

MEMO

TO: Michael Carey, SWEB Development

FROM: Eddie Duncan, INCE Bd. Cert.

DATE: February 7, 2020

SUBJECT: Silver Maple Wind - Additional Information for Maine DEP

Following feedback and discussions with Maine DEP (DEP) regarding the Noise Impact Assessment¹ (NIA) for Silver Maple Wind (Project), SWEB Development would like to provide additional information to the DEP to assist in their review of the Project. This memorandum provides additional information on:

- Sound propagation modeling,
- Noise Reduced Operation (NRO), and
- Plans for postconstruction sound monitoring.

Sound Propagation Modeling

Additional sound propagation model has been conducted for the Project to consider specific model parameters requested by DEP. The sound propagation model that was used in the Noise Impact Assessment (NIA) for the Project was updated to include two model scenarios²:

1. Scenario 1 - Ground factor of $G=0.5$ with +2 dB added to the highest apparent sound power level of the turbine. Specifically:
 - a. 103.9 dBA +2 dB (105.9 dBA) for Silver Maple Turbines 2 through 5 (V136s),
 - b. 97 dBA +2 dB (99 dBA) for Silver Maple Turbine 1 (V136 in SO13 mode), and
 - c. 103.5 dBA +2 dB (105.5 dBA) for all five Pisgah Turbines (V90s)
2. Scenario 2 - Ground factor of $G=0.5$ with +2 dB added to the apparent sound power level of the turbine at a hub height wind speed of 7 m/s. Specifically:

¹ Silver Maple Wind Noise Impact Assessment, RSG, July 16, 2019.

² With the exception of the modeling parameters specified in the scenario descriptions, all other modeling parameters (i.e. receiver height, turbine height, spectral ground attenuation, etc.) were the same as those used in the NIA.

- a. 99.6 dBA +2 dB (101.6 dBA) for all five Silver Maple Turbines (V136s), and
- b. 103.5 +2 dB (105.5 dBA) for all five Pisgah Turbines (V90s).³

Model Scenario 1 Results

The model results for the first scenario (highest sound emissions) are presented in map form in Figure 1 for Silver Maple turbines at a hub height of 105 m and in Figure 2 for Silver Maple turbines at a hub height of 117 m. The results for each modeled receptor are also provided in Table 1, which is comparable to the receptor model results table in Appendix D in the NIA.

As shown in Table 1, the highest modeled sound level is 35 dBA which occurs at 96 Woodchuck Hill Road, which recently became a participating parcel. All other receptors are 34 dBA or less, and the average sound level across all receptors is 29 dBA.

Model Scenario 2 Results

The model results for the second scenario (hub height winds at 7 m/s) are presented in map form in Figure 3 for Silver Maple turbines at a hub height of 105 m and in Figure 4 for Silver Maple turbines at a hub height of 117 m. The results for each modeled receptor are also provided in Table 2. As shown in Table 2, the highest modeled sound level is 34 dBA which occurs at 96 Woodchuck Hill Road and Dragon Fly Lane⁴, both of which are participating parcels. All other receptors are 33 dBA or less, and the average sound level across all receptors is 28 dBA.

Modeling Conclusion

These model results which were produced per specific model parameters discussed with DEP are consistent with the results reported in the NIA, and as such, the conclusions from the NIA are still applicable. Specifically, that given the projected sound levels from Silver Maple Wind and Pisgah Mountain together, the Project can be constructed and operated in such a way as to comply with the noise limits in the Clifton Land Use Ordinance.

NRO on Silver Maple Turbine 1

As discussed in Section 5.3 of the NIA, the purpose of the modeled NRO (SO13) on Turbine 1 when winds are 8 m/s or greater and out of the southeast $\pm 22.5^\circ$ was to ensure that sound levels at 96 Woodchuck Hill Road do not exceed 35 dBA. Given that 96 Woodchuck Hill Road is now a participating parcel, the NRO for Turbine 1 would no longer be necessary.

³ The sound power level of the Pisgah V90 turbines were kept at their highest sound level emissions in the 7 m/s model run. Actual emissions from the V90s would be lower at 7 m/s, so this is a conservative model assumption that produces sound levels that are higher than those that are expected at 7 m/s.

⁴ Also known as Oliver Mountain Road.



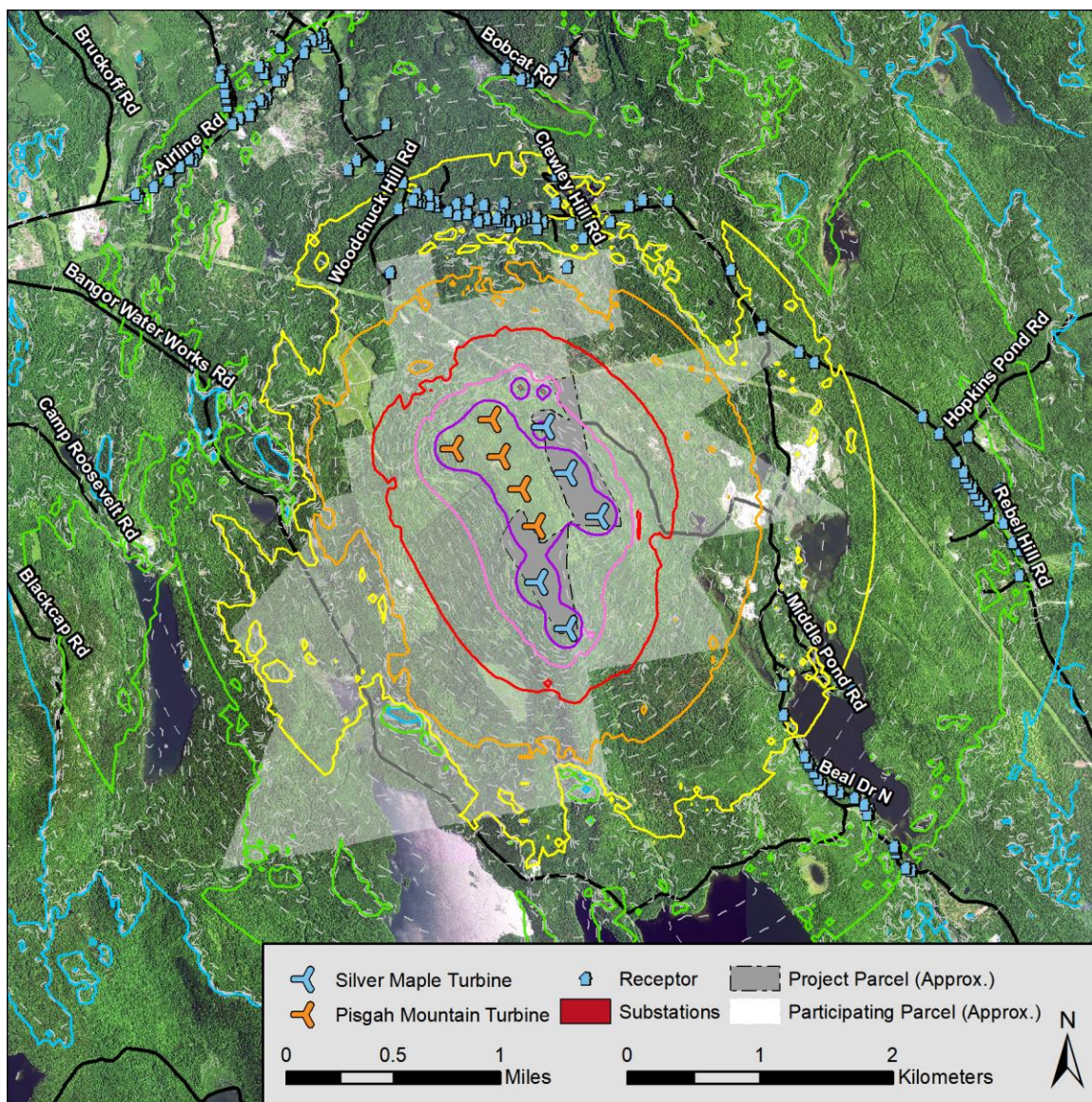
To demonstrate this, an additional model run was conducted that excluded the NRO from Turbine 1. For this additional model scenario, we used the exact same parameters that were used in Scenario 1 described on the previous page, except that the sound power level for Silver Maple Turbine 1 was set to 103.9 +2 dB (105.9 dBA), which is the sound power level for the standard operating mode used on the rest of the Silver Maple Turbines. The results for this model scenario are presented in Figure 5, Figure 6, and Table 3. As shown in Table 3, the highest modeled sound level is 35 dBA which occurs at 96 Woodchuck Hill Road, Dragon Fly Lane, and 115, 119, and 123 Rebel Hill Road. All other receptors are 34 dBA or less, and the average sound level across all receptors is 30 dBA.

