humidity) was collected using a Davis Vantage Pro2 weather station. The weather station was mounted on an environmental tripod and setup adjacent to the sound analyzer at the same height as the sound analyzer microphone. The weather station was programmed to collect 10-minute measurements.

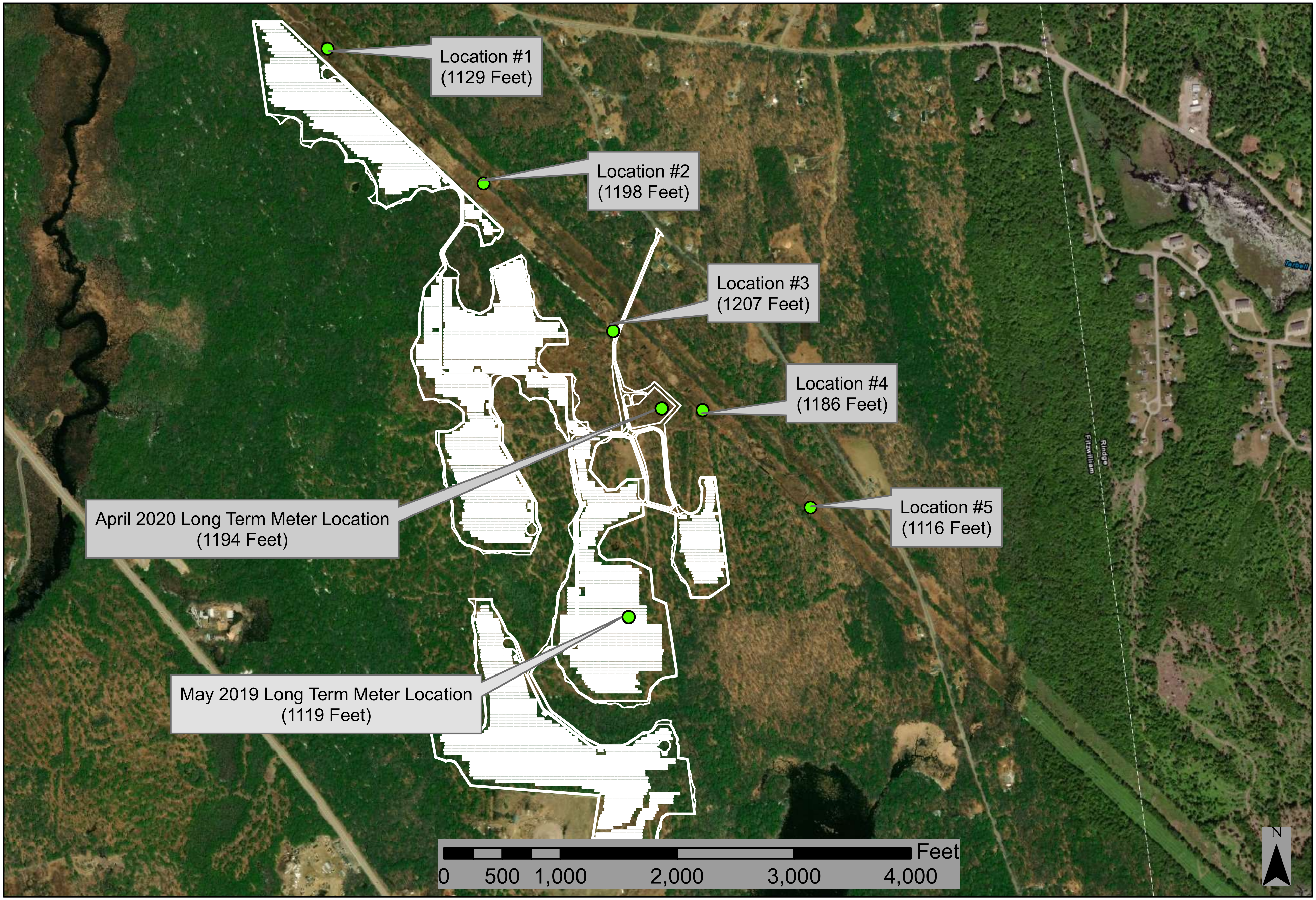

FIGURE 2.
Sound Monitoring Locations
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

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TABLE 1

ADDITIONAL AMBIENT SOUND LEVEL MEASUREMENTS (dBA)
AT THE TRANSFORMER LOCATION
Wednesday, April 22 and Thursday, April 23, 2020

Date	Start Time	L_{90}	L_{eq}	L_{max}
Wednesday 22-Apr	12:00 PM	47	52	61
	1:00 PM	45	51	64
	2:00 PM	43	49	59
	3:00 PM	45	50	61
	4:00 PM	43	51	64
	5:00 PM	43	49	65
	6:00 PM	39	44	60
	7:00 PM	39	45	55
	8:00 PM	39	44	61
	9:00 PM	37	42	55
	10:00 PM	37	46	73
	11:00 PM	32	38	50
	12:00 AM	36	41	55
	1:00 AM	33	38	49
	2:00 AM	29	34	47
	3:00 AM	25	32	44
Thursday 23-Apr	4:00 AM	24**	32	44
	5:00 AM	25	31	43
	6:00 AM	29	34	48
	7:00 AM	33	37	47
	8:00 AM	32	38	56
	9:00 AM	33	39	57
	10:00 AM	33	39	53
	11:00 AM	29	37	58
	12:00 PM	29*	36	52
	1:00 PM	32	37	52
	2:00 PM	30	36	49
	3:00 PM	32	61	95

*Lowest daytime L_{90} level.
**Lowest nighttime L_{90} level.

TABLE 2

SUMMARY OF SHORT-TERM SOUND LEVEL MEASUREMENTS (dBA)
ALONG THE TRANSMISSION LINE EASEMENT
Thursday, April 23, 2020

Measurement Location	Time	L_{90}
Location #1	2:31 PM -2:51 PM	33
Location #2	1:57 PM -2:17 PM	30
Location #3	1:22 PM -1:42 PM	28
Location #4	12:48 PM -1:08 PM	34
Location #5	12:00 PM -12:20 PM	27

The additional ambient sound measurements collected along the northeastern property line, and near the electrical transmission line easement, included some tonal sounds. For comparison, the ambient sound measurements collected in May 2019 had a lowest daytime L_{90} sound level of 23 dBA, which was measured during the 9:00 PM hour. The lowest nighttime L_{90} sound level in May 20219 was 20 dBA, and was measured during the 12:00 AM hour. Those measurements included no tonal sounds.

The lowest daytime L_{90} for the additional ambient sound measurements was 6 dBA louder than the lowest daytime ambient sound measurements collected in May 2019. And, the lowest nighttime daytime L_{90} for the additional ambient sound measurements was 4 dBA louder than the lowest nighttime ambient sound measurements taken in May 2019. The presence of tonal sounds in the additional ambient sound measurements are likely due to the increased proximity to the electrical transmission lines and/or more exposure to local roadways.

CONCLUSIONS

Additional ambient sound measurements were collected for the Chinook Solar PV Farm in Fitzwilliam, New Hampshire. The results showed that the ambient sound levels along the northeastern property line, and near the electrical transmission line easement, were louder than the ambient sound conditions Tech measured in May 2019 near the center of the site. This deviation is likely due to the close proximity to the transmission lines and/or the increased exposure to the surrounding local traffic.

Please call if you have any questions regarding this report.

Sincerely,

TECH ENVIRONMENTAL, INC.

Marc C. Wallace

Marc C. Wallace, QEP, INCE
Vice President
4447/ Additional Sound Monitoring Report April 28 2020

July 31, 2020

Mr. Dana Valleau
Environmental Specialist
Environmental Corporation
6 Ashley Drive
Scarborough, Maine 04074

Re: Coolidge Solar PV Farm, Ludlow, VT – Transformer Sound Monitoring ***Ref. 4447***

Dear Dana:

Tech Environmental, Inc. (Tech) performed sound source measurements of NextEra's Coolidge Solar PV substation transformer in Ludlow, Vermont. Tech visited the Coolidge Solar PV farm (herein referred to as Coolidge Solar) on Barker Road in Ludlow, Vermont to collect sound measurements of the substation transformer. It is our understanding that the Coolidge transformer is a similar model as to the one proposed for Chinook Solar. The goal of the sound level measurements was to estimate the total sound power of the transformer via the ISO 3746 standard[1] for the determination of sound power through near-field measurements and compare them to the broadband and one-third octave band sound levels used in Tech's June 2019 sound study.

Tech updated our June 2019 acoustic model with the Coolidge Solar transformer sound power data and the revised modeling results reveal that sound impacts from the Chinook Solar project will be imperceptible and will not generate tonal sound impacts at the nearest residences to the project site.

Coolidge Solar Transformer Sound Measurements

Tech visited the Coolidge Solar PV farm on Barker Road in Ludlow, Vermont to collect sound measurements of the substation transformer on Wednesday, July 29. It is our understanding that the Coolidge Solar transformer is a similar model as to the one proposed for Chinook Solar. The Coolidge Solar unit is a Hyundai Power Transformer with a rated sound level of 65.6/66.1 dBA at 18/24 MVA. The goal of the sound level measurements was to estimate the total sound power of the transformer via the ISO 3746 standard for the determination of sound power via near-field measurements. The site's power production was mostly steady at 19.5 MVA for the duration of the sound level measurements. Skies were clear and sunny, temperatures were between 80^{o}F and 83^{o}F, and winds were light (i.e. less than 10 mph). All of the measured sound levels presented here include full operation of the transformer's radiator cooling fans.

Tech's acoustic engineers used a Larson Davis 831 Type 1 sound analyzer to collect both broadband A-weighted sound levels and unweighted one-third octave band sound levels. Tech collected twenty-four

[1] ISO 3746:2010 Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane, December 1, 2010.

Address: 303 Wyman Street, Suite 295 | Waltham, MA 02451 | Phone: 781-890-2220 | Fax: 781-890-9451 | Website: www.techenv.com

(24) near-field sound level measurements, three (3) feet from the transformer in all directions, and at heights of four (4) feet and eight (8) feet above grade. The measured sound levels ranged from 55 dBA to 63 dBA (L_{90})[2], and were an average of 60 dBA. We also collected a sound level reading of the ambient L_{90} to be 37 dBA, which is appropriate for a rural area in the middle of the day. The ambient background measurement was later used to subtract the influence of other sources of sound from the measured transformer sound levels.

