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REPORT

**SOUND PROPAGATION MODELING  
REPORT – VERMONT ELECTRIC  
COOP ALBURGH SUBSTATION**

10.21.2014



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# SOUND PROPAGATION MODELING REPORT – VERMONT ELECTRIC COOP ALBURGH SUBSTATION



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## INTRODUCTION

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Vermont Electric Coop (VEC) is proposing relocation of their Alburgh substation, located in Alburgh, Vermont. As part of the Vermont Section 248 process, RSG was asked to perform sound propagation modeling of the proposed facility, to determine sound pressure levels due to substation equipment at nearby receivers. Included in this report are:

- A project description;
- Summary of Section 248 precedent;
- Primer on acoustical terms used in this report;
- Sound propagation modeling procedure;
- Sound propagation modeling results; and
- Conclusions

## 1.0 PROJECT DESCRIPTION

VEC is relocating the the Alburgh substation approximately 1,500 meters (4,900 feet) north of the existing location. Both locations are located along U.S. Route 2 in Alburgh, Vermont. The proposed substation location is approximately 6.2 km (3.9 miles) southeast of the Village of Alburgh, set back approximately 70 meters (230 feet) west of U.S. Route 2 (Figure 1). The closest residence is approximately 70 meters (230 feet) to the southeast, with the next closest residence located 150 meters (490 feet) across U.S. Route 2, to the northeast. The Goose Point Campground is located 230 meters (750 feet) to the south. Lake Champlain is 300 meters (980 feet) to the southeast.

The proposed substation will include a single 10/14 MVA, 250 kV BIL transformer. No other equipment is expected to produce substantial noise. A closer view of the substation is shown in Figure 2.