Postconstruction Sound Monitoring

Postconstruction sound monitoring was conducted for Pisgah Mountain Wind in November and December of 2017 to assess compliance with the Clifton Land Use Ordinance. The same monitoring procedures that were used for the Pisgah postconstruction monitoring are proposed for the Silver Maple postconstruction monitoring. An outline of these procedures is provided below:

1. Monitor Locations – Same locations used as preconstruction monitors in the Silver Maple NIA.
 - a. AMP-1: North-northwest of the turbines on Woodchuck Hill Road. Approximately 4,900 feet from Silver Maple Turbine 1.
 - b. AMP-2: North of the turbines and approximately 1,280 feet south of Rebel Hill Road. Approximately 3,590 feet from Silver Maple Turbine 1.
 - c. AMP-3: East of the turbines on Springy Pond Road. Approximately 4,660 feet from Silver Maple Turbine 3.
 - d. AMP-5: West of the turbines on Bangor Water Works Road. Approximately 5,990 feet from Silver Maple Turbine 4.
2. Timing:
 - a. Leaf-off season, likely late fall or early spring.
 - b. Monitoring period: 2 weeks, but may be extended to 3 weeks depending on weather conditions.
3. Instrumentation at each site:
 - a. ANSI/IEC Class 1 sound level meters
 - b. Digital audio recorders either via an external recorder with input from the sound level meter microphone or internal audio recording capability on the sound level meter.
 - c. Anemometers (Onset S-WSA-M003 wind speed sensor or equivalent)

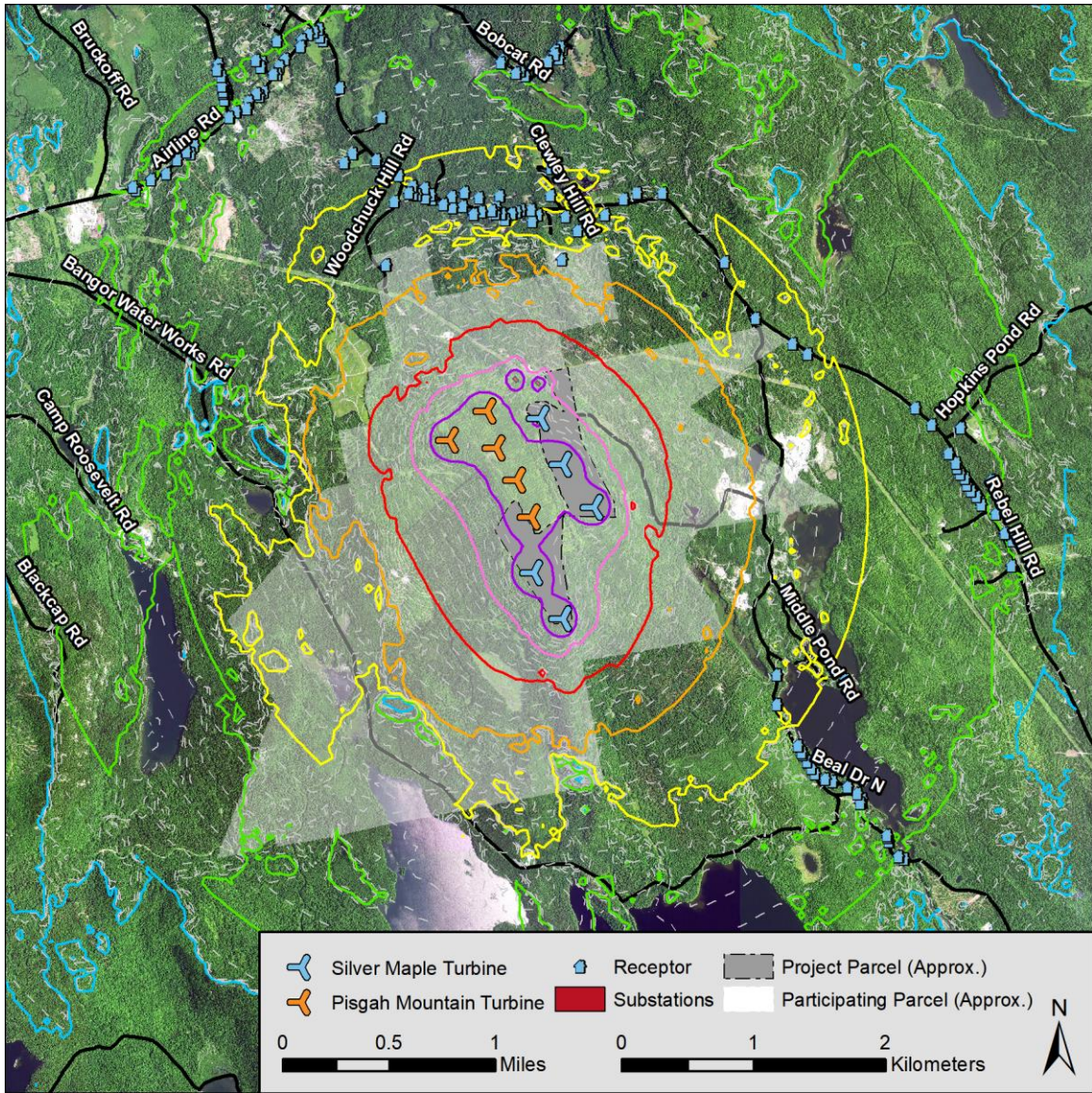
4. Data Collection:
 - a. 1/3 octave band sound level data collected at 50-millisecond intervals.
 - b. Audio at least 16 bit at 24 kbps.
 - c. Maximum and average wind speeds at one-minute intervals.
 - d. Hub height wind speed, wind direction, temperature, yaw direction, rpm, and power output from each turbine in 10-minute intervals.
5. Background Sound Levels Determination:
 - a. Pisgah & Silver Maple Turbines shutdown once per eight-hour period for a shutdown period of 20 minutes, if the project is operation at or near full sound power output and if it is not raining.
6. Data Analysis:
 - a. Data will be screened to for valid periods that meet the data requirements of the Clifton Land Use Ordinance.
 - b. 50-millisecond data will be analyzed to evaluate the presence of SDRS.
 - c. All data will be agglomerated into 10-minute periods.
 - d. Sound level data from valid periods will be compared with the sound level limits in the Clifton Land Use Ordinance.
7. Reporting will include:
 - a. A description of the procedures,
 - b. Maps, photographs, and descriptions of the test sites,
 - c. Tables and graphs of meteorological conditions during the tests,
 - d. Operating conditions of the turbines during the test, including power output, wind speed, nacelle direction, and RPM, if available,
 - e. Sound monitoring results as tables and graphs (A-weighted and C-weighted values for L_{eq} , L90, L10, 1/3 octave band sound levels, all by 10-minute intervals) for all background periods and turbine-on periods within one-hour of a background period,
 - f. Identification of any periods with short-duration repetitive events per the Ordinance, and
 - g. An analysis comparing monitor results with the limits specified in the Ordinance.
 - h. We will also provide a copy of all raw operational, sound, and meteorological data collected during the monitoring period on a hard drive or flash drive to the Clifton Code Enforcement Officer within 30 days of the completion of the monitoring period.