Tech downloaded the data at our office and analyzed the results. We calculated the total sound power level of the Coolidge Solar transformer to be 75 dBA from the average of the sound level measurements, and utilizing the dimensions of the Coolidge Solar transformer, via the ISO 3746 method. This sound power level is 18 dBA less than what was assumed for the acoustic study conducted for the Chinook Solar PV Farm in Fitzwilliam, New Hampshire (i.e. 93 dBA). Figure 1 presents the sound power one-third octave band spectrums from the Coolidge Solar transformer sound measurements (in blue), and those estimated for the Chinook Solar acoustic study (in orange). It is worth noting that the sound power spectrum developed for the Chinook Solar was based upon a sound rating of 75 dBA, the Coolidge Solar transformer has a peak sound rating of 66 dBA.

Updated Acoustic Model

Tech updated the acoustic model used in the June 2019 sound study by replacing the transformer sound data in model with the Coolidge Solar transformer sound levels presented in Figure 1 above. The result of updating our June 2019 acoustic model with the Coolidge Solar transformer sound power levels reveals that the predicted sound level increases at the closest residential receptors on Fullam Hill Road are now 0 dBA at night with only the transformer operating and 1 to 2 dBA during the day with both the transformer and inverters operating simultaneously (see Table 1 below). These sound level increases are imperceptible. The June 2019 study showed predicted sound level increases in the noticeable range of 5 to 6 dBA at the closest receptors on Fullam Hill Road. Also noteworthy, there are no tonal sounds predicted at the closest receptors based on the Coolidge Solar transformer sound data.

L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period.

Please call if you have any questions regarding this report.

Sincerely yours,

TECH ENVIRONMENTAL, INC.

Marc C. Wallace

Marc C. Wallace, QEP, INCE
Vice President
4447/Ludlow Transformer Sound Report 073120

[2] L_{90} is the sound level exceeded 90 percent of the time representing the quietest 10 percent of any time period.

FIGURE 1

COMPARISON OF THE COOLIDGE SOLAR TRANSFORMER AND PROPOSED CHINOOK SOLAR ONE-THIRD OCTAVE BAND SOUND LEVELS (dBA)

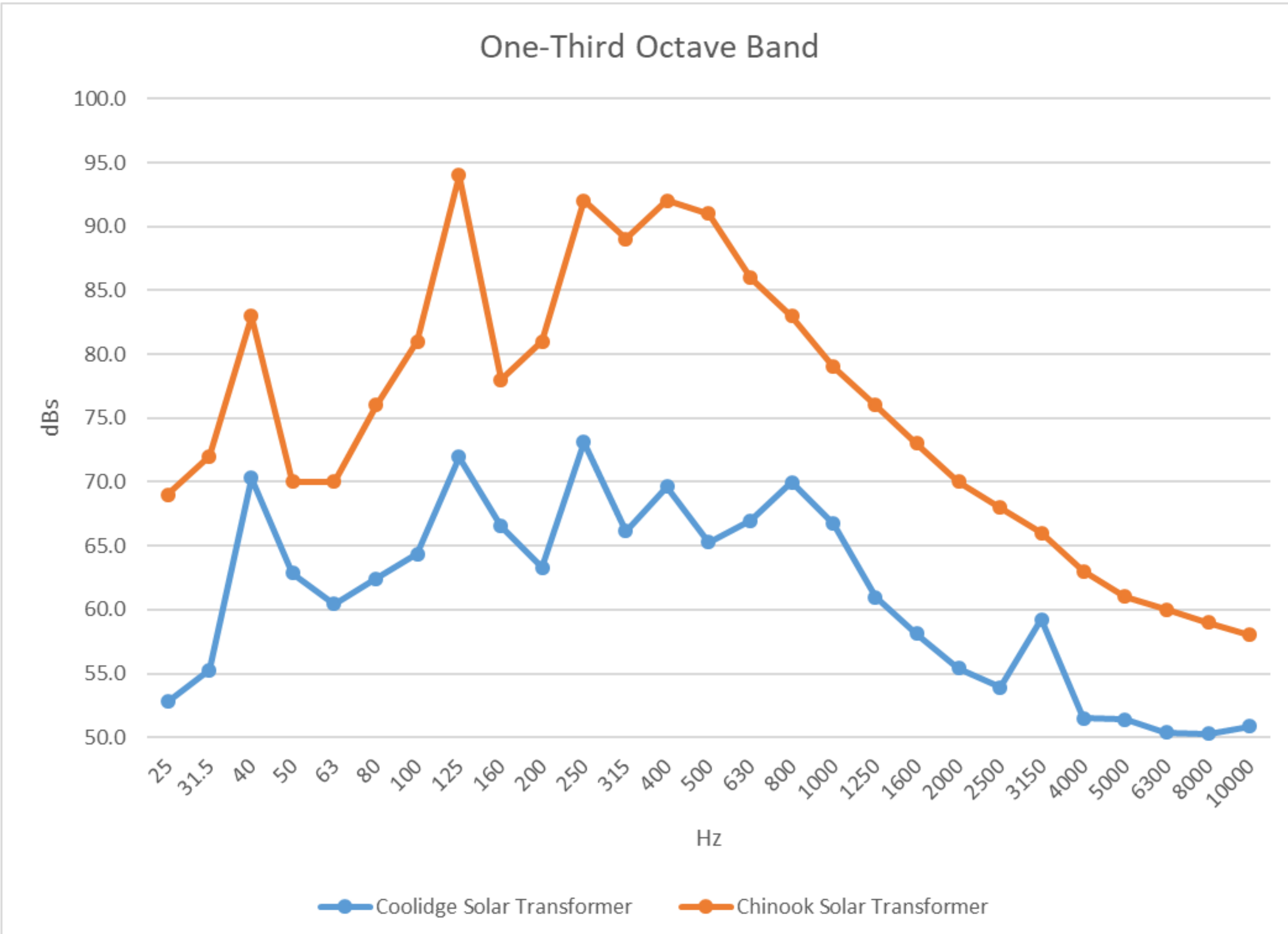

TABLE 1

UPDATED PREDICTED SOUND LEVELS AT NEARBY RESIDENCES FROM THE CHINOOK SOLAR PROJECT AT PREDICTED SOUND LEVEL

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
1	10 Crane Road	15	0	23	20	24	20	1	0
2	3 Crane Road	16	0	23	20	24	20	1	0
3	19 Crane Road	16	0	23	20	24	20	1	0
4	35 Crane Road	19	0	23	20	24	20	1	0
5	532 Rt 12 S	14	0	23	20	23	20	1	0
6	549 Rt 12 S	13	0	23	20	23	20	0	0
7	550 Rt 12 S	13	0	23	20	23	20	0	0
8	444 Fullam Hill Road	9	0	23	20	23	20	0	0
9	423 Fullam Hill Road	9	0	23	20	23	20	0	0
10	414 Fullam Hill Road	11	0	23	20	23	20	0	0
11	391 Fullam Hill Road	10	0	23	20	23	20	0	0
12	364 Fullam Hill Road	12	0	23	20	23	20	0	0
13	309 Fullam Hill Road	13	0	23	20	23	20	0	0
14	307 Fullam Hill Road	13	0	23	20	23	20	0	0
15	277 Fullam Hill Road	13	0	23	20	23	20	0	0
16	264 Fullam Hill Road	13	0	23	20	23	20	0	0
17	199 Fullam Hill Road	17	0	23	20	24	20	1	0
18	161 Fullam Hill Road	18	4	23	20	24	20	1	0
19	123 Fullam Hill Road	17	4	23	20	24	20	1	0
20	106 Fullam Hill Road	19	6	23	20	24	20	1	0
21	99 Fullam Hill Road	18	4	23	20	24	20	1	0
22	94 Fullam Hill Road	19	5	23	20	24	20	2	0
23	85 Fullam Hill Road	18	2	23	20	24	20	1	0
24	88 Fullam Hill Road	20	4	23	20	25	20	2	0
25	73 Fullam Hill Road	18	1	23	20	24	20	1	0
26	68 Fullam Hill Road	20	2	23	20	24	20	2	0

TABLE 1 (CONT.)

UPDATED PREDICTED SOUND LEVELS AT NEARBY RESIDENCES FROM THE CHINOOK SOLAR PROJECT AT PREDICTED SOUND LEVEL

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
27	64 Fullam Hill Road	19	0	23	20	24	20	1	0
28	45 Fullam Hill Road	18	0	23	20	24	20	1	0
29	33 Fullam Hill Road	17	0	23	20	24	20	1	0
30	23 Fullam Hill Road	17	0	23	20	24	20	1	0
31	484 RT 119 E	10	0	23	20	23	20	0	0
32	468 RT 119 E	12	0	23	20	23	20	0	0
33	462 RT 119 E	13	0	23	20	23	20	0	0
34	450 RT 119 E	14	0	23	20	23	20	1	0
35	432 RT 119 E	15	0	23	20	23	20	1	0
36	406 RT 1119 E	16	0	23	20	24	20	1	0
37	377 RT 1119 E	16	0	23	20	24	20	1	0
38	347 RT 1119 E	14	0	23	20	23	20	1	0
39	334 RT 119 E	20	0	23	20	25	20	2	0
40	327 RT 119 E	17	0	23	20	24	20	1	0
41	328 RT 119 E	18	0	23	20	24	20	1	0
42	310 RT 119 E	16	0	23	20	24	20	1	0
43	269 RT 1119 E	12	0	23	20	23	20	0	0
44	253 RT 1119 E	12	0	23	20	23	20	0	0
45	224 RT 1119 E	12	0	23	20	23	20	0	0
46	6 Phillips CT	11	0	23	20	23	20	0	0
47	14 Phillips CT	12	0	23	20	23	20	0	0
48	206 RT 1119 E	11	0	23	20	23	20	0	0
49	15 Doyle CT	11	0	23	20	23	20	0	0
50	5 Doyle CT	10	0	23	20	23	20	0	0
51	18 Doyle CT	11	0	23	20	23	20	0	0
52*	126 Fullam Hill Road	19	9	23	20	24	20	1	0

* Nearest residential receptor added after the June 2019 sound study.

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August 12, 2020

Mr. Dana Valleau
Environmental Specialist
TRC Environmental Corporation
6 Ashley Drive
Scarborough, Maine 04074

Re: Chinook Solar PV Farm, Fitzwilliam, NH – Sound Mitigation Study ***Ref. 4447***

Dear Dana:

This report presents the results of additional acoustic modeling of sound mitigation alternatives for the Chinook Solar PV Farm in Fitzwilliam, NH (herein referred to as the Project). Acoustic modeling conducted for the initial acoustic sound study (the Sound Study) determined that the Project, as proposed, will comply with both the New Hampshire Site Evaluation Committee and Town of Fitzwilliam noise ordinance incremental sound limits[1]. Additional existing baseline ambient sound monitoring (Additional Sound Monitoring) collected along the Project's northeastern site property line was louder than the existing baseline ambient sound monitoring collected for the initial Sound Study near the center of the site, and further from the electrical transmission line easement and local traffic in the area[2]. And, sound source measurements of NextEra's Coolidge Solar PV substation transformer in Ludlow, Vermont (Transformer Sound Monitoring), determined that transformer is significantly quieter than the transformer assumed for the Sound Study[3].