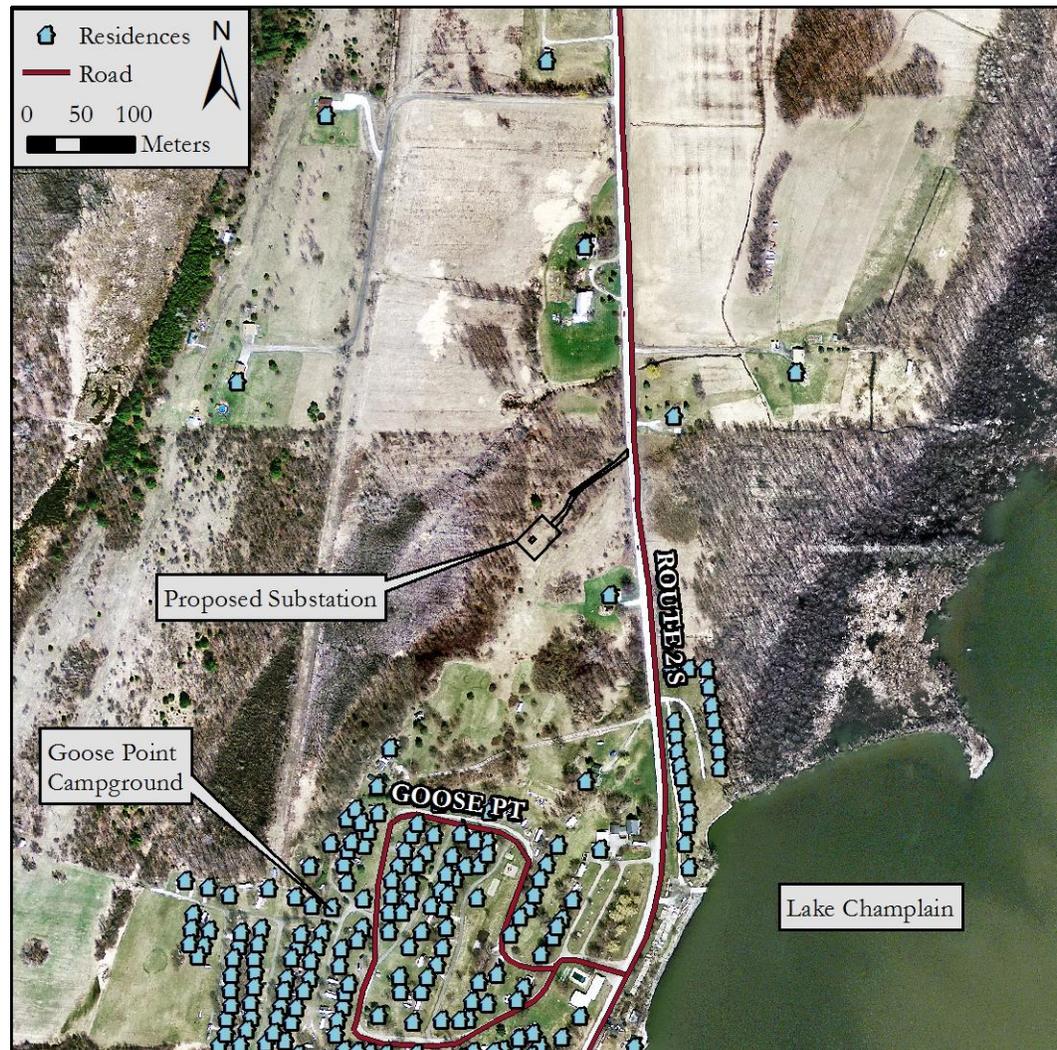


FIGURE 1: AREA MAP

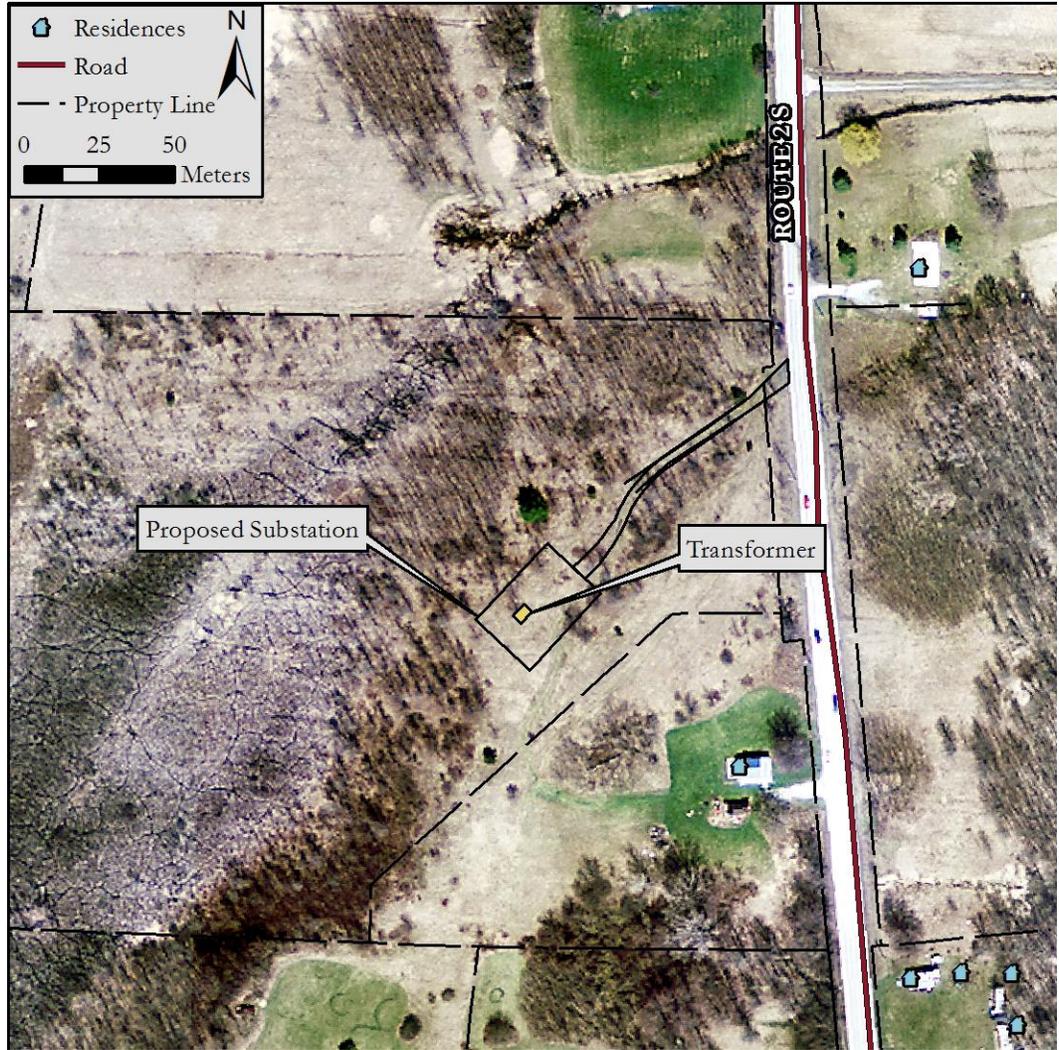


FIGURE 2: SITE MAP

## 2.0 NOISE STANDARDS AND GUIDELINES

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### 2.1 | LOCAL

Local noise standards are not applicable in this case, though the Town of Alburgh does have a qualitative noise ordinance which is reproduced below.

#### General Prohibitions

It shall be unlawful for any person to make or cause to be made any loud or unreasonable noise on a daily or recurring basis or for an excessive period of time. Noise shall be deemed to be unreasonable when upon investigation by a Municipal Official or Law Enforcement official it is found to disturb, injure or endanger the peace, health, safety, or welfare of another or to disturb, injure or endanger the peace, health, safety, or welfare of the community. Any such noise shall be considered a noise disturbance and a public nuisance.

Nighttime construction noise is particularly prohibited under the Express Prohibitions section.

#### 1) Construction Noise

Noises emanating from the excavation, demolition, alteration, or repair of buildings structures, property or highways between the hours of 11:00 pm and 5:00 am except for emergency repairs necessary to protect people and/or property.

### 2.2 | WORLD HEALTH ORGANIZATION GUIDELINES

The United Nation's World Health Organization (WHO) has published "Guidelines for Community Noise" (1999) which uses the most current research on the health impacts of noise to develop guideline sound levels for communities. The foreword of the report states, "The scope of WHO's effort to derive guidelines for community noise is to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments."

The WHO guidelines suggest a daytime and nighttime protective noise level. During the day, the levels are 55 dBA  $Leq_{(16)}$ , that is, an average over a 16-hour day, to protect against serious annoyance and 50 dBA  $Leq_{(16)}$  to protect against moderate annoyance.

During the night, the WHO recommends limits of 45 dBA  $Leq_{(8)}$  and an instantaneous maximum of 60 dBA  $L_{Amax}$  (fast response maximum). These are to be measured outside the bedroom window. These guidelines are based on the assumption that sound levels indoors would be reduced by 15 dBA with windows open. That is, sound level inside the bedroom that is protective of sleep is 30 dBA  $Leq_{(8)}$ . So long as the sound levels outside of the house remain at or below 45 dBA, sound levels in the bedroom will remain below 30 dBA. Given the climate in this region, this is essentially a summertime standard, since

residents are less likely to have their windows open during other times of the year. By closing windows, an additional ~10 dB of sound attenuation will result.

Table 4.1 of the WHO's "Guidelines for Community Noise" (1999) provides guideline values for community noise in specific environments.

In October, 2009, WHO Europe conducted an updated literature review and developed guidelines for nighttime noise in Europe. They expanded on the 1999 WHO guidelines by adding an *annual* average nighttime guideline level to protect against adverse effects on sleep disturbance. This guideline is 40 dBA  $L_{\text{night, outside}}$ .



## 3.0 A NOISE PRIMER

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### 3.1 | HOW IS SOUND DESCRIBED?

Sound is caused by variations in air pressure at a range of frequencies. Sound levels that are detectable by human hearing are defined in the decibel (dB) scale, with 0 dB being the approximate threshold of human hearing, and 135 dB causing pain and permanent damage to the ear. Figure 3 shows the sound levels of typical activities that generate noise.

The decibel scale can be weighted to mimic the human perception of certain frequencies. The most common of these weighting scales is the “A” weighting. It is the most frequently used weighting scale in environmental noise analyses. Sound levels that are weighted by the “A” scale have units of dBA or dB(A).

### 3.2 | DIFFERENCE BETWEEN SOUND PRESSURE LEVEL AND SOUND POWER LEVEL

Both sound power and sound pressure levels are described in terms of decibels, but they are not the same thing. Sound power is a measure of the acoustic power emitted or radiated by a source. The sound power level of a source does not change with its surrounding conditions.

Sound pressure level is observed at a specific location and is related to the difference in air pressure above or below atmospheric pressure. This fluctuation in air pressure is a result of the sound power of a source, the distance at which the sound pressure level is being observed, and the characteristics of the path and environment around the source and receiver. When one refers to sound level, they are generally speaking of the perceived level, or sound pressure level.