Sound Pressure Level (dBA)

- 1 dB Increment
- 20 dBA
- 25 dBA
- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA

FIGURE 1: MODEL RESULTS MAP FOR SILVER MAPLE TURBINES AT 105 METER HUB HEIGHT AND MODEL SCENARIO 1 DESCRIBED ABOVE



Sound Pressure Level (dBA)

- - - 1 dB Increment
- 25 dBA
- 35 dBA
- 45 dBA
- 20 dBA
- 30 dBA
- 40 dBA
- 50 dBA

FIGURE 2: MODEL RESULTS MAP FOR SILVER MAPLE TURBINES AT 117 METER HUB HEIGHT AND MODEL SCENARIO 1 DESCRIBED ABOVE



TABLE 1: RECEPTOR MODEL RESULTS – SCENARIO 1 (HIGHEST SOUND EMISSIONS +2dB & G=0.5)

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
100 AIRLINE RD	27	47	27	47	534978	4960321	57
101 AIRLINE RD	26	43	26	43	535000	4960295	57
120 AIRLINE RD	27	47	27	47	535112	4960376	58
135 AIRLINE RD	22	40	22	40	535226	4960420	55
154 AIRLINE RD	25	45	25	45	535312	4960529	56
166 AIRLINE RD	25	42	25	42	535381	4960585	55
167 AIRLINE RD	25	40	25	40	535412	4960571	56
176 AIRLINE RD	25	40	25	40	535439	4960632	53
58 SCOTTS POINT RD	26	47	26	46	535615	4961208	50
63 SCOTTS POINT RD	26	47	26	46	535621	4961251	50
49 SCOTTS POINT RD	27	47	27	47	535645	4961159	52
40 SCOTTS POINT RD	27	47	27	47	535652	4961087	50
30 SCOTTS POINT RD	27	47	27	47	535658	4961045	50
28 SCOTTS POINT RD	27	47	27	47	535661	4961032	50
34 SCOTTS POINT RD	27	47	27	47	535664	4961051	51
39 SCOTTS POINT RD	27	47	27	47	535665	4961094	51
20 SCOTTS POINT RD	27	47	27	47	535667	4960983	50
35 SCOTTS POINT RD	27	47	27	47	535676	4961067	51
29 SCOTTS POINT RD	27	47	27	47	535688	4961051	51
25 SCOTTS POINT RD	27	47	27	47	535693	4961026	51
4 SCOTTS POINT RD	28	47	27	47	535707	4960848	51
226 AIRLINE RD	27	45	27	45	535758	4960890	53
235 AIRLINE RD	28	47	28	47	535836	4960913	56
242 AIRLINE RD	27	47	27	47	535853	4960965	57
38 MCLAUGHLIN RD	27	47	27	47	535906	4961280	62
254 AIRLINE RD	27	47	27	47	535914	4961029	59
253 AIRLINE RD	28	47	27	47	535936	4961008	59
26 MCLAUGHLIN RD	27	47	27	47	535943	4961227	61
31 MCLAUGHLIN RD	27	47	27	47	535952	4961263	61
259 AIRLINE RD	28	47	27	47	535967	4961041	59
278 AIRLINE RD	27	47	27	47	536039	4961175	61
281 AIRLINE RD	27	47	27	47	536066	4961173	60
30 PLEASANT LN	27	47	26	47	536067	4961425	58
288 AIRLINE RD	27	47	27	47	536084	4961231	60
298 AIRLINE RD	27	47	27	47	536129	4961287	60
319 AIRLINE RD	27	47	27	47	536246	4961384	57

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
324 AIRLINE RD	27	47	27	47	536257	4961434	58
333 AIRLINE RD	27	47	27	47	536307	4961475	56
3 REBEL HILL RD	27	47	27	47	536345	4961493	56
4 REBEL HILL RD	26	46	26	46	536382	4961517	54
7 REBEL HILL RD	27	47	27	47	536394	4961457	56
9 REBEL HILL RD	27	47	27	47	536416	4961429	56
26 REBEL HILL RD	28	47	28	48	536542	4961073	53
22 WOOD BRIDGE LN	30	49	30	49	536575	4960502	60
11 WOOD BRIDGE LN	30	48	30	48	536640	4960574	58
61 REBEL HILL RD	29	46	29	46	536818	4960526	59
67 REBEL HILL RD	30	49	30	49	536821	4960513	60
37 BIRCH HILL LN	29	48	30	49	536862	4960849	54
71 REBEL HILL RD	31	49	31	49	536869	4960465	59
96 WOODCHUCK HILL RD	35	52	35	52	536893	4959728	69
15 WOODCHUCK HILL RD	32	50	32	50	536959	4960212	60
80 REBEL HILL RD	30	45	30	45	536991	4960406	60
87 REBEL HILL RD	32	50	32	50	537068	4960277	61
88 REBEL HILL RD	31	48	31	48	537097	4960324	62
89 REBEL HILL RD	32	50	32	50	537102	4960264	63
91 REBEL HILL RD	32	50	32	50	537130	4960259	64
94 REBEL HILL RD	32	48	32	48	537185	4960313	61
95 REBEL HILL RD	33	50	33	50	537190	4960238	62
98 REBEL HILL RD	33	51	33	51	537233	4960262	64
97 REBEL HILL RD	33	51	33	51	537241	4960229	62
103 REBEL HILL RD	33	51	33	51	537331	4960186	64
106 REBEL HILL RD	33	51	33	51	537393	4960248	65
107 REBEL HILL RD	33	51	33	51	537396	4960164	64
111 REBEL HILL RD	33	51	33	51	537476	4960172	67
112 REBEL HILL RD	33	51	33	51	537490	4960278	68
115 REBEL HILL RD	34	51	34	51	537558	4960115	67
118 REBEL HILL RD	34	51	34	51	537597	4960239	70
119 REBEL HILL RD	34	52	34	52	537619	4960132	71
123 REBEL HILL RD	34	52	34	52	537697	4960139	76
125 REBEL HILL RD	33	51	33	51	537724	4960119	76
126 REBEL HILL RD	32	48	32	48	537729	4960163	76
128 REBEL HILL RD	33	51	33	51	537755	4960251	80