Tech Environmental (Tech) has performed additional acoustic modeling for the Project to investigate the effectiveness of the following sound mitigation alternatives:

1. Replacing the proposed transformer, which has a projected National Electrical Manufacturers Association (NEMA) sound level rating of 75 decibels (dBA), with a transformer having a projected NEMA sound rating of 65 dBA;
2. Installing a sound barrier wall around three (3) sides of the substation, including the transformer, that is twelve (12) feet tall, and 700 feet long;
3. Installing a sound barrier wall around three (3) sides of the substation, including the transformer, that is twelve (12) feet tall, 700 feet long, and with a cantilever top extending towards the substation to increase sound mitigation; and

[1] Tech Environmental, "Chinook Solar PV Farm, Fitzwilliam, NH – Acoustic Study Report" Received by Mr. Dana Valleau, TRC Environmental Corporation, June 28, 2018.
[2] Tech Environmental, "Chinook Solar PV Farm, Fitzwilliam, NH – Additional Sound Monitoring" Received by Mr. Dana Valleau, TRC Environmental Corporation, April 28, 2020.
[3] Tech Environmental, "Coolidge Solar PV Farm, Ludlow, VT – Transformer Sound Monitoring" Received by Mr. Dana Valleau, TRC Environmental Corporation, July 31, 2020.

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4. Installing a sound barrier wall around three (3) sides of the substation, including the transformer, that is twenty-five (25) feet tall, and 700 feet long.

SUMMARY OF RESULTS

The results of the additional acoustic modeling demonstrate that the sound mitigation alternatives presented above could reduce the total predicted sound levels at the fifty-two (52) nearest residential uses by 0 to 6 dBA, assuming that existing baseline ambient sound levels are equivalent to those assumed for the initial Sound Study[4]. Those lowest existing baseline ambient sound levels were 23 dBA during the day, and 20 dBA at night. The results of the additional acoustic modeling, assuming existing baseline ambient sound levels from the initial Sound Study, are summarized in **Table 1**.

TABLE 1

SUMMARY OF PREDICTED PROJECT SOUND LEVELS WITH SOUND MITIGATION
With Existing Baseline Ambient Sound Levels from Initial Sound Study

Mitigation Option	Predicted Sound Level Impacts (dBA)		Existing Ambient Sound Levels (dBA)		Total Predicted Sound Levels (dBA)		Effects of Sound Mitigation (dBA)	
	Day	Night	Day	Night	Day	Night	Day	Night
Proposed Project	10 to 28	5 to 27	23	20	23 to 29	20 to 28	**NA**	**NA**
65 dBA Transformer	9 to 21	0 to 17	23	20	23 to 25	20 to 22	**0 to -4**	**0 to -6**
12’ Wall	10 to 27	5 to 27	23	20	23 to 29	20 to 28	**0**	**0**
12’ Wall + Cantilever	10 to 27	5 to 27	23	20	23 to 29	20 to 28	**0**	**0**
25’ Wall	10 to 26	5 to 25	23	20	23 to 27	20 to 26	**0 to -1**	**0 to -2**

This analysis demonstrates that the effects of replacing the proposed transformer with one having a NEMA sound rating of 65 dBA could reduce sound levels by 0 to 4 dBA during the day, and by 0 to 6 dBA at night. These changes in sound levels are imperceptible at most residential receptor locations to slightly noticeable at only the nearest residential receptor locations on Fullam Hill Road.

The effects of installing a 12 feet tall sound barrier wall around the substation would not reduce sound levels during the day, or at night, even with a cantilever top extending towards the substation (i.e. 0 dBA). And, the effects of installing a 25 feet tall sound barrier wall around the substation could reduce sound levels by 0 to 1 dBA during the day, and by 0 to 2 dBA at night. These sound reductions are imperceptible. The sound barrier wall options do not provide any perceptible sound reduction because the proposed location of the barriers walls are outside the operating and restricted substation area along the perimeter security fence (approximately 200 to 340 feet away from the transformer). Constructing barrier walls near the transformer is not feasible given the necessary clearance required for the substation and its equipment. For sound barrier walls to be effective, they need to be either close to the source of sound or close to the receiver. It is not practical to build sound barrier walls near the closest residences to the site.

[4] These revised acoustic modeling results include a receptor at 126 Fullam Hill Road, which is new construction and was not included in the initial Sound Study.

These predicted effects of the sound mitigation alternatives are based on existing baseline ambient sound levels collected from the middle of the project site, which is further away from the surrounding roads than the residential uses. Therefore, these predicted impacts of the Project at the receptors are conservative, and are likely less. Furthermore, the predicted sound levels at night are likely conservative since it is assumed that the proposed transformer will have a maximum electrical load from the solar farm, which is not possible at night.

Additional Sound Monitoring collected along the Project's northeastern site property line was louder than the existing baseline ambient sound monitoring collected for the initial Sound Study near the center of the site, and further from the electrical transmission line easement and local traffic in the area. The results of the additional acoustic modeling demonstrate that the sound mitigation alternatives presented above could reduce the total predicted sound levels at the fifty-two (52) nearest residential uses by 0 to 4 dBA, assuming that existing baseline ambient sound levels are equivalent to the Additional Sound Monitoring measured sound levels. Those lowest existing baseline ambient sound levels were 29 dBA during the day, and 24 dBA at night. The results of the additional acoustic modeling assuming existing baseline ambient sound levels from the Additional Sound Monitoring are summarized in **Table 2**.

TABLE 2

SUMMARY OF PREDICTED PROJECT SOUND LEVELS WITH SOUND MITIGATION
With Existing Baseline Ambient Sound Levels from Additional Sound Monitoring

Mitigation Option	Predicted Sound Level Impacts (dBA)		Existing Ambient Sound Levels (dBA)		Total Predicted Sound Levels (dBA)		Effects of Sound Mitigation (dBA)	
	Day	Night	Day	Night	Day	Night	Day	Night
Proposed Project	10 to 28	5 to 27	29	24	29 to 31	24 to 29	**NA**	**NA**
65 dBA Transformer	9 to 21	0 to 17	29	24	29	24 to 25	**0 to -2**	**0 to -4**
12' Wall	10 to 27	5 to 27	29	24	29 to 31	24 to 29	**0**	**0**
12' Wall + Cantilever	10 to 27	5 to 27	29	24	29 to 31	24 to 29	**0**	**0**
25' Wall	10 to 26	5 to 25	29	24	29 to 31	24 to 27	**0 to -1**	**0 to -1**

This analysis demonstrates that the effects of replacing the proposed transformer with one having a NEMA sound rating of 65 dBA could reduce sound levels by 0 to 2 dBA during the day, and by 0 to 4 dBA at night. These changes in sound levels are imperceptible to slightly noticeable at only the nearest residential receptor locations on Fullam Hill Road. The effects of installing a 12 feet tall sound barrier wall around the substation would not reduce sound levels during the day, or at night, even with a cantilever top extending towards the substation (i.e. 0 dBA). And, the effects of installing a 25 feet tall sound barrier wall around the substation could reduce sound levels by 0 to 1 dBA during the day and at night. These changes in sound levels are imperceptible.

The attached figures illustrate the predicted sound level impacts of the Project with and without the sound mitigation measures presented above. **Figure 1** and **Figure 2** show decibel-level contour maps of the proposed Project predicted daytime and nighttime sound levels, respectively. **Figure 3** and **Figure 4** show similar decibel-level contour maps for the Project with a quieter transformer, having a NEMA rating of 65 dBA. **Figure 5** and **Figure 6** show similar decibel-level contour maps for the Project with a twelve (12) feet tall sound barrier wall surrounding the substation. **Figure 7** and **Figure 8** show similar decibel-level contour maps for the Project with a twelve (12) feet tall sound barrier wall surrounding the substation having a cantilever top extending towards the substation to increase sound mitigation. And, **Figure 9** and **Figure 10** show similar decibel-level contour maps for the Project with a twenty-five (25) feet tall sound barrier wall surrounding the substation. The modeling results of the four (4) sound mitigation alternatives are attached in tabular form in **Appendix A** as **Table A-1** through **Table A-4**.

The results of the sound mitigation modeling demonstrate that installing a quieter transformer or installing sound barrier walls will likely not achieve a significant change in sound level impacts from the Project at residential uses compared to the modeling results in the initial Sound Study. Furthermore, the Transformer Sound Monitoring demonstrated that the sound levels emitted from the NextEra transformer in Ludlow Vermont are noticeably less than the manufacturer's NEMA rating.

Please call if you have any questions regarding this report.

Sincerely yours,

TECH ENVIRONMENTAL, INC.