For example, a coffee grinder will have the same sound power whether or not it is grinding indoors or outdoors. The amount of sound the coffee grinder generates is always the same. However, if you are standing six meters away from the coffee grinder indoors, you would experience a higher sound pressure level than you would if you were six meters away from the coffee grinder outdoors in an open field. The reason for this is that sound emitted from the coffee grinder would bounce off walls and other surfaces indoors which would cause sound to build up, raising the sound pressure level.

Sound power cannot be directly measured. However, since sound pressure and sound power are related, sound power can be calculated by measurements of sound pressure and sound intensity. It can be helpful to note that over soft ground outside, the sound pressure level of a small source observed 50 meters away is roughly 33 dB lower than its sound power level.

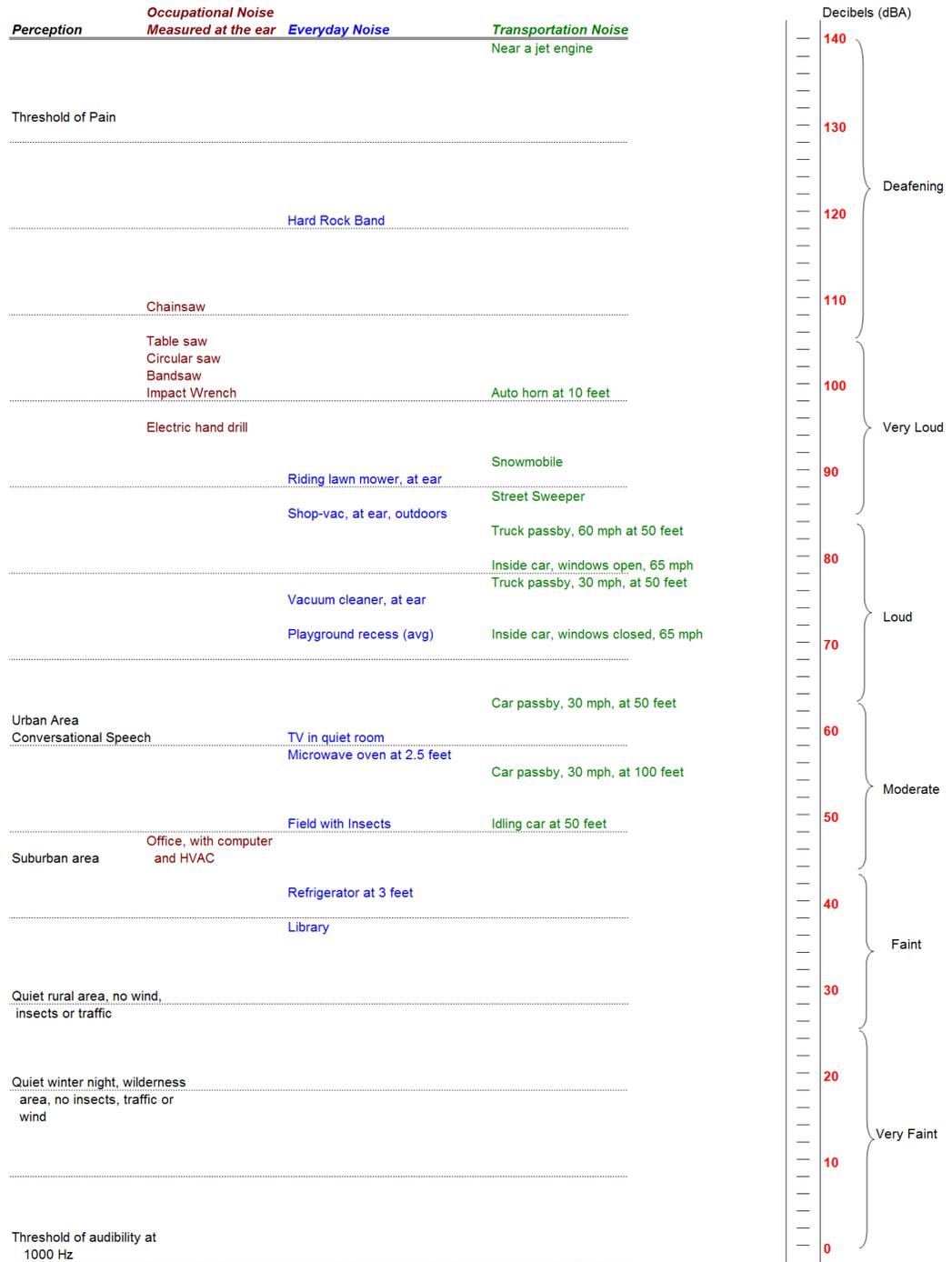


FIGURE 3: BASIC THEORY - COMMON SOUNDS IN DECIBELS

### 3.3 | HOW IS SOUND MODELED?

The decibel sound level is described on a logarithmic scale. One manifestation of this is that sound power increases by a factor of 10 for every 10 dB increase. However, for every 10 dB

increase in sound pressure, we perceive an approximate doubling of loudness. Small changes in sound level, below 3 dB, are generally not perceptible.

For a point source, sound level diminishes or attenuates by 6 dB for every doubling of distance due to geometrical divergence. For example, if an idling truck is measured at 50 meters as 66 dBA, at 100 meters the level will decline to 60 dBA, and at 200 meters, 54 dBA, assuming no other influences. From a line source, like a gas pipeline or from closely spaced point sources, like a roadway or string of wind turbines, sound attenuates at approximately 3 dB per of doubling distance. These “line sources” transition to an attenuation of 6 dB per doubling at a distance of roughly a third of the length of the line source.

Other factors, such as intervening vegetation, terrain, walls, berms, buildings, and atmospheric absorption will also further reduce the sound level reaching the listener. In each of these, higher frequencies will attenuate faster than lower frequencies. Finally, the ground can also have an impact on sound levels. Harder ground generally increases and softer ground generally decreases the sound level at a receiver. Reflections off of buildings and walls can increase broadband sound levels by as much as 3 dB.

If we add two equal sources together, the resulting sound level will be 3 dB higher. For example, if one machine registers 76 dBA at 50 meters, two co-located machines would register 3 dB more, or 79 dBA at that distance. In a similar manner, at a distance of 50 meters, four machines, all operating at the same place and time, would register 82 dBA and eight machines would register 85 dBA. If the two sources differ in sound level then 0 to 3 dB will be added to the higher level as shown in Table 1.