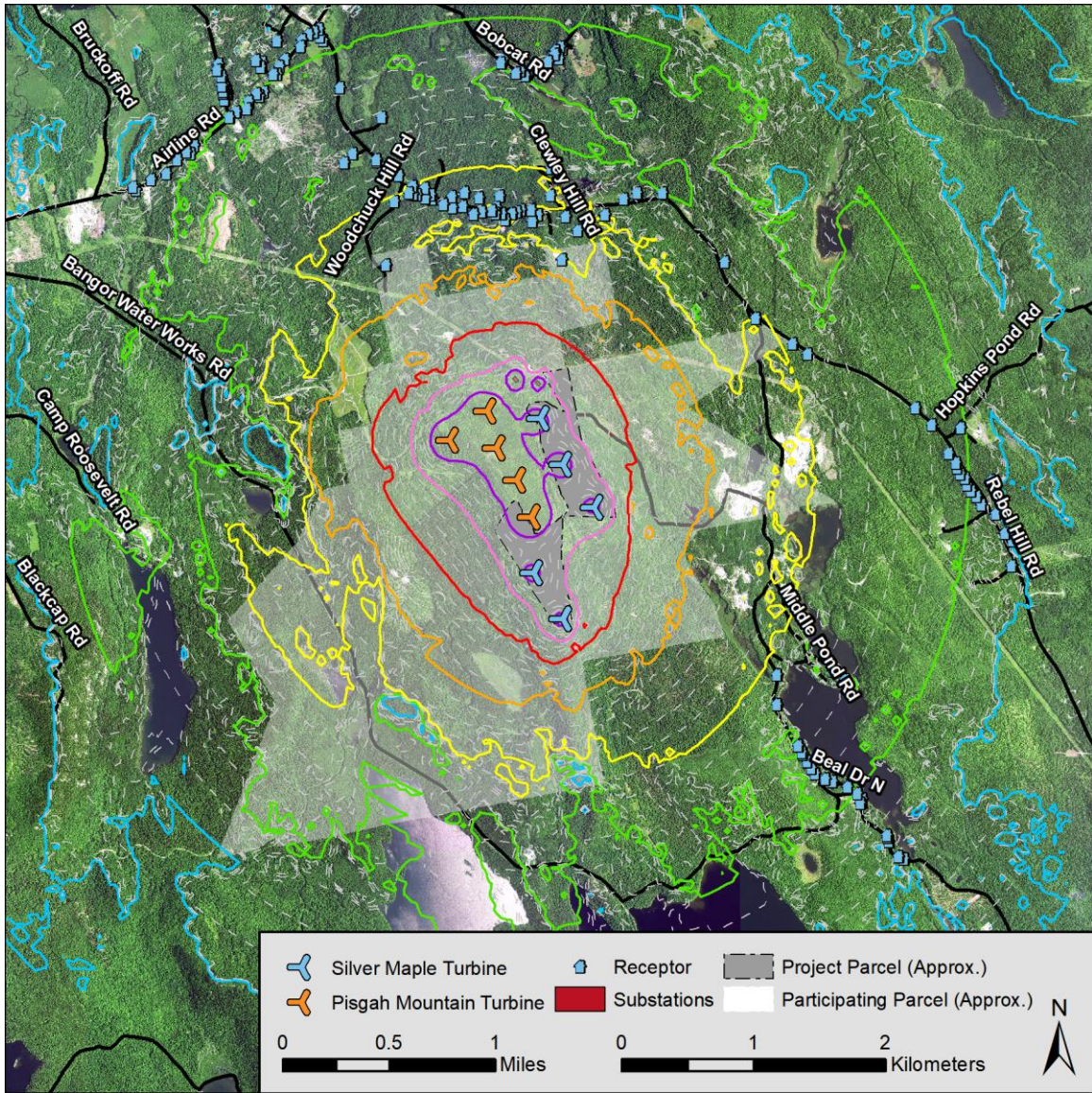


Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
187 BOBCAT RD	28	47	28	47	537765	4961261	68
127 REBEL HILL RD	33	50	33	51	537771	4960120	77
188 BOBCAT RD	28	47	28	47	537782	4961286	68
129 REBEL HILL RD	33	50	33	50	537796	4960072	76
131 REBEL HILL RD	32	50	33	50	537849	4960118	79
207 BOBCAT RD	28	47	28	47	537881	4961183	70
133 REBEL HILL RD	32	50	32	50	537884	4960131	80
210 BOBCAT RD	28	47	28	47	537910	4961200	72
135 REBEL HILL RD	32	50	32	50	537918	4960145	81
212 BOBCAT RD	28	47	28	47	537948	4961165	70
139 REBEL HILL RD	32	50	32	50	537992	4960147	86
141 REBEL HILL RD	29	45	29	45	538003	4960058	92
143 REBEL HILL RD	29	45	29	45	538044	4960110	92
2 DRAGON FLY LN	31	49	31	49	538119	4960153	96
243 BOBCAT RD	29	48	29	48	538123	4961271	78
147 REBEL HILL RD	30	45	30	45	538141	4959998	114
20 CLEWLEY HILL RD	33	50	33	50	538143	4960256	103
74 CLEWLEY HILL RD	32	50	32	50	538146	4960462	118
18 DRAGON FLY LN	29	45	29	45	538155	4959994	114
1 ZACHARYS WAY	28	48	28	48	538172	4961326	83
258 BOBCAT RD	28	48	28	48	538176	4961355	83
3 ZACHARYS WAY	29	48	29	48	538205	4961293	85
272 BOBCAT RD	28	48	28	48	538216	4961380	89
DRAGON FLY LN	34	49	34	49	538228	4959772	153
271 BOBCAT RD	28	48	28	48	538234	4961366	88
155 REBEL HILL RD	30	47	30	47	538257	4960095	107
159 REBEL HILL RD	29	45	29	45	538346	4959991	118
173 REBEL HILL RD	33	51	33	51	538554	4960110	125
182 REBEL HILL RD	27	44	28	44	538698	4960230	110
188 REBEL HILL RD	29	47	29	47	538797	4960274	104
198 REBEL HILL RD	28	44	28	44	538991	4960273	111
236 REBEL HILL RD	30	46	31	47	539461	4959750	117
261 REBEL HILL RD	33	51	33	51	539695	4959327	116
434 SPRINGY POND RD	32	49	32	49	539858	4956397	98
412 SPRINGY POND RD	34	51	34	51	539858	4956621	96
281 REBEL HILL RD	33	50	33	50	539976	4959132	115

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
468 SPRINGY POND RD	31	49	31	49	540015	4956084	97
476 SPRINGY POND RD	31	49	31	49	540045	4956034	98
478 SPRINGY POND RD	31	49	31	49	540053	4956020	98
486 SPRINGY POND RD	31	49	31	49	540085	4955967	98
289 REBEL HILL RD	33	50	33	50	540089	4959055	113
494 SPRINGY POND RD	30	48	30	48	540120	4955915	98
500 SPRINGY POND RD	30	48	30	48	540144	4955873	98
33 BEAL DR N	30	48	30	48	540223	4955834	96
27 BEAL DR N	30	48	30	48	540280	4955816	96
35 HENDRICKSON LN	30	44	30	44	540285	4956655	98
51 HENDRICKSON LN	31	49	31	49	540374	4956586	99
11 BEAL DR N	29	48	29	48	540392	4955773	95
2 BEAL DR S	29	47	29	47	540468	4955722	96
562 SPRINGY POND RD	28	47	28	47	540489	4955652	93
8 BEAL DR S	28	46	28	46	540504	4955685	93
606 SPRINGY POND RD	27	47	27	47	540690	4955408	94
608 SPRINGY POND RD	27	47	27	47	540698	4955393	94
612 SPRINGY POND RD	27	47	27	47	540704	4955360	95
632 SPRINGY POND RD	27	46	27	46	540778	4955245	95
638 SPRINGY POND RD	27	46	27	46	540820	4955228	94
342 REBEL HILL RD	30	48	30	48	540905	4958644	159
351 REBEL HILL RD	29	48	29	48	541033	4958516	174
367 REBEL HILL RD	29	48	29	48	541161	4958300	192
373 REBEL HILL RD	29	48	29	48	541217	4958227	199
375 REBEL HILL RD	29	48	29	48	541224	4958190	199
377 REBEL HILL RD	29	48	29	48	541247	4958147	202
4 OCTOBER WAY	28	47	28	47	541249	4958495	198
381 REBEL HILL RD	28	47	28	47	541284	4958113	204
383 REBEL HILL RD	28	47	28	47	541297	4958065	206
385 REBEL HILL RD	28	47	28	47	541329	4958019	208



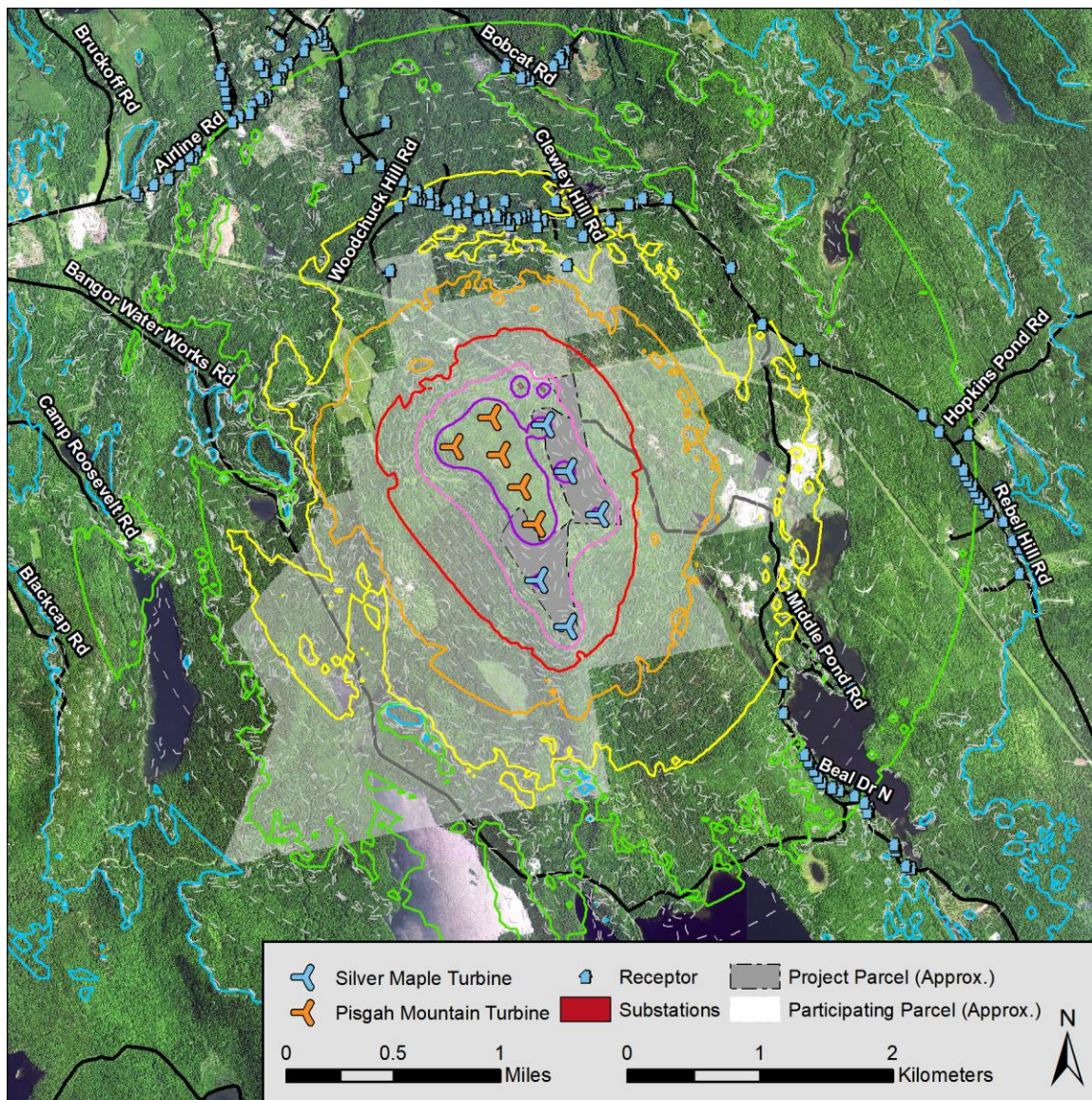
Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
389 REBEL HILL RD	28	47	28	47	541369	4957978	211
393 REBEL HILL RD	28	47	28	47	541408	4957912	211
388 REBEL HILL RD	27	44	27	44	541482	4958093	208
400 REBEL HILL RD	25	40	25	40	541516	4957843	207
410 REBEL HILL RD	27	44	27	45	541586	4957698	203
49 FICKETT MOUNTAIN TRL	27	46	27	46	541635	4957450	190
414 REBEL HILL RD	23	39	24	39	541642	4957642	197