Marc C. Wallace

Marc C. Wallace, QEP, INCE
Vice President
4447/Sound Mitigation Report 081220

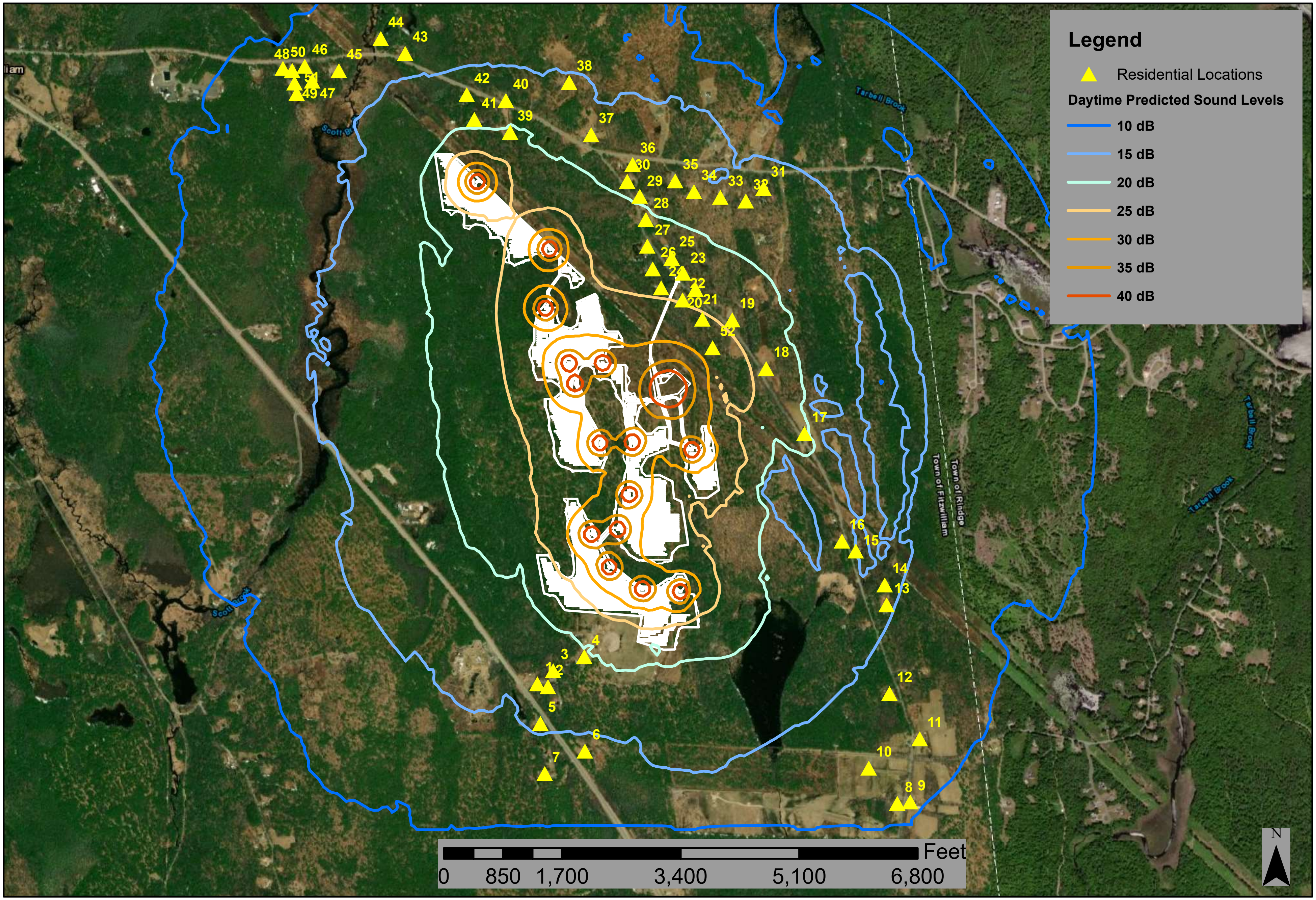

FIGURE 1.
Daytime Predicted Sound Levels (Base Case, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

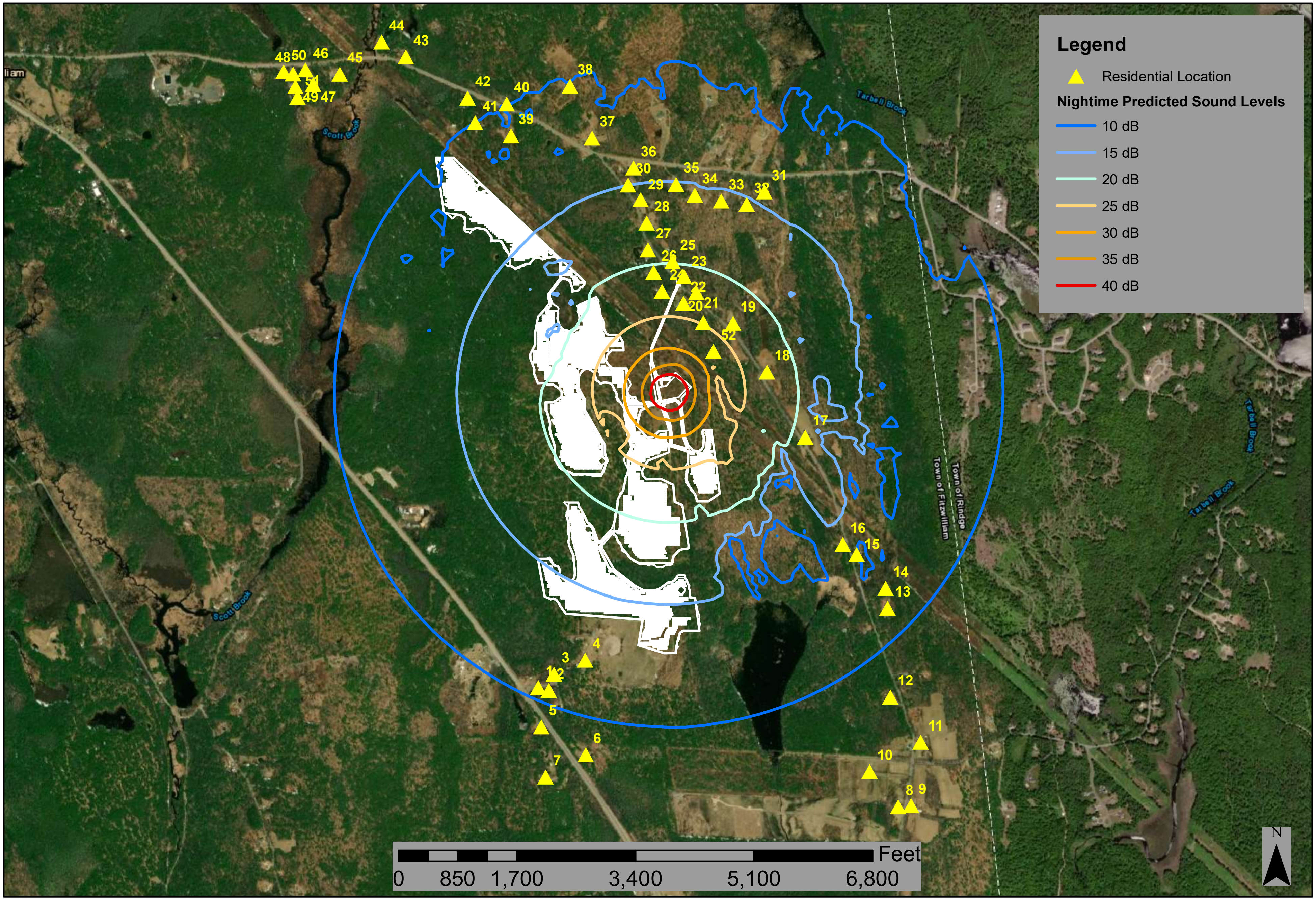

FIGURE 2.
Nighttime Predicted Sound Levels (Base Case, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

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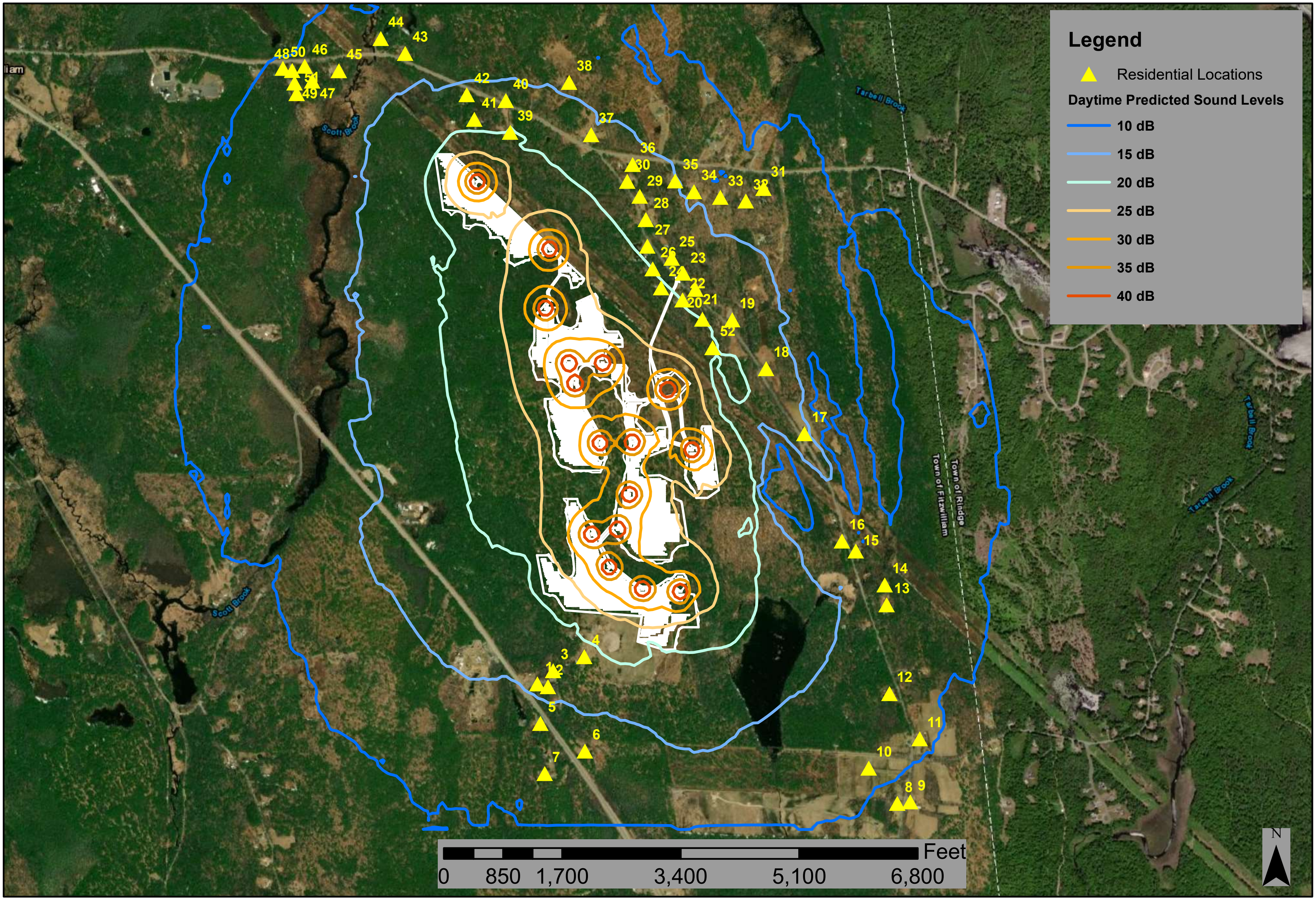

FIGURE 3.
Daytime Predicted Sound Levels (Quieter Transformer, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