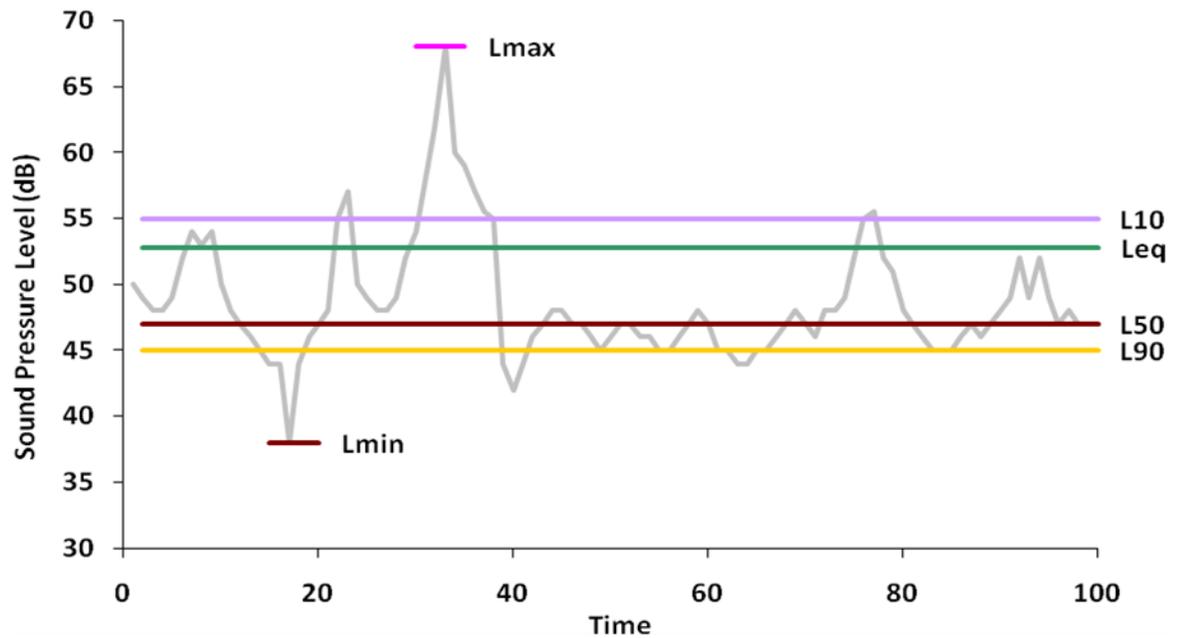
**TABLE 1: DECIBEL ADDITION**

If Two Sources Differ By	Add
0-1 dB	3 dB
2-4 dB	2 dB
5-9 dB	1 dB
>9 dB	0 dB

### 3.4 | DESCRIPTION OF TERMS

Sound can be measured in many different ways. Perhaps the simplest way is to take an instantaneous measurement, which gives the sound pressure level at an exact moment in time. The level reading could be 62 dB, but a second later it could 57 dB. Sound pressure levels are constantly changing. It is for this reason that it makes sense to describe noise and sound in terms of time.

Take as an example, the sound levels measured over time shown in Figure 4. Instantaneous measurements are shown as a ragged grey line. The sound levels that occur over this time can be described verbally, but it is much easier to describe the recorded levels statistically. This is done using a variety of “levels” which are described below.



**FIGURE 4 : EXAMPLE OF SOUND MEASUREMENT OVER TIME AND DESCRIPTIVE STATISTICS**

### **LMIN AND LMAX**

Lmin and Lmax are simply the minimum and maximum sound level, respectively, monitored over a period of time. Other acoustical metrics are used to describe the Lmin and Lmax. For example, one could define the Lmin or Lmax using an impulse response level (35 ms time constant), fast response level (125 ms time constant), slow response level (1 sec time constant), or equivalent level over some period of time.

### **PERCENTILE SOUND LEVEL - LN**

$L_n$  is the sound level exceeded  $n$  percent of the time. This type of statistical sound level, also shown in Figure 2, gives us information about the distribution of sound levels over time. For example, the L10 is the sound level that is exceeded 10 percent of the time, while the L90 is the sound level exceeded 90% of the time. The L50 is exceeded half the time. The L90 is a residual base level which most of the sound exceeds, while the L10 is representative of the peaks and higher, but less frequent levels.

When one is trying to measure a continuous sound, like a wind turbine, the L90 is often used to filter out other short-term environmental sounds that increase the level, such as dogs barking, vehicle passbys, wind gusts, and talking. That residual sound, or L90, is then the sound that is occurring in the absence of these noises.

### EQUIVALENT AVERAGE SOUND LEVEL - LEQ

One of the most common ways of describing noise levels is in terms of the continuous equivalent sound level (Leq). The Leq is the average of the sound pressure over an entire monitoring period and expressed as a decibel:

$$Leq_T = 10 * \log_{10} \left( \frac{1}{T} \int_{\theta}^T p_A^2(t) dt / p_0^2 \right)$$

where  $p_A^2$  is the squared instantaneous weighted sound pressure signal, as a function of elapsed time  $t$ ,  $p_0$  is the reference pressure of  $20\mu\text{Pa}$ , and  $T$  is the stated time interval.

The monitoring period,  $T$ , can be for any amount of time. It could be one second (Leq 1-sec), one hour (Leq(1)), or 24 hours (Leq(24)). Because Leq is a logarithmic function of the average pressure, loud and infrequent sounds have a greater effect on the resulting Leq than quieter and more frequent sounds. For example, in Figure 4, the L50 (median) is about 47 dB, but the Leq is 53 dB. Because it tends to weight the higher sound levels and is representative of sound that takes place over time, the Leq is the most commonly used descriptor in noise standards and regulations.

## 4.0 SOUND PROPAGATION MODELING

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### 4.1 | PROCEDURE

Modeling for the project was completed using the International Standards Organization ISO 9613-2 standard, “Acoustics – Attenuation of sound during propagation outdoors, Part 2: General Method of Calculation.” The ISO standard states,

“This part of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level ... under meteorological conditions favorable to propagation from sources of known sound emissions. These conditions are for downwind propagation ... or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.”

The model takes into account source sound power levels, surface reflection and absorption, atmospheric absorption, geometric divergence, meteorological conditions, walls, barriers, berms, and terrain. The ISO standard was implemented in the Cadna A acoustical modeling software. Made by Datakustik GmbH, Cadna A is an internationally accepted acoustical model, used by many other noise control professionals in the United States and abroad.

For this study, we modeled the sound propagation in accordance with ISO 9613-2 with spectral ground attenuation and soft ground ( $G=1$ ), except within the substation where ground was modeled as mixed ( $G=0.6$ ), and bodies of water where the surface was modeled as hard ( $G=0$ ). Sound pressure levels were calculated over a 4.5 square kilometer (1.7 square mile) area or “grid,” at a height of 1.5 meters (5 feet). Sound pressure levels were also calculated at 204 discrete receivers at a 4 meter (13 foot) height.