Sound Pressure Level (dBA)

- 1 dB Increment 25 dBA 35 dBA 45 dBA
- 20 dBA 30 dBA 40 dBA 50 dBA

FIGURE 3: MODEL RESULTS MAP FOR SILVER MAPLE TURBINES AT 105 METER HUB HEIGHT AND MODEL SCENARIO 2 DESCRIBED ABOVE



Sound Pressure Level (dBA)

- 1 dB Increment
- 20 dBA (Blue line)
- 25 dBA (Green line)
- 30 dBA (Yellow line)
- 35 dBA (Orange line)
- 40 dBA (Red line)
- 45 dBA (Pink line)
- 50 dBA (Purple line)

FIGURE 4: MODEL RESULTS MAP FOR SILVER MAPLE TURBINES AT 117 METER HUB HEIGHT AND MODEL SCENARIO 2 DESCRIBED ABOVE

TABLE 2: RECEPTOR MODEL RESULTS – SCENARIO 2 (SOUND EMISSIONS FOR HUB HEIGHT WIND SPEED OF 7 M/S +2dB & G=0.5)

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dB C	dBA	dB C	X (m)	Y (m)	
100 AIRLINE RD	26	46	26	46	534978	4960321	57
101 AIRLINE RD	25	42	25	42	535000	4960295	57
120 AIRLINE RD	26	46	26	46	535112	4960376	58
135 AIRLINE RD	21	39	21	39	535226	4960420	55
154 AIRLINE RD	25	44	25	44	535312	4960529	56
166 AIRLINE RD	24	42	24	42	535381	4960585	55
167 AIRLINE RD	24	40	24	40	535412	4960571	56
176 AIRLINE RD	24	40	24	40	535439	4960632	53
58 SCOTTS POINT RD	25	46	25	46	535615	4961208	50
63 SCOTTS POINT RD	25	46	25	46	535621	4961251	50
49 SCOTTS POINT RD	26	46	26	46	535645	4961159	52
40 SCOTTS POINT RD	26	46	26	46	535652	4961087	50
30 SCOTTS POINT RD	26	46	26	46	535658	4961045	50
28 SCOTTS POINT RD	26	46	26	46	535661	4961032	50
34 SCOTTS POINT RD	26	46	26	46	535664	4961051	51
39 SCOTTS POINT RD	26	46	26	46	535665	4961094	51
20 SCOTTS POINT RD	26	46	26	46	535667	4960983	50
35 SCOTTS POINT RD	26	46	26	46	535676	4961067	51
29 SCOTTS POINT RD	26	46	26	46	535688	4961051	51
25 SCOTTS POINT RD	26	46	26	46	535693	4961026	51
4 SCOTTS POINT RD	27	46	27	46	535707	4960848	51
226 AIRLINE RD	26	45	26	45	535758	4960890	53
235 AIRLINE RD	27	47	27	47	535836	4960913	56
242 AIRLINE RD	27	46	27	46	535853	4960965	57
38 MCLAUGHLIN RD	26	46	26	46	535906	4961280	62
254 AIRLINE RD	27	46	26	46	535914	4961029	59
253 AIRLINE RD	27	46	27	46	535936	4961008	59
26 MCLAUGHLIN RD	26	46	26	46	535943	4961227	61
31 MCLAUGHLIN RD	26	46	26	46	535952	4961263	61
259 AIRLINE RD	27	46	27	46	535967	4961041	59
278 AIRLINE RD	26	46	26	46	536039	4961175	61
281 AIRLINE RD	26	46	26	46	536066	4961173	60
30 PLEASANT LN	26	46	26	46	536067	4961425	58
288 AIRLINE RD	26	46	26	46	536084	4961231	60
298 AIRLINE RD	26	46	26	46	536129	4961287	60
319 AIRLINE RD	26	46	26	46	536246	4961384	57