Tech environmental

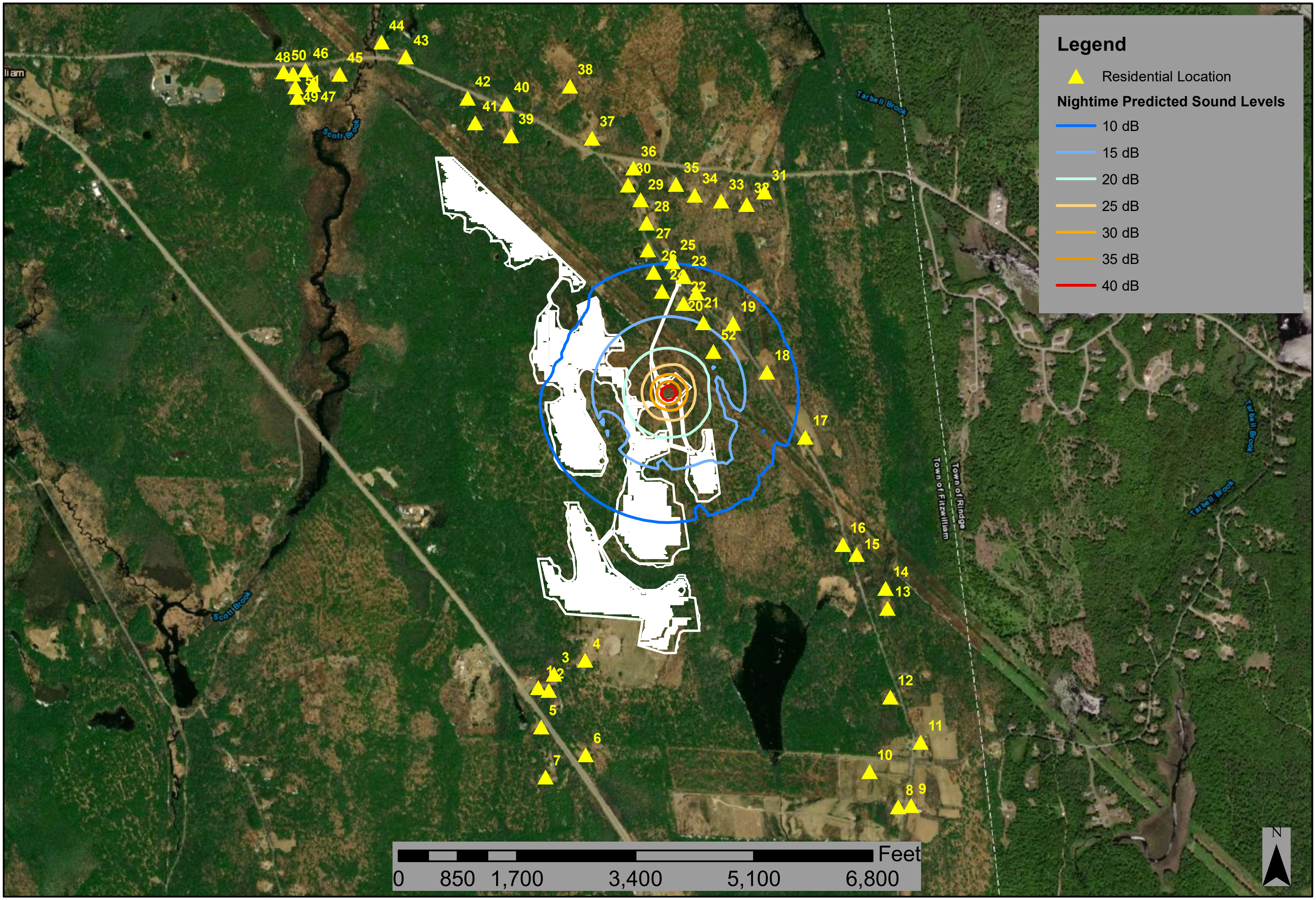

FIGURE 4.
Nighttime Predicted Sound Levels (Quieter Transformer, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

Tech environmental

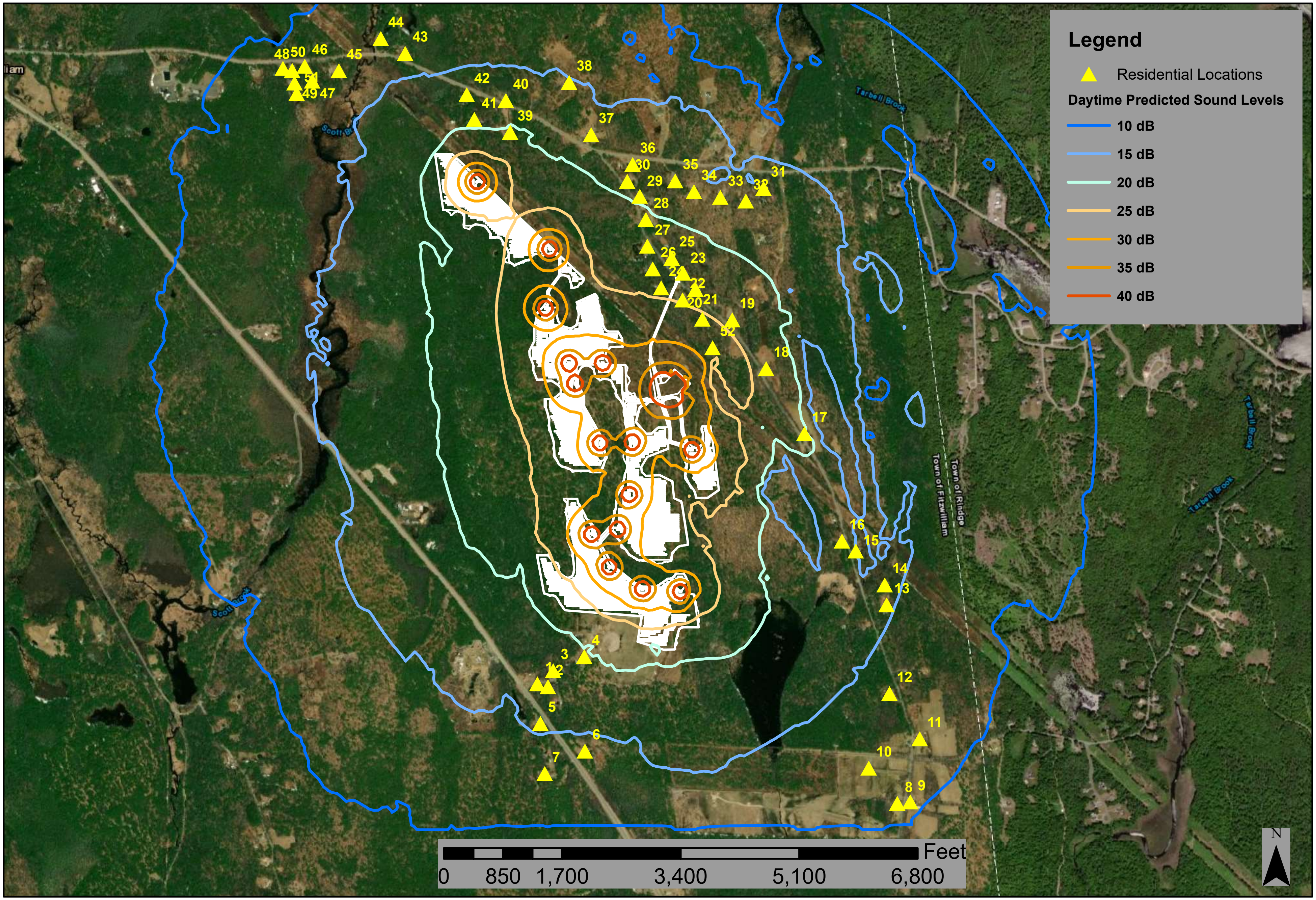

FIGURE 5.
Daytime Predicted Sound Levels (Vertical Wall 12ft, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

Tech Environmental

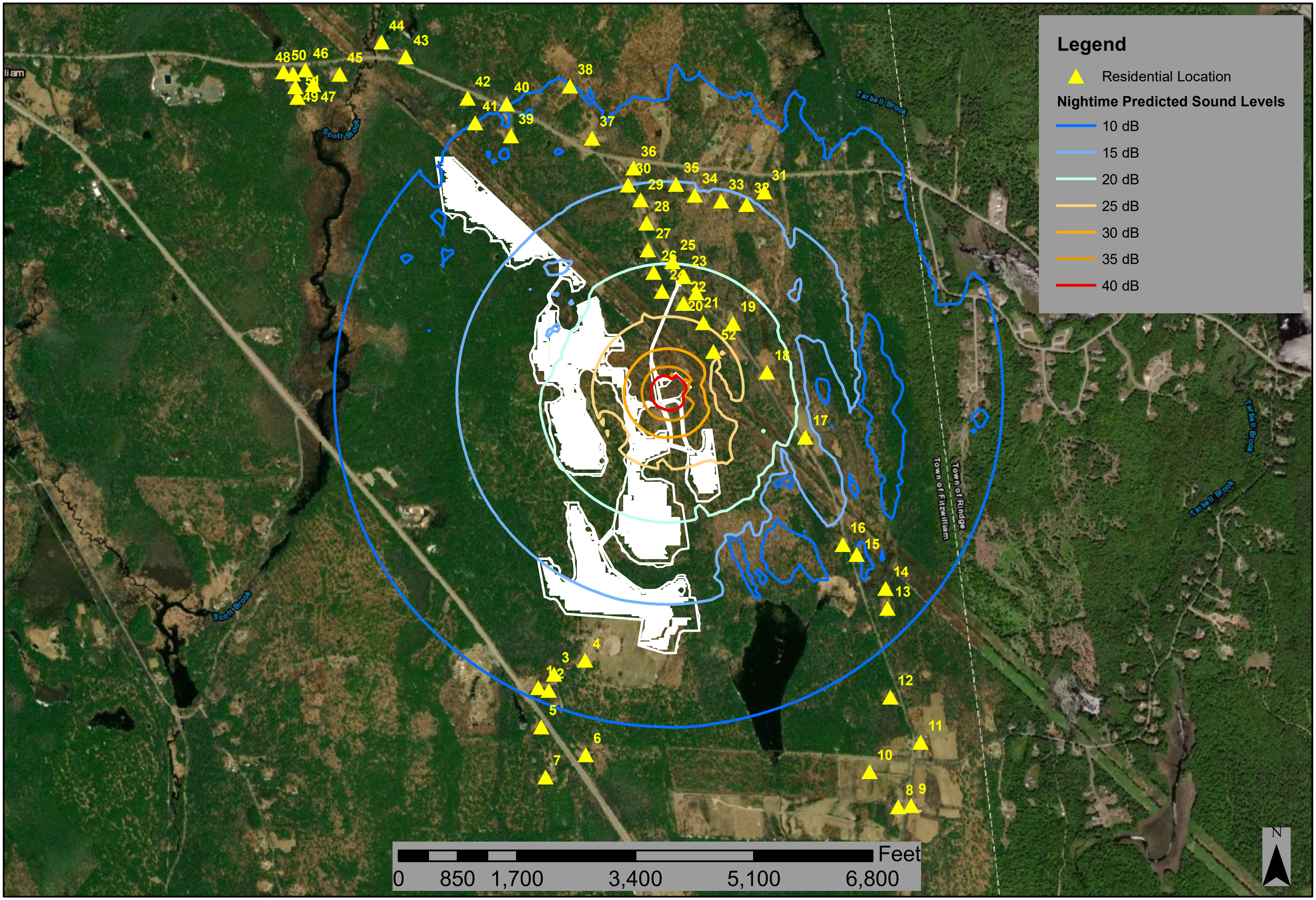

FIGURE 6.
Nighttime Predicted Sound Levels (Vertical Wall 12ft, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