The primary noise producing equipment will be a 10/14 MVA, 250 kV BIL transformer. Given the transformer size, the NEMA TR-1 sound *pressure* level rating is 65 to 67 dBA ONAN (fans off) and 68 to 71 dBA ONAF (fans on). However, VEC has obtained a guarantee of 60 dBA ONAN and 68 dBA ONAF from the manufacturer. The modeled ONAN and ONAF sound power level for the transformer is shown in Table 2. The sound power is calculated as a function of the guaranteed sound pressure levels, the turbine size, and a spectral adjustment based on RSG measurement results from a similarly sized transformer.

**TABLE 2: MODELED TRANSFORMER SOUND POWER SPECTRUM (DBZ UNLESS OTHERWISE NOTED)**

Transformer Condition	1/1 Octave Band Center Frequency Sound Power (dBZ)									Sum (dBA)	Sum (dBZ)
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
ONAN	66	69	79	79	77	73	63	52	44	78	84
ONAF	57	68	79	81	83	82	81	77	71	87	89

**4.2 | RESULTS**

Sound propagation modeling results are shown for ONAN cooling in Figure 5 and ONAF cooling in Figure 6. The highest sound pressure level at a residence is 22 dBA ONAN and 30 dBA ONAF, at the closest residence to the southeast. Sound levels at the second closest home to the substation, located to the northeast, are 19 dBA ONAN and 29 dBA ONAF. Sound levels at the closest property line, located to the southeast of the substation, are 35 dBA ONAN and 45 dBA ONAF. Sound levels at the second closest property line, located to the north, are 24 dBA ONAN and 34 dBA ONAF.

As with most transformers, fans are expected to operate only during the day. The ONAN and ONAF results are consistent with the lower background sound levels for night and day, respectively, we have measured in Vermont on other docket.

As with all transformers, core noise is tonal at 120 Hz and its harmonics. Transformer noise under ONAN cooling will be tonal, to the extent that the sound is prominent above the background at residences. Under ONAF, that is, with the fans operating, the transformer is less likely to be tonal.

Due to the low overall sound levels produced by the transformer at surrounding residences we do not recommend mitigation at this time.