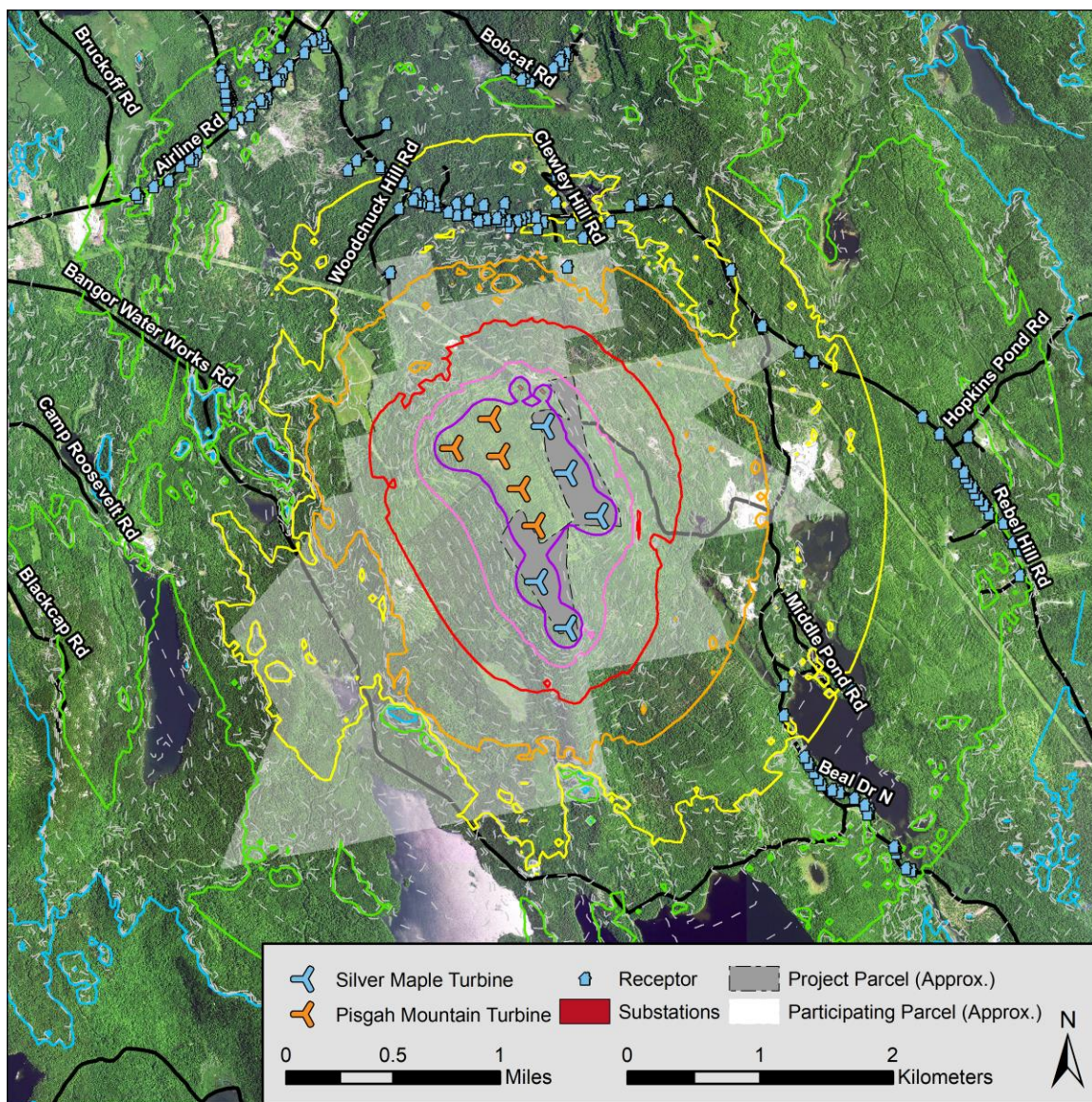
Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
324 AIRLINE RD	26	46	26	46	536257	4961434	58
333 AIRLINE RD	26	46	26	46	536307	4961475	56
3 REBEL HILL RD	26	46	26	46	536345	4961493	56
4 REBEL HILL RD	26	45	26	45	536382	4961517	54
7 REBEL HILL RD	26	46	26	46	536394	4961457	56
9 REBEL HILL RD	26	46	26	46	536416	4961429	56
26 REBEL HILL RD	27	47	27	47	536542	4961073	53
22 WOOD BRIDGE LN	29	48	29	48	536575	4960502	60
11 WOOD BRIDGE LN	29	48	29	48	536640	4960574	58
61 REBEL HILL RD	29	46	29	46	536818	4960526	59
67 REBEL HILL RD	30	48	30	48	536821	4960513	60
37 BIRCH HILL LN	29	48	29	48	536862	4960849	54
71 REBEL HILL RD	30	49	30	49	536869	4960465	59
96 WOODCHUCK HILL RD	34	52	34	52	536893	4959728	69
15 WOODCHUCK HILL RD	32	50	32	50	536959	4960212	60
80 REBEL HILL RD	30	45	30	45	536991	4960406	60
87 REBEL HILL RD	32	50	32	50	537068	4960277	61
88 REBEL HILL RD	31	47	31	48	537097	4960324	62
89 REBEL HILL RD	32	50	32	50	537102	4960264	63
91 REBEL HILL RD	32	50	32	50	537130	4960259	64
94 REBEL HILL RD	31	48	31	48	537185	4960313	61
95 REBEL HILL RD	32	50	32	50	537190	4960238	62
98 REBEL HILL RD	32	50	32	50	537233	4960262	64
97 REBEL HILL RD	32	50	32	50	537241	4960229	62
103 REBEL HILL RD	33	50	33	50	537331	4960186	64
106 REBEL HILL RD	32	51	32	51	537393	4960248	65
107 REBEL HILL RD	33	51	33	51	537396	4960164	64
111 REBEL HILL RD	33	51	33	51	537476	4960172	67
112 REBEL HILL RD	33	51	33	51	537490	4960278	68
115 REBEL HILL RD	33	51	33	51	537558	4960115	67
118 REBEL HILL RD	33	51	33	51	537597	4960239	70
119 REBEL HILL RD	33	51	33	51	537619	4960132	71
123 REBEL HILL RD	33	51	33	51	537697	4960139	76
125 REBEL HILL RD	33	51	33	51	537724	4960119	76
126 REBEL HILL RD	32	47	32	47	537729	4960163	76
128 REBEL HILL RD	33	51	33	51	537755	4960251	80

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
187 BOBCAT RD	27	46	27	46	537765	4961261	68
127 REBEL HILL RD	33	50	33	50	537771	4960120	77
188 BOBCAT RD	27	46	27	47	537782	4961286	68
129 REBEL HILL RD	32	50	33	50	537796	4960072	76
131 REBEL HILL RD	32	50	32	50	537849	4960118	79
207 BOBCAT RD	27	47	28	47	537881	4961183	70
133 REBEL HILL RD	32	50	32	50	537884	4960131	80
210 BOBCAT RD	27	47	27	47	537910	4961200	72
135 REBEL HILL RD	32	50	32	50	537918	4960145	81
212 BOBCAT RD	27	46	27	46	537948	4961165	70
139 REBEL HILL RD	32	49	32	49	537992	4960147	86
141 REBEL HILL RD	28	45	28	45	538003	4960058	92
143 REBEL HILL RD	28	44	28	44	538044	4960110	92
2 DRAGON FLY LN	31	48	31	49	538119	4960153	96
243 BOBCAT RD	28	47	28	47	538123	4961271	78
147 REBEL HILL RD	29	45	29	45	538141	4959998	114
20 CLEWLEY HILL RD	32	50	32	50	538143	4960256	103
74 CLEWLEY HILL RD	31	50	31	50	538146	4960462	118
18 DRAGON FLY LN	29	45	29	45	538155	4959994	114
1 ZACHARYS WAY	27	47	27	47	538172	4961326	83
258 BOBCAT RD	27	47	27	47	538176	4961355	83
3 ZACHARYS WAY	28	47	28	47	538205	4961293	85
272 BOBCAT RD	27	47	27	47	538216	4961380	89
DRAGON FLY LN	34	49	34	49	538228	4959772	153
271 BOBCAT RD	27	47	27	47	538234	4961366	88
155 REBEL HILL RD	30	47	30	47	538257	4960095	107
159 REBEL HILL RD	28	44	28	44	538346	4959991	118
173 REBEL HILL RD	32	50	32	50	538554	4960110	125
182 REBEL HILL RD	26	43	27	43	538698	4960230	110
188 REBEL HILL RD	29	47	29	47	538797	4960274	104
198 REBEL HILL RD	28	43	28	43	538991	4960273	111
236 REBEL HILL RD	28	44	29	45	539461	4959750	117
261 REBEL HILL RD	32	49	32	49	539695	4959327	116
434 SPRINGY POND RD	30	47	30	47	539858	4956397	98
412 SPRINGY POND RD	31	49	31	49	539858	4956621	96
281 REBEL HILL RD	31	49	31	49	539976	4959132	115



Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
468 SPRINGY POND RD	29	47	29	47	540015	4956084	97
476 SPRINGY POND RD	28	47	28	47	540045	4956034	98
478 SPRINGY POND RD	28	47	28	47	540053	4956020	98
486 SPRINGY POND RD	28	47	28	47	540085	4955967	98
289 REBEL HILL RD	31	49	31	49	540089	4959055	113
494 SPRINGY POND RD	28	47	28	47	540120	4955915	98
500 SPRINGY POND RD	28	47	28	47	540144	4955873	98
33 BEAL DR N	27	47	27	47	540223	4955834	96
27 BEAL DR N	27	47	27	47	540280	4955816	96
35 HENDRICKSON LN	28	42	28	42	540285	4956655	98
51 HENDRICKSON LN	29	48	29	48	540374	4956586	99
11 BEAL DR N	27	46	27	46	540392	4955773	95
2 BEAL DR S	26	46	26	46	540468	4955722	96
562 SPRINGY POND RD	26	46	26	46	540489	4955652	93
8 BEAL DR S	26	44	26	44	540504	4955685	93
606 SPRINGY POND RD	25	45	25	45	540690	4955408	94
608 SPRINGY POND RD	25	45	25	45	540698	4955393	94
612 SPRINGY POND RD	25	45	25	45	540704	4955360	95
632 SPRINGY POND RD	25	45	25	45	540778	4955245	95
638 SPRINGY POND RD	25	45	24	45	540820	4955228	94
342 REBEL HILL RD	28	47	28	47	540905	4958644	159
351 REBEL HILL RD	27	47	27	47	541033	4958516	174
367 REBEL HILL RD	27	47	27	47	541161	4958300	192
373 REBEL HILL RD	27	46	27	46	541217	4958227	199
375 REBEL HILL RD	27	46	27	46	541224	4958190	199
377 REBEL HILL RD	27	46	27	46	541247	4958147	202
4 OCTOBER WAY	27	46	27	46	541249	4958495	198
381 REBEL HILL RD	27	46	27	46	541284	4958113	204
383 REBEL HILL RD	27	46	27	46	541297	4958065	206
385 REBEL HILL RD	26	46	26	46	541329	4958019	208