Tech Environmental

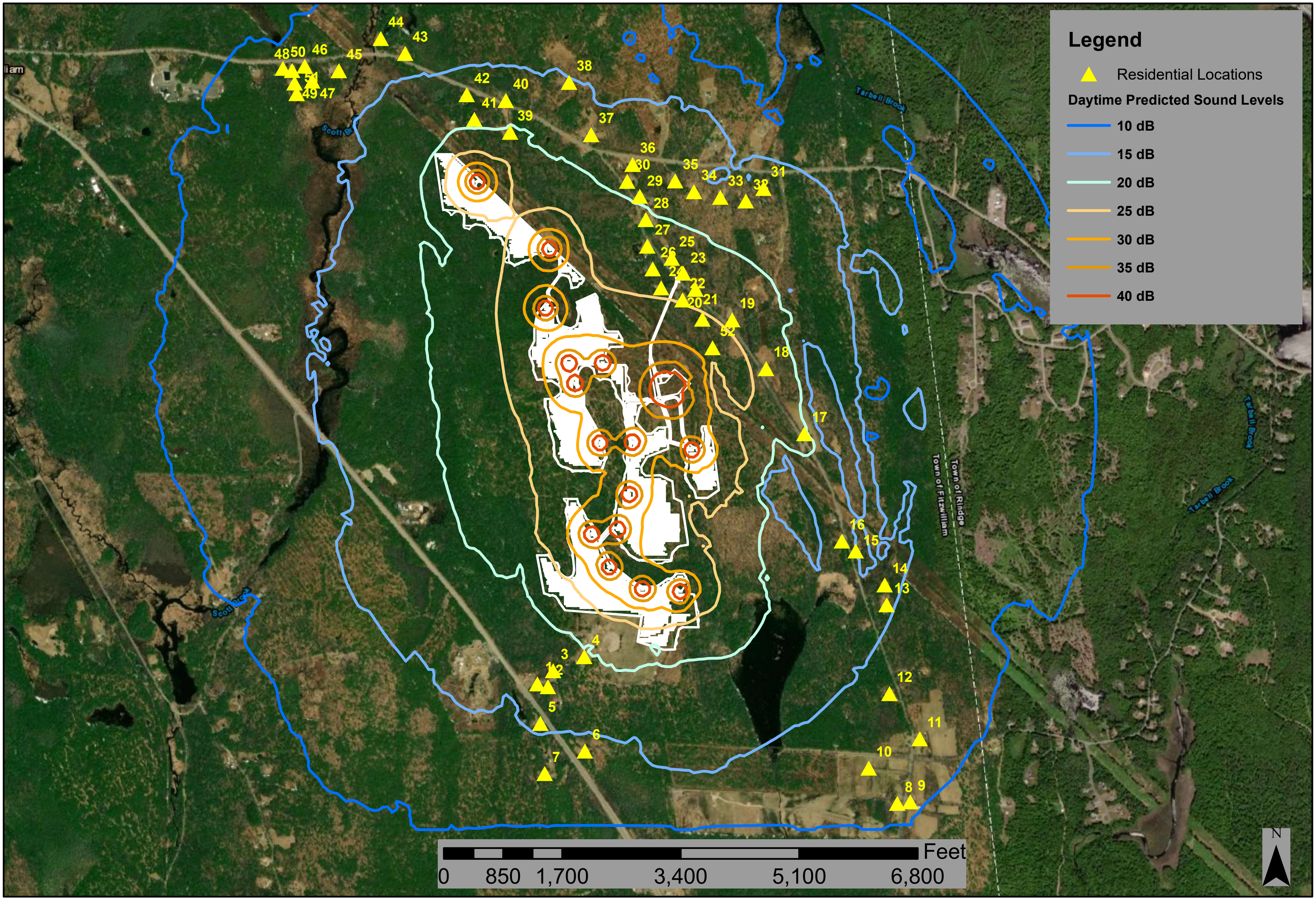

FIGURE 7.
Daytime Predicted Sound Levels (Cantilever Wall, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

Tech Environmental

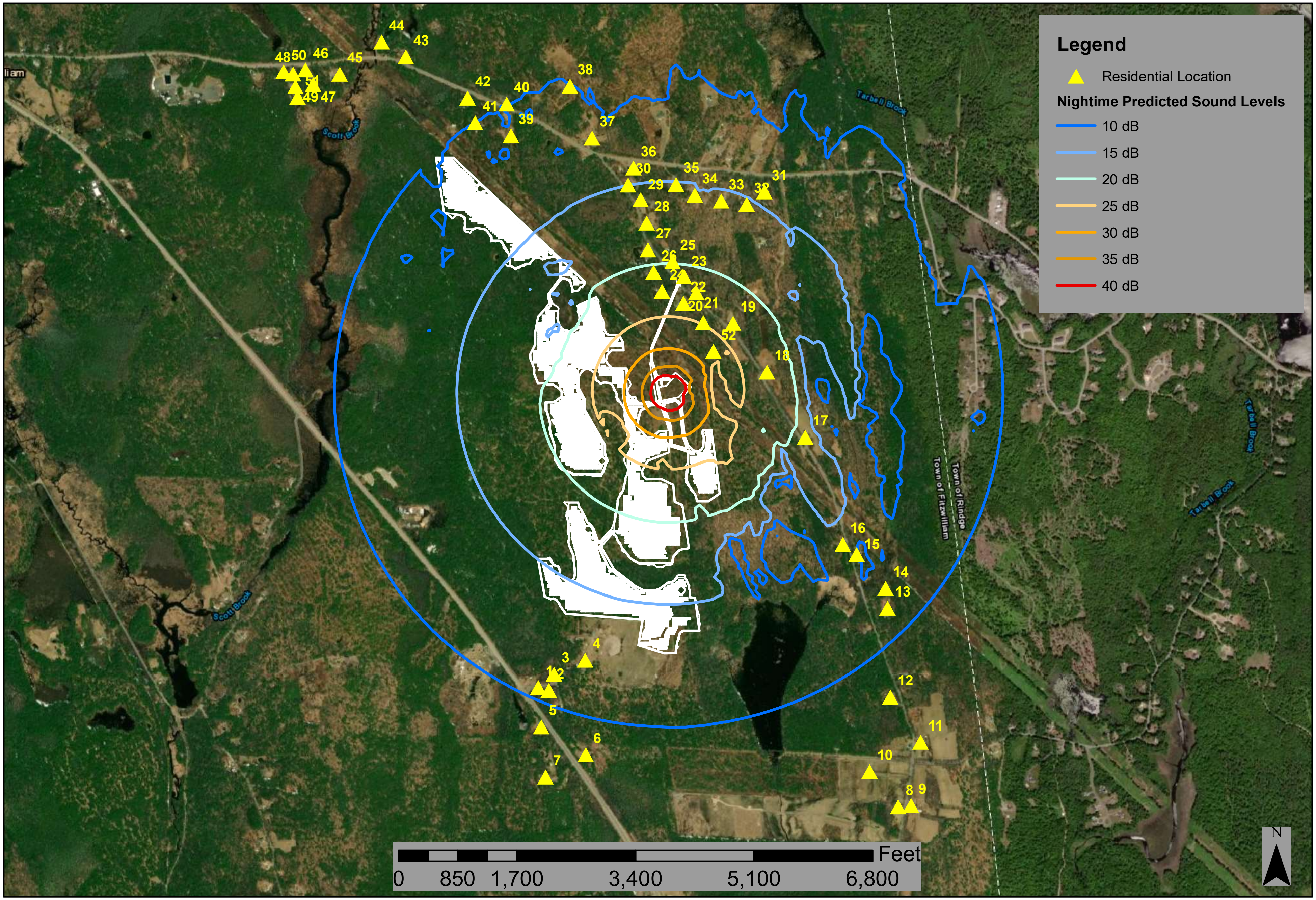

FIGURE 8.
Nighttime Predicted Sound Levels (Cantilever Wall, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

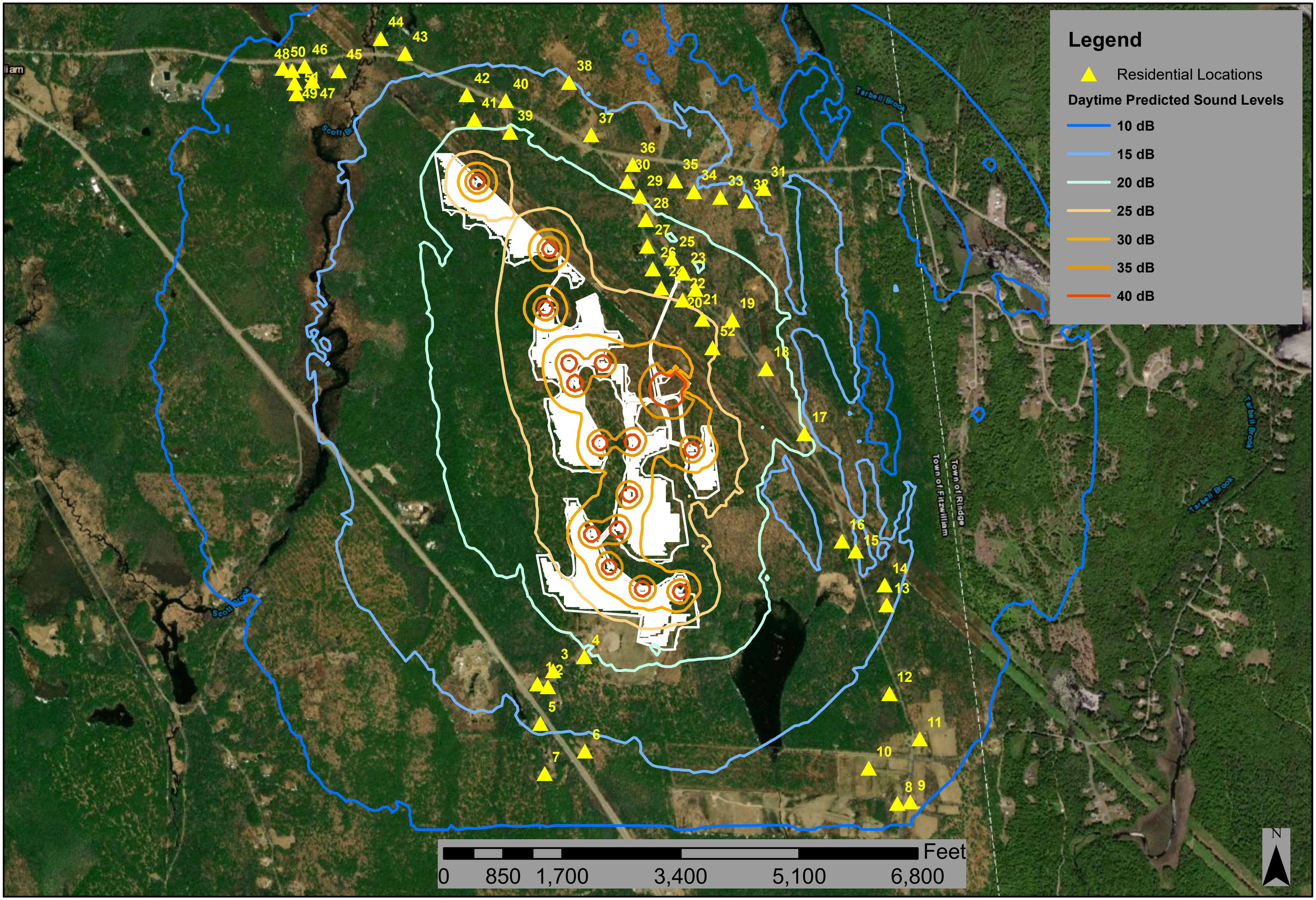

FIGURE 9.
Daytime Predicted Sound Levels (Vertical Wall 25ft, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