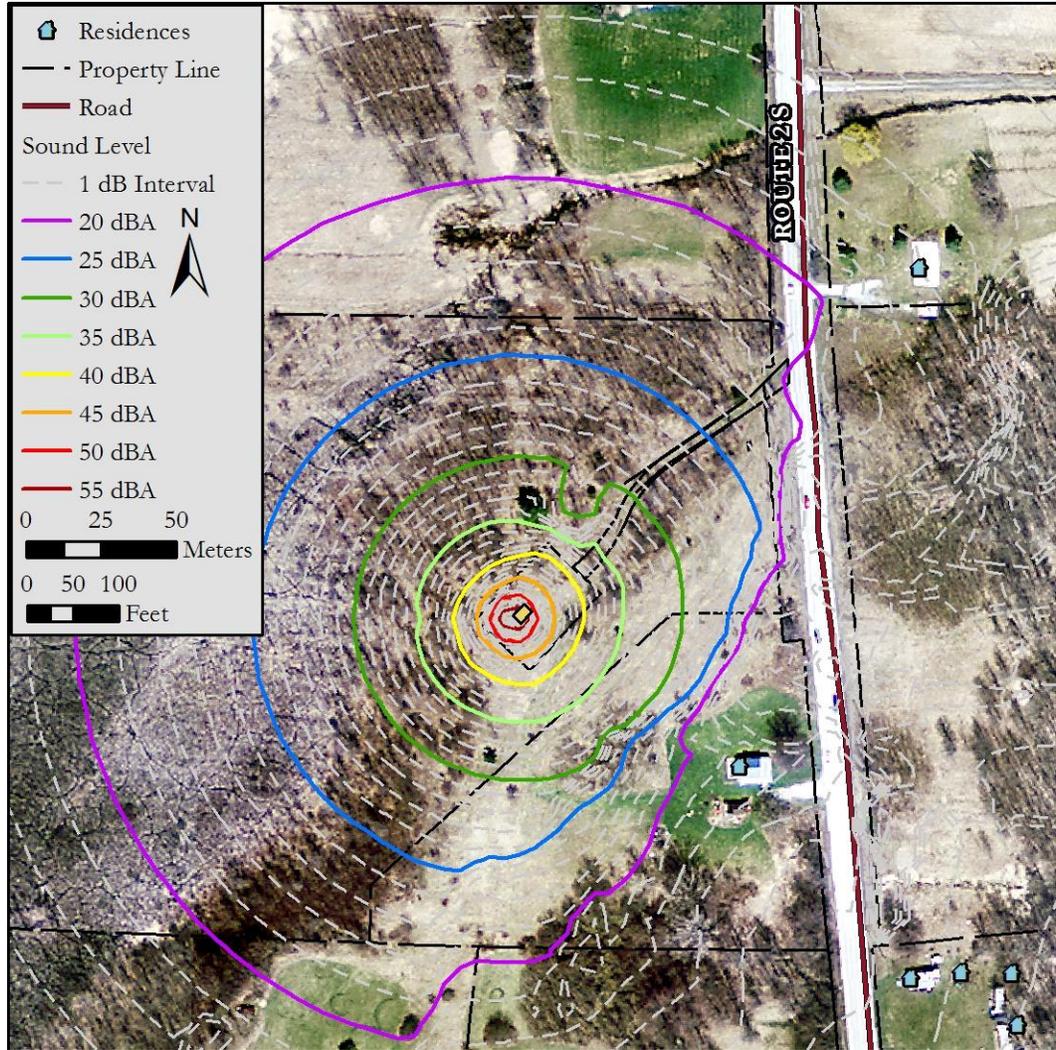


FIGURE 5: SOUND PROPAGATION MODELING RESULTS - ONAN COOLING

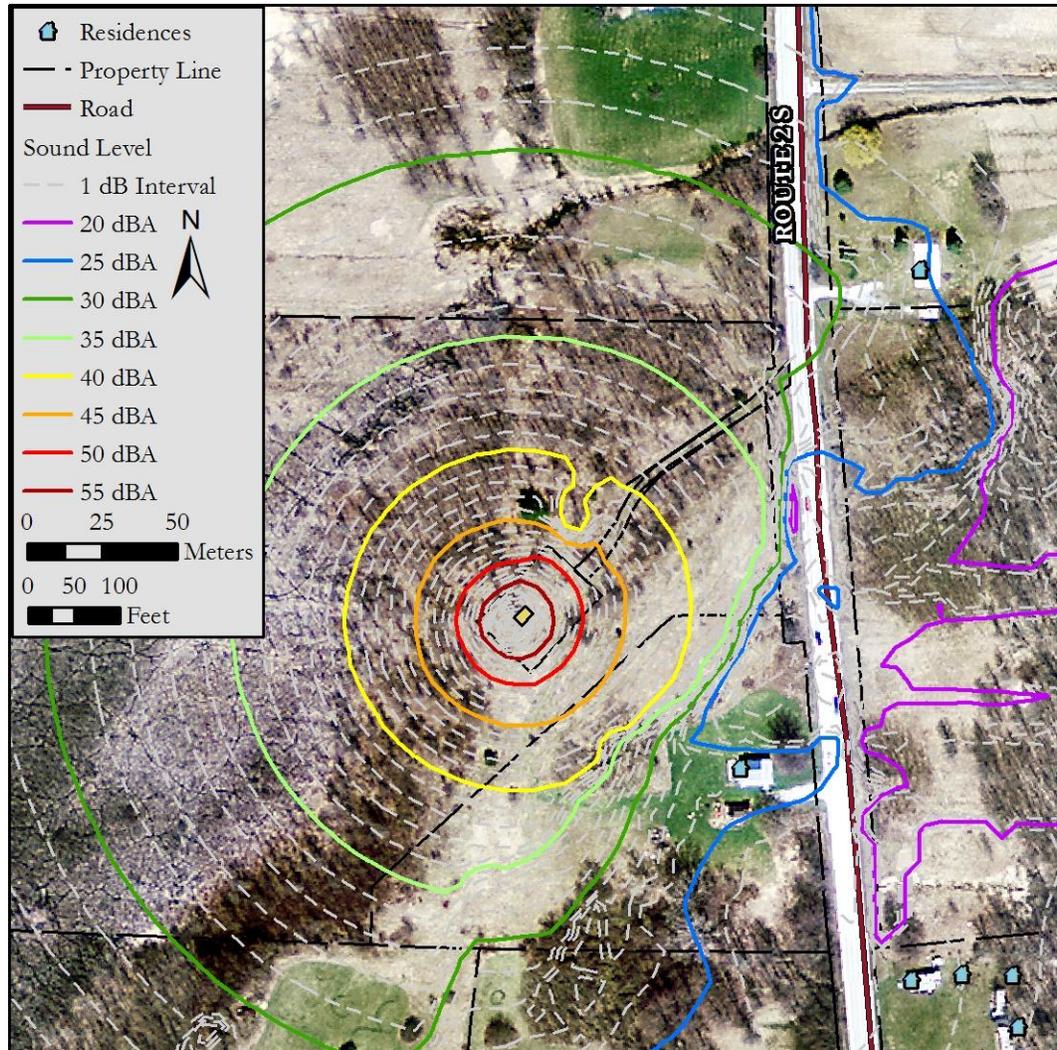


FIGURE 6: SOUND PROPAGATION MODELING RESULTS - ONAF COOLING

## 5.0 CONCLUSIONS

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RSG conducted sound propagation modeling for the relocated Vermont Electric Coop (VEC) Alburgh substation, located in the Town of Alburgh, Vermont. Our conclusions are as follows:

- The proposed Alburgh substation is located approximately 3.9 miles (6 km) southeast of Alburgh Village Vermont just west of U.S. Route 2.
- The proposed substation will contain a 10/14 MVA, 250 kV BIL transformer, along with ancillary equipment.
- RSG performed sound propagation modeling of the substation using the ISO 9613-2 prediction algorithm implemented in Datakustik Cadna/A software.
- The highest predicted sound levels at a residence, the closest to the substation, are 22 dBA under ONAN (fans off) cooling and 30 dBA under ONAF (fans on) cooling. Sound levels at the second closest residence to the substation, located to the northeast, are 19 dBA ONAN and 29 dBA ONAF.
- Sound levels at the closest property line, located to the southeast of the substation, are 35 dBA ONAN and 45 dBA ONAF. Sound levels at the second closest property line, located to the north, are 24 dBA ONAN and 34 dBA ONAF.
- Under ONAN cooling, sound emissions of the transformer are expected to be tonal.
- Given the relatively low sound levels expected, mitigation is not recommended at this time. The relocated VEC Alburgh substation is also not expected to cause an undue adverse impact on the surrounding area due to noise.

**APPENDIX A: SOURCE INFORMATION****TABLE A 1: MODELED SOURCES**

Source	Modeled Sound Power (dBA)	Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
			X (m)	Y (m)	Z (m)
Transformer - ONAN Cooling	78	3	438783	269640	44
Transformer - ONAF Cooling	87	3	438783	269640	44

**TABLE A 2: SOUND PROPAGATION MODELING PARAMETERS**

Parameter	Setting
Ground Absorption	ISO 9613-2 Spectral, G=0.6 within the substation, G=0 over water, G=1 elsewhere
Atmospheric Absorption	Base on 10 Degrees Celcius, 70% Humidity
Search Radius	4000 meters (2.5 miles)
Receiver Height	4 meters (13 feet) for residences, 1.5 meters (5 feet) for grid

## APPENDIX B: RECEIVER RESULTS



FIGURE B 1: RECEIVER LOCATIONS

TABLE B 1: DISCRETE RECEIVER RESULTS

Receiver ID	Receiver Type	Modeled Sound Pressure Level (dBA)		Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
		ONAN	ONAF		X (m)	Y (m)	Z (m)
1	MOBILE HOME	11	19	4	438824	269307	38
2	MULTI-FAMILY DWELLING	6	14	4	438809	270406	53
3	MOBILE HOME	8	16	4	438740	270321	52
4	SINGLE FAMILY DWELLING	0	5	4	438938	270755	51
5	SINGLE FAMILY DWELLING	0	7	4	438272	268845	52
6	MOBILE HOME	14	22	4	438920	269460	36