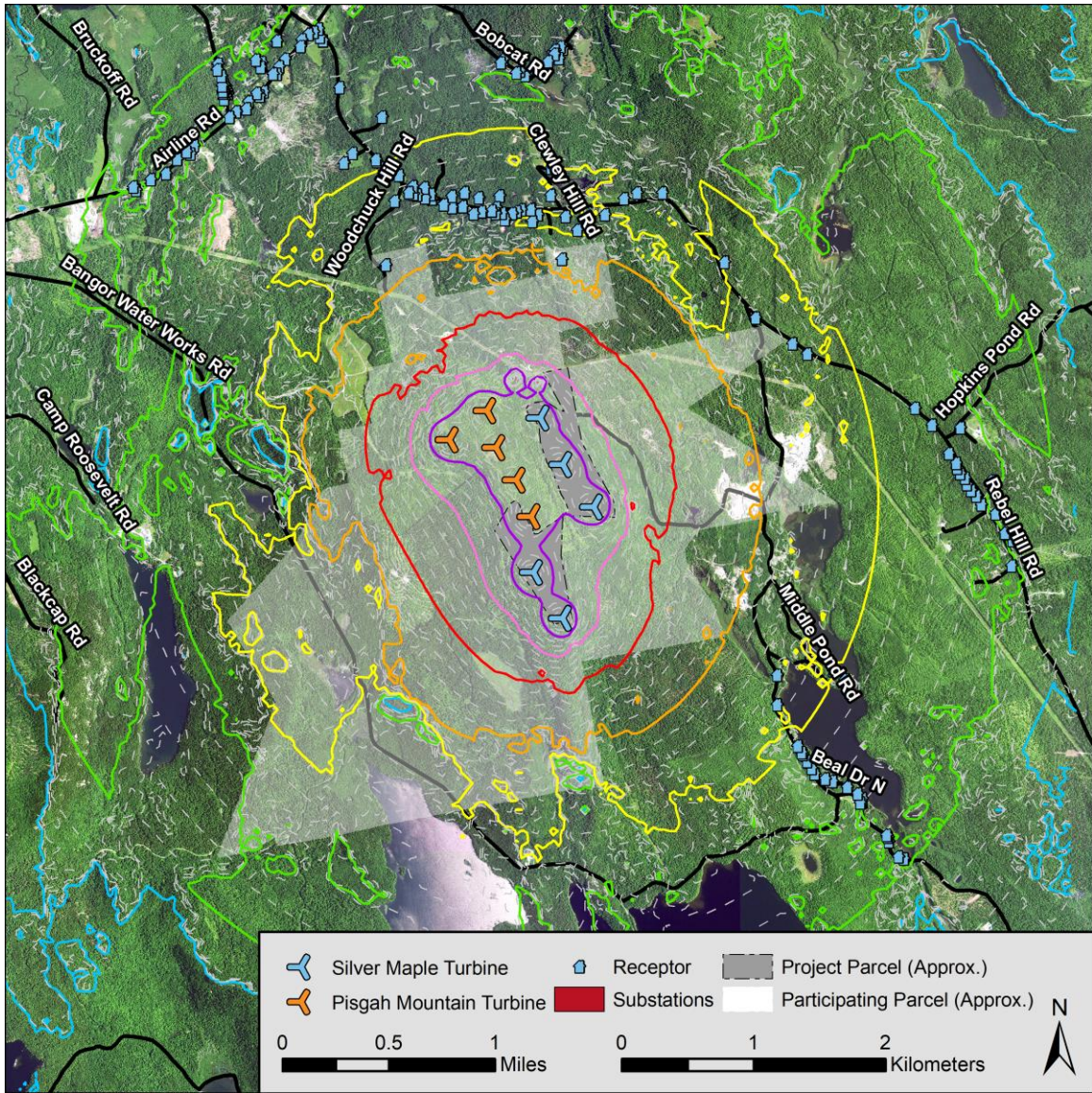
Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
389 REBEL HILL RD	26	46	26	46	541369	4957978	211
393 REBEL HILL RD	26	46	26	46	541408	4957912	211
388 REBEL HILL RD	25	43	25	43	541482	4958093	208
400 REBEL HILL RD	22	39	23	39	541516	4957843	207
410 REBEL HILL RD	24	42	25	43	541586	4957698	203
49 FICKETT MOUNTAIN TRL	25	45	25	45	541635	4957450	190
414 REBEL HILL RD	21	38	21	38	541642	4957642	197



Sound Pressure Level (dBA)

- 1 dB Increment
- 25 dBA
- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA

FIGURE 5: MODEL RESULTS MAP FOR SILVER MAPLE TURBINES AT 105 METER HUB HEIGHT AND NO NRO



Sound Pressure Level (dBA)

- 1 dB Increment 25 dBA 35 dBA 45 dBA
- 20 dBA 30 dBA 40 dBA 50 dBA

FIGURE 6: MODEL RESULTS MAP FOR SILVER MAPLE TURBINES AT 117 METER HUB HEIGHT AND NO NRO



TABLE 3: RECEPTOR MODEL RESULTS – NO NRO (HIGHEST SOUND EMISSIONS +2dB & G=0.5)

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
100 AIRLINE RD	27	47	27	47	534978	4960321	57
101 AIRLINE RD	26	43	26	43	535000	4960295	57
120 AIRLINE RD	28	47	28	47	535112	4960376	58
135 AIRLINE RD	22	40	22	40	535226	4960420	55
154 AIRLINE RD	26	45	26	45	535312	4960529	56
166 AIRLINE RD	25	42	25	42	535381	4960585	55
167 AIRLINE RD	25	41	25	41	535412	4960571	56
176 AIRLINE RD	25	41	25	41	535439	4960632	53
58 SCOTTS POINT RD	27	47	27	47	535615	4961208	50
63 SCOTTS POINT RD	27	47	27	47	535621	4961251	50
49 SCOTTS POINT RD	27	47	27	47	535645	4961159	52
40 SCOTTS POINT RD	27	47	27	47	535652	4961087	50
30 SCOTTS POINT RD	27	47	27	47	535658	4961045	50
28 SCOTTS POINT RD	27	47	27	47	535661	4961032	50
34 SCOTTS POINT RD	27	47	27	47	535664	4961051	51
39 SCOTTS POINT RD	27	47	27	47	535665	4961094	51
20 SCOTTS POINT RD	28	47	28	47	535667	4960983	50
35 SCOTTS POINT RD	27	47	27	47	535676	4961067	51
29 SCOTTS POINT RD	27	47	27	47	535688	4961051	51
25 SCOTTS POINT RD	28	47	27	47	535693	4961026	51
4 SCOTTS POINT RD	28	48	28	47	535707	4960848	51
226 AIRLINE RD	27	45	27	46	535758	4960890	53
235 AIRLINE RD	28	48	28	48	535836	4960913	56
242 AIRLINE RD	28	47	28	47	535853	4960965	57
38 MCLAUGHLIN RD	27	47	27	47	535906	4961280	62
254 AIRLINE RD	28	47	28	47	535914	4961029	59
253 AIRLINE RD	28	48	28	47	535936	4961008	59
26 MCLAUGHLIN RD	27	47	27	47	535943	4961227	61
31 MCLAUGHLIN RD	27	47	27	47	535952	4961263	61
259 AIRLINE RD	28	47	28	47	535967	4961041	59
278 AIRLINE RD	28	47	28	47	536039	4961175	61
281 AIRLINE RD	28	47	28	47	536066	4961173	60
30 PLEASANT LN	27	47	27	47	536067	4961425	58
288 AIRLINE RD	28	47	28	47	536084	4961231	60