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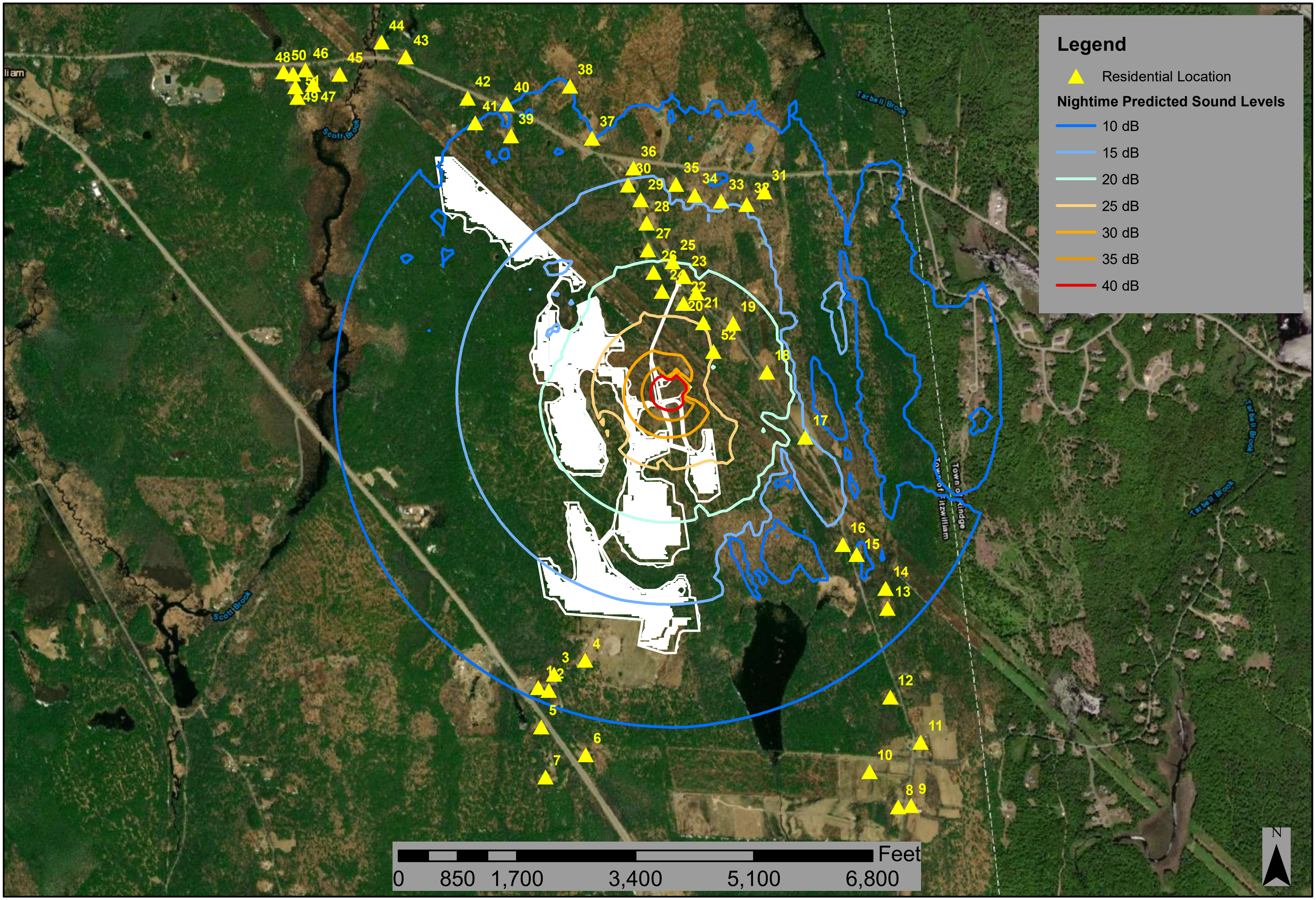

FIGURE 10.
Nighttime Predicted Sound Levels (Vertical Wall 25ft, Updated August 2020)
Chinook Solar PV Farm, Fitzwilliam, New Hampshire

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APPENDIX A

MODELING RESULTS OF SOUND MITIGATION ALTERNATIVES IN TABULAR FORM

TABLE A-1

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH NEMA RATED 65 dBA TRANSFORMER

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
1	10 Crane Road	16	0	23	20	24	20	1	0
2	3 Crane Road	16	0	23	20	24	20	1	0
3	19 Crane Road	16	1	23	20	24	20	1	0
4	35 Crane Road	19	2	23	20	24	20	1	0
5	532 Rt 12 S	14	0	23	20	23	20	1	0
6	549 Rt 12 S	13	0	23	20	23	20	0	0
7	550 Rt 12 S	13	0	23	20	23	20	0	0
8	444 Fullam Hill Road	9	0	23	20	23	20	0	0
9	423 Fullam Hill Road	9	0	23	20	23	20	0	0
10	414 Fullam Hill Road	11	0	23	20	23	20	0	0
11	391 Fullam Hill Road	11	0	23	20	23	20	0	0
12	364 Fullam Hill Road	12	0	23	20	23	20	0	0
13	309 Fullam Hill Road	14	1	23	20	23	20	0	0
14	307 Fullam Hill Road	14	1	23	20	23	20	0	0
15	277 Fullam Hill Road	14	3	23	20	23	20	0	0
16	264 Fullam Hill Road	14	4	23	20	23	20	1	0
17	199 Fullam Hill Road	17	9	23	20	24	20	1	0
18	161 Fullam Hill Road	19	13	23	20	24	21	1	1
19	123 Fullam Hill Road	19	13	23	20	24	21	1	1
20	106 Fullam Hill Road	20	15	23	20	25	21	2	1
21	99 Fullam Hill Road	19	12	23	20	24	21	1	1
22	94 Fullam Hill Road	20	13	23	20	25	21	2	1
23	85 Fullam Hill Road	18	11	23	20	24	21	1	1
24	88 Fullam Hill Road	20	12	23	20	25	21	2	1
25	73 Fullam Hill Road	18	10	23	20	24	20	1	0
26	68 Fullam Hill Road	20	11	23	20	25	20	2	0

TABLE A-1 (CONT.)

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH NEMA RATED 65 dBA TRANSFORMER

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
27	64 Fullam Hill Road	19	9	23	20	24	20	2	0
28	45 Fullam Hill Road	18	7	23	20	24	20	1	0
29	33 Fullam Hill Road	18	6	23	20	24	20	1	0
30	23 Fullam Hill Road	17	5	23	20	24	20	1	0
31	484 RT 119 E	11	4	23	20	23	20	0	0
32	468 RT 119 E	13	5	23	20	23	20	0	0
33	462 RT 119 E	13	6	23	20	23	20	0	0
34	450 RT 119 E	14	6	23	20	23	20	1	0
35	432 RT 119 E	15	5	23	20	23	20	1	0
36	406 RT 1119 E	16	4	23	20	24	20	1	0
37	377 RT 1119 E	16	2	23	20	24	20	1	0
38	347 RT 1119 E	14	0	23	20	23	20	1	0
39	334 RT 119 E	21	1	23	20	25	20	2	0
40	327 RT 119 E	17	0	23	20	24	20	1	0
41	328 RT 119 E	18	0	23	20	24	20	1	0
42	310 RT 119 E	16	0	23	20	24	20	1	0
43	269 RT 1119 E	12	0	23	20	23	20	0	0
44	253 RT 1119 E	12	0	23	20	23	20	0	0
45	224 RT 1119 E	12	0	23	20	23	20	0	0
46	6 Phillips CT	11	0	23	20	23	20	0	0
47	14 Phillips CT	12	0	23	20	23	20	0	0
48	206 RT 1119 E	11	0	23	20	23	20	0	0
49	15 Doyle CT	11	0	23	20	23	20	0	0
50	5 Doyle CT	11	0	23	20	23	20	0	0
51	18 Doyle CT	11	0	23	20	23	20	0	0
52*	126 Fullam Hill Road	21	17	23	20	25	22	2	2

* Nearest residential receptor added after the initial Sound Study.

TABLE A-2

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH A 12 FEET TALL SOUND BARRIER

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
1	10 Crane Road	17	10	23	20	24	20	1	0
2	3 Crane Road	17	10	23	20	24	20	1	0
3	19 Crane Road	17	11	23	20	24	21	1	1
4	35 Crane Road	20	12	23	20	24	21	2	1
5	532 Rt 12 S	15	9	23	20	24	20	1	0
6	549 Rt 12 S	14	9	23	20	23	20	1	0
7	550 Rt 12 S	14	8	23	20	23	20	1	0
8	444 Fullam Hill Road	11	6	23	20	23	20	0	0
9	423 Fullam Hill Road	10	6	23	20	23	20	0	0
10	414 Fullam Hill Road	12	7	23	20	23	20	0	0
11	391 Fullam Hill Road	12	7	23	20	23	20	0	0
12	364 Fullam Hill Road	14	9	23	20	23	20	1	0
13	309 Fullam Hill Road	15	11	23	20	24	21	1	1
14	307 Fullam Hill Road	16	11	23	20	24	21	1	1
15	277 Fullam Hill Road	16	13	23	20	24	21	1	1
16	264 Fullam Hill Road	17	14	23	20	24	21	1	1
17	199 Fullam Hill Road	21	19	23	20	25	22	2	2
18	161 Fullam Hill Road	24	22	23	20	26	24	3	4
19	123 Fullam Hill Road	24	23	23	20	26	25	4	5
20	106 Fullam Hill Road	26	25	23	20	27	26	5	6
21	99 Fullam Hill Road	23	22	23	20	26	24	3	4
22	94 Fullam Hill Road	25	23	23	20	27	25	4	5
23	85 Fullam Hill Road	23	21	23	20	26	23	3	3
24	88 Fullam Hill Road	24	22	23	20	27	24	4	4
25	73 Fullam Hill Road	22	20	23	20	25	23	3	3
26	68 Fullam Hill Road	23	21	23	20	26	23	3	3

TABLE A-2 (CONT.)