Receiver ID	Receiver Type	Modeled Sound Pressure Level (dBA)		Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
		ONAN	ONAF		X (m)	Y (m)	Z (m)
7	SINGLE FAMILY DWELLING	0	7	4	438274	268802	52
8	SINGLE FAMILY DWELLING	3	11	4	439179	270585	48
9	SINGLE FAMILY DWELLING	19	29	4	438918	269757	41
10	MOBILE HOME	8	16	4	438831	269198	37
11	SINGLE FAMILY DWELLING	14	23	4	438836	269417	41
12	SINGLE FAMILY DWELLING	12	20	4	439031	269798	36
13	SINGLE FAMILY DWELLING	10	19	4	438804	270167	46
14	MOBILE HOME	4	12	4	438721	269020	36
15	MOBILE HOME	6	13	4	438754	269092	36
16	MOBILE HOME	12	20	4	438932	269391	35
17	SINGLE FAMILY DWELLING	2	9	4	438362	268931	53
18	SINGLE FAMILY DWELLING	12	20	4	438849	269355	38
19	SINGLE FAMILY DWELLING	9	17	4	438835	270251	46
20	SINGLE FAMILY DWELLING	6	14	4	438914	270430	46
21	SINGLE FAMILY DWELLING	16	25	4	438835	269915	44
22	MOBILE HOME	14	23	4	438919	269474	36
23	CAMP	0	7	4	438650	268682	35
24	MOBILE HOME	16	24	4	438915	269521	37
25	SINGLE FAMILY DWELLING	4	12	4	438938	270390	43
26	MULTI-FAMILY DWELLING	5	12	4	438861	270543	54
27	MOBILE HOME	11	19	4	438932	269338	35
28	MOBILE HOME	12	21	4	438930	269406	35
29	SINGLE FAMILY DWELLING	7	15	4	439130	270282	45
30	MOBILE HOME	18	27	4	438653	269449	49
31	SINGLE FAMILY DWELLING	0	6	4	439300	270648	46
32	MOBILE HOME	12	20	4	438799	270088	44
33	MOBILE HOME	14	22	4	438922	269446	36
34	SINGLE FAMILY DWELLING	0	8	4	438618	268741	37
35	MOBILE HOME	13	21	4	438924	269433	36
36	SINGLE FAMILY DWELLING	12	20	4	438594	270037	53
37	SINGLE FAMILY DWELLING	7	14	4	438758	269138	38
38	SINGLE FAMILY DWELLING	4	12	4	438879	270563	55
39	MOBILE HOME	13	21	4	438926	269421	35
40	SINGLE FAMILY DWELLING	0	7	4	438587	268671	37
41	MOBILE HOME	12	20	4	438931	269377	35
42	SINGLE FAMILY DWELLING	7	15	4	438881	269170	36
43	SINGLE FAMILY DWELLING	15	24	4	438511	269789	53
44	SINGLE FAMILY DWELLING	22	30	4	438858	269591	41
45	MOBILE HOME	12	21	4	438719	269369	43
46	MOBILE HOME	7	15	4	438553	269208	42

Receiver ID	Receiver Type	Modeled Sound Pressure Level (dBA)		Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
		ONAN	ONAF		X (m)	Y (m)	Z (m)
47	MOBILE HOME	7	15	4	438513	269264	42
48	MOBILE HOME	9	17	4	438628	269281	44
49	MOBILE HOME	7	15	4	438529	269240	42
50	MOBILE HOME	7	15	4	438528	269253	42
51	MOBILE HOME	8	16	4	438569	269264	43
52	MOBILE HOME	13	22	4	438731	269397	43
53	MOBILE HOME	11	19	4	438629	269358	45
54	MOBILE HOME	8	16	4	438607	269245	43
55	MOBILE HOME	7	15	4	438651	269164	40
56	MOBILE HOME	11	19	4	438662	269339	45
57	MOBILE HOME	9	17	4	438671	269264	42
58	MOBILE HOME	10	18	4	438614	269323	44
59	MOBILE HOME	7	14	4	438611	269168	41
60	MOBILE HOME	10	19	4	438782	269299	43
61	MOBILE HOME	9	17	4	438794	269256	39
62	MOBILE HOME	10	19	4	438504	269312	42
63	MOBILE HOME	9	17	4	438540	269317	42
64	MOBILE HOME	9	17	4	438581	269302	43
65	MOBILE HOME	6	13	4	438495	269172	41
66	MOBILE HOME	6	14	4	438500	269183	41
67	MOBILE HOME	6	14	4	438502	269197	42
68	MOBILE HOME	6	14	4	438506	269210	42
69	MOBILE HOME	7	14	4	438505	269224	42
70	MOBILE HOME	7	15	4	438507	269238	42
71	MOBILE HOME	7	15	4	438508	269253	42
72	MOBILE HOME	8	16	4	438533	269280	42
73	MOBILE HOME	6	14	4	438525	269198	42
74	MOBILE HOME	6	14	4	438520	269186	41
75	MOBILE HOME	6	14	4	438514	269172	41
76	MOBILE HOME	6	14	4	438538	269174	41
77	MOBILE HOME	8	16	4	438571	269275	43
78	MOBILE HOME	8	16	4	438562	269253	42
79	MOBILE HOME	7	15	4	438558	269234	42
80	MOBILE HOME	7	15	4	438555	269222	42
81	MOBILE HOME	7	14	4	438549	269198	42
82	MOBILE HOME	13	22	4	438746	269389	42
83	MOBILE HOME	13	21	4	438699	269396	45
84	MOBILE HOME	11	20	4	438614	269383	46
85	MOBILE HOME	11	19	4	438598	269360	45
86	MOBILE HOME	10	18	4	438579	269339	45



Receiver ID	Receiver Type	Modeled Sound Pressure Level (dBA)		Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
		ONAN	ONAF		X (m)	Y (m)	Z (m)
87	MOBILE HOME	12	20	4	438643	269388	47
88	MOBILE HOME	11	20	4	438634	269371	46
89	MOBILE HOME	10	18	4	438611	269340	44
90	MOBILE HOME	9	17	4	438599	269300	43
91	MOBILE HOME	9	17	4	438590	269277	43
92	MOBILE HOME	8	16	4	438586	269263	43
93	MOBILE HOME	8	16	4	438580	269250	43
94	MOBILE HOME	8	15	4	438579	269234	42
95	MOBILE HOME	7	15	4	438574	269223	42
96	MOBILE HOME	7	14	4	438562	269194	42
97	MOBILE HOME	6	14	4	438556	269176	42
98	MOBILE HOME	6	14	4	438568	269163	42
99	MOBILE HOME	10	18	4	438629	269308	45
100	MOBILE HOME	9	17	4	438624	269270	44
101	MOBILE HOME	8	16	4	438608	269262	43
102	MOBILE HOME	7	15	4	438610	269208	42
103	MOBILE HOME	7	15	4	438605	269195	42
104	MOBILE HOME	7	15	4	438603	269182	42
105	MOBILE HOME	8	16	4	438612	269221	43
106	MOBILE HOME	7	14	4	438635	269165	40
107	MOBILE HOME	7	15	4	438679	269164	39
108	MOBILE HOME	9	17	4	438653	269277	43
109	MOBILE HOME	10	18	4	438653	269296	44
110	MOBILE HOME	10	18	4	438655	269311	44
111	MOBILE HOME	10	19	4	438655	269326	45
112	MOBILE HOME	11	20	4	438668	269353	46
113	MOBILE HOME	12	20	4	438674	269367	45
114	MOBILE HOME	12	20	4	438679	269378	45
115	MOBILE HOME	11	20	4	438688	269351	45
116	MOBILE HOME	11	19	4	438679	269340	45
117	MOBILE HOME	11	19	4	438673	269322	44
118	MOBILE HOME	10	18	4	438672	269307	43
119	MOBILE HOME	10	18	4	438665	269295	43
120	MOBILE HOME	7	15	4	438643	269200	41
121	MOBILE HOME	8	16	4	438664	269221	40
122	MOBILE HOME	8	16	4	438663	269236	41
123	MOBILE HOME	9	17	4	438683	269278	41
124	MOBILE HOME	12	20	4	438711	269348	43
125	MOBILE HOME	12	20	4	438744	269361	41
126	MOBILE HOME	11	20	4	438736	269339	41

