

APPENDIX D

Comsearch Reports:

Off-Air TV Analysis

AM and FM Radio Report

Licensed Microwave Report

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Wind Power GeoPlanner™

Off-Air TV Analysis

Community Wind South



Prepared on Behalf of
WSB & Associates

August 22, 2011



COMSEARCH
A CommScope Company



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1. Introduction

In this report, Comsearch analyzed the off-air television stations whose service could potentially be affected by the proposed Community Wind South wind energy project in Nobles County, Minnesota. Off-air stations are television broadcasters that transmit signals that can be received directly on a television receiver from terrestrially located broadcast facilities. Comsearch examined the coverage of the off-air TV stations and the communities in the area that could potentially have degraded television reception because of the location of the proposed wind energy project.

2. Summary of Results

The proposed wind energy project area and local communities are depicted in Figure 1, below.

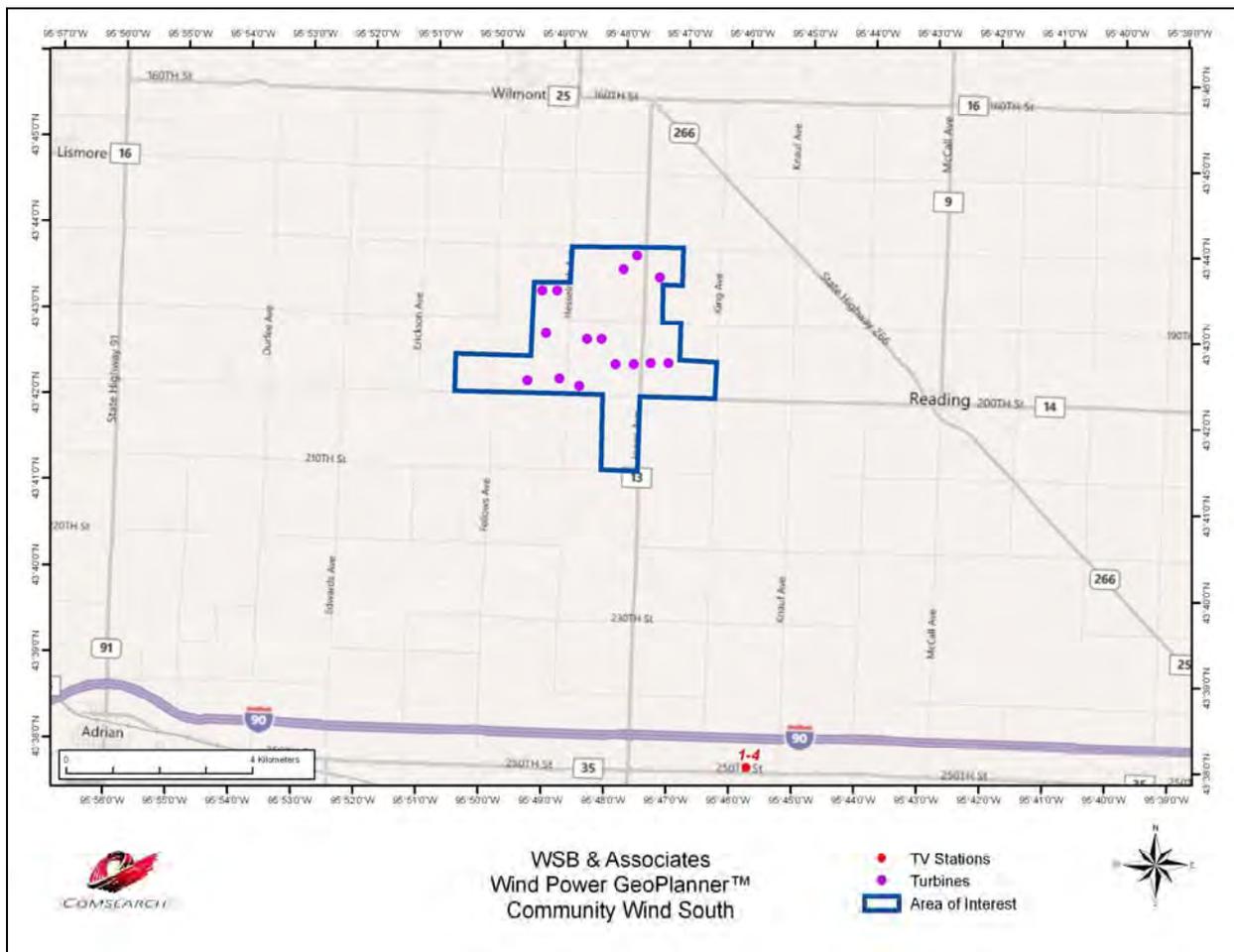


Figure 1: Wind Farm Project Area and Local Communities

To begin the analysis, Comsearch compiled all off-air television stations¹ within 150 kilometers of the wind project area of interest (AOI). Appendix A contains a tabular summary of these stations. A plot depicting their locations appears in Figure 2, below.