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
298 AIRLINE RD	28	47	28	47	536129	4961287	60
319 AIRLINE RD	28	47	27	47	536246	4961384	57
324 AIRLINE RD	27	47	27	47	536257	4961434	58
333 AIRLINE RD	27	47	27	47	536307	4961475	56
3 REBEL HILL RD	27	47	27	47	536345	4961493	56
4 REBEL HILL RD	27	46	27	46	536382	4961517	54
7 REBEL HILL RD	28	47	27	47	536394	4961457	56
9 REBEL HILL RD	28	47	28	47	536416	4961429	56
26 REBEL HILL RD	29	48	29	48	536542	4961073	53
22 WOOD BRIDGE LN	31	49	31	49	536575	4960502	60
11 WOOD BRIDGE LN	30	49	31	49	536640	4960574	58
61 REBEL HILL RD	30	47	30	47	536818	4960526	59
67 REBEL HILL RD	31	49	31	49	536821	4960513	60
37 BIRCH HILL LN	30	49	30	49	536862	4960849	54
71 REBEL HILL RD	31	50	31	50	536869	4960465	59
96 WOODCHUCK HILL RD	35	53	35	53	536893	4959728	69
15 WOODCHUCK HILL RD	33	51	33	51	536959	4960212	60
80 REBEL HILL RD	31	46	31	46	536991	4960406	60
87 REBEL HILL RD	33	51	33	51	537068	4960277	61
88 REBEL HILL RD	32	48	32	49	537097	4960324	62
89 REBEL HILL RD	33	51	33	51	537102	4960264	63
91 REBEL HILL RD	33	51	33	51	537130	4960259	64
94 REBEL HILL RD	33	49	33	49	537185	4960313	61
95 REBEL HILL RD	33	51	33	51	537190	4960238	62
98 REBEL HILL RD	33	51	33	51	537233	4960262	64
97 REBEL HILL RD	34	51	34	51	537241	4960229	62
103 REBEL HILL RD	34	51	34	51	537331	4960186	64
106 REBEL HILL RD	34	51	34	51	537393	4960248	65
107 REBEL HILL RD	34	51	34	51	537396	4960164	64
111 REBEL HILL RD	34	51	34	51	537476	4960172	67
112 REBEL HILL RD	34	52	34	52	537490	4960278	68
115 REBEL HILL RD	35	52	35	52	537558	4960115	67
118 REBEL HILL RD	34	52	34	52	537597	4960239	70
119 REBEL HILL RD	35	52	35	52	537619	4960132	71
123 REBEL HILL RD	35	52	35	52	537697	4960139	76
125 REBEL HILL RD	34	51	34	51	537724	4960119	76



Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
126 REBEL HILL RD	33	48	33	48	537729	4960163	76
128 REBEL HILL RD	34	52	34	52	537755	4960251	80
187 BOBCAT RD	29	47	29	47	537765	4961261	68
127 REBEL HILL RD	34	51	34	51	537771	4960120	77
188 BOBCAT RD	29	47	29	48	537782	4961286	68
129 REBEL HILL RD	33	50	34	51	537796	4960072	76
131 REBEL HILL RD	33	50	34	51	537849	4960118	79
207 BOBCAT RD	29	47	29	48	537881	4961183	70
133 REBEL HILL RD	33	50	34	51	537884	4960131	80
210 BOBCAT RD	29	48	29	48	537910	4961200	72
135 REBEL HILL RD	34	51	34	51	537918	4960145	81
212 BOBCAT RD	29	47	29	47	537948	4961165	70
139 REBEL HILL RD	32	50	32	50	537992	4960147	86
141 REBEL HILL RD	30	46	30	46	538003	4960058	92
143 REBEL HILL RD	30	45	30	45	538044	4960110	92
2 DRAGON FLY LN	32	49	33	50	538119	4960153	96
243 BOBCAT RD	29	48	29	48	538123	4961271	78
147 REBEL HILL RD	30	46	30	46	538141	4959998	114
20 CLEWLEY HILL RD	34	51	34	51	538143	4960256	103
74 CLEWLEY HILL RD	33	51	33	51	538146	4960462	118
18 DRAGON FLY LN	30	46	30	46	538155	4959994	114
1 ZACHARYS WAY	29	48	29	48	538172	4961326	83
258 BOBCAT RD	29	48	29	48	538176	4961355	83
3 ZACHARYS WAY	29	48	29	48	538205	4961293	85
272 BOBCAT RD	29	48	29	48	538216	4961380	89
DRAGON FLY LN	35	50	35	50	538228	4959772	153
271 BOBCAT RD	29	48	29	48	538234	4961366	88
155 REBEL HILL RD	31	48	31	48	538257	4960095	107
159 REBEL HILL RD	30	46	30	46	538346	4959991	118
173 REBEL HILL RD	34	51	34	51	538554	4960110	125
182 REBEL HILL RD	28	44	29	44	538698	4960230	110
188 REBEL HILL RD	30	47	31	48	538797	4960274	104
198 REBEL HILL RD	29	44	30	44	538991	4960273	111
236 REBEL HILL RD	31	47	32	48	539461	4959750	117
261 REBEL HILL RD	34	51	34	51	539695	4959327	116
434 SPRINGY POND RD	33	49	32	49	539858	4956397	98

Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
412 SPRINGY POND RD	34	51	34	51	539858	4956621	96
281 REBEL HILL RD	33	51	33	51	539976	4959132	115
468 SPRINGY POND RD	31	49	31	49	540015	4956084	97
476 SPRINGY POND RD	31	49	31	49	540045	4956034	98
478 SPRINGY POND RD	31	49	31	49	540053	4956020	98
486 SPRINGY POND RD	31	49	31	49	540085	4955967	98
289 REBEL HILL RD	33	51	33	51	540089	4959055	113
494 SPRINGY POND RD	31	49	31	49	540120	4955915	98
500 SPRINGY POND RD	30	49	30	49	540144	4955873	98
33 BEAL DR N	30	48	30	48	540223	4955834	96
27 BEAL DR N	30	48	30	48	540280	4955816	96
35 HENDRICKSON LN	30	44	30	44	540285	4956655	98
51 HENDRICKSON LN	31	49	31	49	540374	4956586	99
11 BEAL DR N	29	48	29	48	540392	4955773	95
2 BEAL DR S	29	48	29	48	540468	4955722	96
562 SPRINGY POND RD	29	48	29	48	540489	4955652	93
8 BEAL DR S	28	46	29	46	540504	4955685	93
606 SPRINGY POND RD	28	47	28	47	540690	4955408	94
608 SPRINGY POND RD	28	47	28	47	540698	4955393	94
612 SPRINGY POND RD	27	47	27	47	540704	4955360	95
632 SPRINGY POND RD	27	47	27	46	540778	4955245	95
638 SPRINGY POND RD	27	46	27	46	540820	4955228	94
342 REBEL HILL RD	30	49	30	49	540905	4958644	159
351 REBEL HILL RD	30	48	30	48	541033	4958516	174
367 REBEL HILL RD	29	48	29	48	541161	4958300	192
373 REBEL HILL RD	29	48	29	48	541217	4958227	199
375 REBEL HILL RD	29	48	29	48	541224	4958190	199
377 REBEL HILL RD	29	48	29	48	541247	4958147	202
4 OCTOBER WAY	29	48	29	48	541249	4958495	198



Receiver	Silver Maple 105 m HH & Pisgah Mountain		Silver Maple 117 m HH & Pisgah Mountain		Coordinates (UTM NAD83)		Elevation + Receiver Height (m)
	dBA	dBC	dBA	dBC	X (m)	Y (m)	
381 REBEL HILL RD	29	48	29	48	541284	4958113	204
383 REBEL HILL RD	29	48	29	48	541297	4958065	206
385 REBEL HILL RD	29	48	29	48	541329	4958019	208
389 REBEL HILL RD	29	48	29	48	541369	4957978	211
393 REBEL HILL RD	28	47	28	47	541408	4957912	211
388 REBEL HILL RD	27	44	27	44	541482	4958093	208
400 REBEL HILL RD	25	40	25	40	541516	4957843	207
410 REBEL HILL RD	27	44	27	45	541586	4957698	203
49 FICKETT MOUNTAIN TRL	27	46	27	46	541635	4957450	190
414 REBEL HILL RD	24	40	24	40	541642	4957642	197