Receiver ID	Receiver Type	Modeled Sound Pressure Level (dBA)		Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
		ONAN	ONAF		X (m)	Y (m)	Z (m)
127	MOBILE HOME	11	20	4	438724	269338	41
128	MOBILE HOME	11	19	4	438714	269327	41
129	MOBILE HOME	10	18	4	438702	269299	41
130	MOBILE HOME	10	18	4	438706	269282	40
131	MOBILE HOME	9	17	4	438697	269247	40
132	MOBILE HOME	8	15	4	438675	269194	39
133	MOBILE HOME	8	16	4	438730	269213	40
134	MOBILE HOME	12	20	4	438800	269340	43
135	MOBILE HOME	11	19	4	438788	269312	43
136	MOBILE HOME	10	18	4	438775	269291	43
137	MOBILE HOME	11	19	4	438793	269326	43
138	MOBILE HOME	7	14	4	438524	269212	42
139	MOBILE HOME	7	15	4	438528	269227	42
140	MOBILE HOME	8	16	4	438531	269266	42
141	MOBILE HOME	8	16	4	438515	269277	42
142	MOBILE HOME	7	15	4	438567	269206	42
143	MOBILE HOME	6	14	4	438545	269184	42
144	MOBILE HOME	7	14	4	438624	269166	41
145	MOBILE HOME	8	16	4	438615	269229	43
146	MOBILE HOME	9	17	4	438566	269310	44
147	MOBILE HOME	8	17	4	438486	269278	43
148	MOBILE HOME	8	16	4	438481	269265	43
149	MOBILE HOME	7	15	4	438475	269255	43
150	MOBILE HOME	12	20	4	438484	269319	41
151	MOBILE HOME	12	20	4	438464	269325	41
152	MOBILE HOME	11	20	4	438471	269294	43
153	MOBILE HOME	11	20	4	438468	269280	44
154	MOBILE HOME	11	19	4	438467	269266	44
155	MOBILE HOME	12	20	4	438695	269368	44
156	MOBILE HOME	10	18	4	438692	269302	42
157	MOBILE HOME	11	19	4	438700	269317	42
158	MOBILE HOME	11	19	4	438706	269331	42
159	MOBILE HOME	8	16	4	438683	269222	40
160	MOBILE HOME	9	16	4	438688	269236	40
161	MOBILE HOME	9	17	4	438703	269263	40
162	MOBILE HOME	11	19	4	438708	269312	41
163	MOBILE HOME	11	19	4	438734	269309	40
164	MOBILE HOME	12	21	4	438733	269362	42
165	MOBILE HOME	10	18	4	438765	269275	42
166	MOBILE HOME	7	15	4	438771	269163	38



Receiver ID	Receiver Type	Modeled Sound Pressure Level (dBA)		Relative Height (m)	Coordinates (Vermont State Plane NAD83)		
		ONAN	ONAF		X (m)	Y (m)	Z (m)
167	MOBILE HOME	7	15	4	438793	269171	37
168	MOBILE HOME	8	16	4	438702	269195	39
169	MOBILE HOME	12	20	4	438621	269391	47
170	MOBILE HOME	12	20	4	438745	269350	41
171	MOBILE HOME	12	20	4	438810	269358	43
172	MOBILE HOME	8	16	4	438726	269196	40
173	MOBILE HOME	9	17	4	438753	269238	41
174	MOBILE HOME	8	16	4	438718	269195	39
175	MOBILE HOME	10	18	4	438814	269289	38
176	MOBILE HOME	10	18	4	438805	269273	38
177	MOBILE HOME	9	16	4	438778	269226	39
178	MOBILE HOME	8	16	4	438772	269214	39
179	MOBILE HOME	8	16	4	438744	269210	40
180	MOBILE HOME	7	15	4	438689	269152	38
181	MOBILE HOME	7	15	4	438700	269158	39
182	MOBILE HOME	8	15	4	438787	269183	37
183	MOBILE HOME	7	15	4	438813	269179	36
184	MOBILE HOME	11	19	4	438615	269354	45
185	MOBILE HOME	11	19	4	438618	269361	45
186	MOBILE HOME	11	20	4	438627	269379	46
187	MOBILE HOME	10	18	4	438809	269282	38
188	MOBILE HOME	9	17	4	438737	269231	40
189	MOBILE HOME	7	15	4	438759	269168	38
190	MOBILE HOME	7	15	4	438774	269178	38
191	MOBILE HOME	7	15	4	438785	269162	37
192	MOBILE HOME	7	15	4	438751	269166	38
193	MOBILE HOME	7	15	4	438731	269166	39
194	MOBILE HOME	7	15	4	438720	269160	38
195	MOBILE HOME	13	22	4	438642	269413	48
196	MOBILE HOME	14	22	4	438953	269489	34
197	MOBILE HOME	13	21	4	438961	269445	34
198	MOBILE HOME	12	20	4	438960	269430	34
199	MOBILE HOME	13	21	4	438955	269474	35
200	MOBILE HOME	13	21	4	438958	269459	35
201	MOBILE HOME	14	22	4	438951	269505	35
202	MOBILE HOME	15	23	4	438932	269523	36
203	MOBILE HOME	11	19	4	438928	269359	35
204	MOBILE HOME	15	23	4	438949	269522	35