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH A 12 FEET TALL SOUND BARRIER

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
27	64 Fullam Hill Road	22	19	23	20	25	22	3	2
28	45 Fullam Hill Road	21	17	23	20	25	22	2	2
29	33 Fullam Hill Road	20	16	23	20	24	21	2	1
30	23 Fullam Hill Road	19	15	23	20	24	21	2	1
31	484 RT 119 E	16	14	23	20	24	21	1	1
32	468 RT 119 E	17	15	23	20	24	21	1	1
33	462 RT 119 E	17	16	23	20	24	21	1	1
34	450 RT 119 E	18	16	23	20	24	21	1	1
35	432 RT 119 E	18	15	23	20	24	21	1	1
36	406 RT 1119 E	18	14	23	20	24	21	1	1
37	377 RT 1119 E	18	12	23	20	24	21	1	1
38	347 RT 1119 E	16	10	23	20	24	20	1	0
39	334 RT 119 E	21	11	23	20	25	21	2	1
40	327 RT 119 E	17	10	23	20	24	20	1	0
41	328 RT 119 E	19	10	23	20	24	20	1	0
42	310 RT 119 E	17	9	23	20	24	20	1	0
43	269 RT 1119 E	13	7	23	20	23	20	0	0
44	253 RT 1119 E	13	6	23	20	23	20	0	0
45	224 RT 1119 E	13	6	23	20	23	20	0	0
46	6 Phillips CT	12	6	23	20	23	20	0	0
47	14 Phillips CT	13	6	23	20	23	20	0	0
48	206 RT 1119 E	12	5	23	20	23	20	0	0
49	15 Doyle CT	12	6	23	20	23	20	0	0
50	5 Doyle CT	12	5	23	20	23	20	0	0
51	18 Doyle CT	12	6	23	20	23	20	0	0
52*	126 Fullam Hill Road	27	27	23	20	29	28	6	8

* Nearest residential receptor added after the initial Sound Study.

TABLE A-3

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH A 12 FEET TALL SOUND BARRIER WITH CANTILEVER TOP

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
1	10 Crane Road	17	10	23	20	24	20	1	0
2	3 Crane Road	17	10	23	20	24	20	1	0
3	19 Crane Road	17	11	23	20	24	21	1	1
4	35 Crane Road	20	12	23	20	24	21	2	1
5	532 Rt 12 S	15	9	23	20	24	20	1	0
6	549 Rt 12 S	14	9	23	20	23	20	1	0
7	550 Rt 12 S	14	8	23	20	23	20	1	0
8	444 Fullam Hill Road	11	6	23	20	23	20	0	0
9	423 Fullam Hill Road	10	6	23	20	23	20	0	0
10	414 Fullam Hill Road	12	7	23	20	23	20	0	0
11	391 Fullam Hill Road	12	7	23	20	23	20	0	0
12	364 Fullam Hill Road	14	9	23	20	23	20	1	0
13	309 Fullam Hill Road	15	11	23	20	24	21	1	1
14	307 Fullam Hill Road	16	11	23	20	24	21	1	1
15	277 Fullam Hill Road	16	13	23	20	24	21	1	1
16	264 Fullam Hill Road	17	14	23	20	24	21	1	1
17	199 Fullam Hill Road	21	19	23	20	25	22	2	2
18	161 Fullam Hill Road	24	22	23	20	26	24	3	4
19	123 Fullam Hill Road	24	23	23	20	26	25	4	5
20	106 Fullam Hill Road	26	25	23	20	27	26	5	6
21	99 Fullam Hill Road	23	22	23	20	26	24	3	4
22	94 Fullam Hill Road	25	23	23	20	27	25	4	5
23	85 Fullam Hill Road	23	21	23	20	26	23	3	3
24	88 Fullam Hill Road	24	22	23	20	27	24	4	4
25	73 Fullam Hill Road	22	20	23	20	25	23	3	3
26	68 Fullam Hill Road	23	21	23	20	26	23	3	3

TABLE A-3 (CONT.)

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH A 12 FEET TALL SOUND BARRIER WITH CANTILEVER TOP

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
27	64 Fullam Hill Road	22	19	23	20	25	22	3	2
28	45 Fullam Hill Road	21	17	23	20	25	22	2	2
29	33 Fullam Hill Road	20	16	23	20	24	21	2	1
30	23 Fullam Hill Road	19	15	23	20	24	21	2	1
31	484 RT 119 E	16	14	23	20	24	21	1	1
32	468 RT 119 E	17	15	23	20	24	21	1	1
33	462 RT 119 E	17	16	23	20	24	21	1	1
34	450 RT 119 E	18	16	23	20	24	21	1	1
35	432 RT 119 E	18	15	23	20	24	21	1	1
36	406 RT 1119 E	18	14	23	20	24	21	1	1
37	377 RT 1119 E	18	12	23	20	24	21	1	1
38	347 RT 1119 E	16	10	23	20	24	20	1	0
39	334 RT 119 E	21	11	23	20	25	21	2	1
40	327 RT 119 E	17	10	23	20	24	20	1	0
41	328 RT 119 E	19	10	23	20	24	20	1	0
42	310 RT 119 E	17	9	23	20	24	20	1	0
43	269 RT 1119 E	13	7	23	20	23	20	0	0
44	253 RT 1119 E	13	6	23	20	23	20	0	0
45	224 RT 1119 E	13	6	23	20	23	20	0	0
46	6 Phillips CT	12	6	23	20	23	20	0	0
47	14 Phillips CT	13	6	23	20	23	20	0	0
48	206 RT 1119 E	12	5	23	20	23	20	0	0
49	15 Doyle CT	12	6	23	20	23	20	0	0
50	5 Doyle CT	12	5	23	20	23	20	0	0
51	18 Doyle CT	12	6	23	20	23	20	0	0
52*	126 Fullam Hill Road	27	27	23	20	29	28	6	8

* Nearest residential receptor added after the initial Sound Study.

TABLE A-4

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH A 25 FEET TALL SOUND BARRIER

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
1	10 Crane Road	17	10	23	20	24	20	1	0
2	3 Crane Road	17	10	23	20	24	20	1	0
3	19 Crane Road	17	11	23	20	24	21	1	1
4	35 Crane Road	20	12	23	20	24	21	2	1
5	532 Rt 12 S	15	9	23	20	24	20	1	0
6	549 Rt 12 S	14	9	23	20	23	20	1	0
7	550 Rt 12 S	14	8	23	20	23	20	1	0
8	444 Fullam Hill Road	11	6	23	20	23	20	0	0
9	423 Fullam Hill Road	10	6	23	20	23	20	0	0
10	414 Fullam Hill Road	12	7	23	20	23	20	0	0
11	391 Fullam Hill Road	12	7	23	20	23	20	0	0
12	364 Fullam Hill Road	14	9	23	20	23	20	1	0
13	309 Fullam Hill Road	15	11	23	20	24	21	1	1
14	307 Fullam Hill Road	16	11	23	20	24	21	1	1
15	277 Fullam Hill Road	16	13	23	20	24	21	1	1
16	264 Fullam Hill Road	17	14	23	20	24	21	1	1
17	199 Fullam Hill Road	21	19	23	20	25	22	2	2
18	161 Fullam Hill Road	23	22	23	20	26	24	3	4
19	123 Fullam Hill Road	24	23	23	20	26	25	3	5
20	106 Fullam Hill Road	25	24	23	20	27	26	4	6
21	99 Fullam Hill Road	23	22	23	20	26	24	3	4
22	94 Fullam Hill Road	25	24	23	20	27	25	4	5
23	85 Fullam Hill Road	23	21	23	20	26	23	3	3
24	88 Fullam Hill Road	24	22	23	20	27	24	4	4
25	73 Fullam Hill Road	22	20	23	20	25	23	3	3
26	68 Fullam Hill Road	23	21	23	20	26	23	3	3

TABLE A-4 (CONT.)

PREDICTED SOUND LEVEL IMPACTS OF THE PROJECT WITH A 25 FEET TALL SOUND BARRIER

ID	Residence Address	Predicted Sound Level (dBA)		Ambient Sound Level (dBA)		Total Predicted Sound Level (dBA)		Predicted Sound Level Increase (dBA)	
		Day	Night	Day	Night	Day	Night	Day	Night
27	64 Fullam Hill Road	22	19	23	20	25	23	3	3
28	45 Fullam Hill Road	21	17	23	20	25	22	2	2
29	33 Fullam Hill Road	20	16	23	20	25	21	2	1
30	23 Fullam Hill Road	19	15	23	20	24	21	2	1
31	484 RT 119 E	14	12	23	20	23	21	1	1
32	468 RT 119 E	16	14	23	20	24	21	1	1
33	462 RT 119 E	17	15	23	20	24	21	1	1
34	450 RT 119 E	17	14	23	20	24	21	1	1
35	432 RT 119 E	18	14	23	20	24	21	1	1
36	406 RT 1119 E	18	14	23	20	24	21	1	1
37	377 RT 1119 E	17	11	23	20	24	20	1	0
38	347 RT 1119 E	15	8	23	20	23	20	1	0
39	334 RT 119 E	21	11	23	20	25	21	2	1
40	327 RT 119 E	17	10	23	20	24	20	1	0
41	328 RT 119 E	19	10	23	20	24	20	1	0
42	310 RT 119 E	17	9	23	20	24	20	1	0
43	269 RT 1119 E	13	7	23	20	23	20	0	0
44	253 RT 1119 E	13	6	23	20	23	20	0	0
45	224 RT 1119 E	13	6	23	20	23	20	0	0
46	6 Phillips CT	12	6	23	20	23	20	0	0
47	14 Phillips CT	13	6	23	20	23	20	0	0
48	206 RT 1119 E	12	5	23	20	23	20	0	0
49	15 Doyle CT	12	6	23	20	23	20	0	0
50	5 Doyle CT	12	5	23	20	23	20	0	0
51	18 Doyle CT	12	6	23	20	23	20	0	0
52*	126 Fullam Hill Road	26	25	23	20	27	26	5	6

* Nearest residential receptor added after the initial Sound Study.