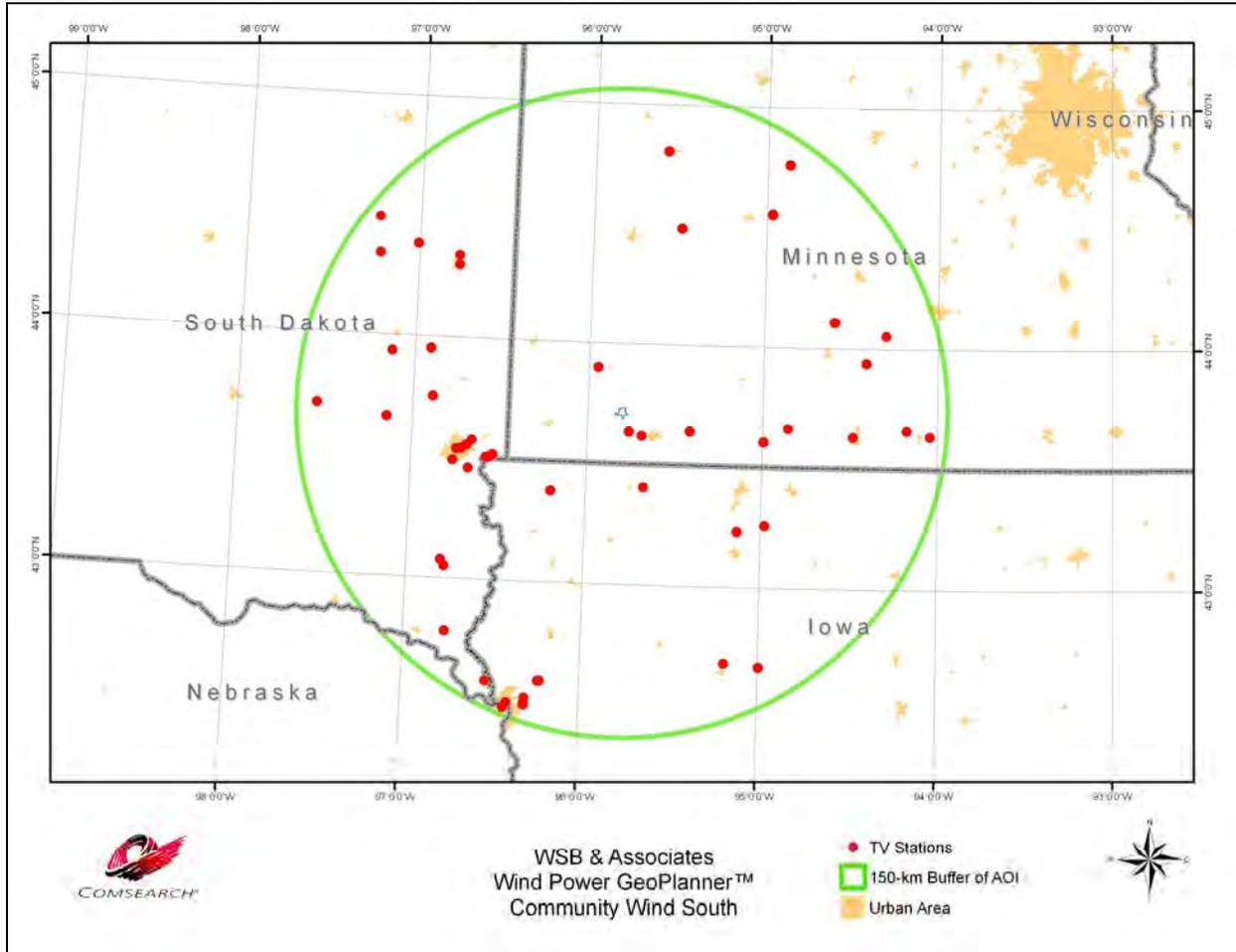


Figure 2: Plot of Off-Air TV Stations within 150 Kilometers of Project Area

TV stations at a distance of 65 kilometers or less are the most likely to provide off-air coverage to the project area and its neighboring communities. These stations are listed in Table 1, below, and a plot depicting these locations is provided in Figure 3. There are a total of nineteen database records for stations within approximately 65 kilometers of the wind energy project. Of these stations, nine are currently licensed and operating, three of which are low-power digital stations or translators. Translator stations are low-power stations that receive signals from

¹ Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data presented in this report is derived from the TV station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

distant broadcasters and retransmit the signal to a local audience. All of the low-power stations serve local audiences and have limited range, which is a function of their transmit power and the height of their transmit antenna. The six full-power stations in the area are licensed under call signs KSMN, KELO-TV, KSFY-TV, KDLT-TV, KTTW, and KWSD.

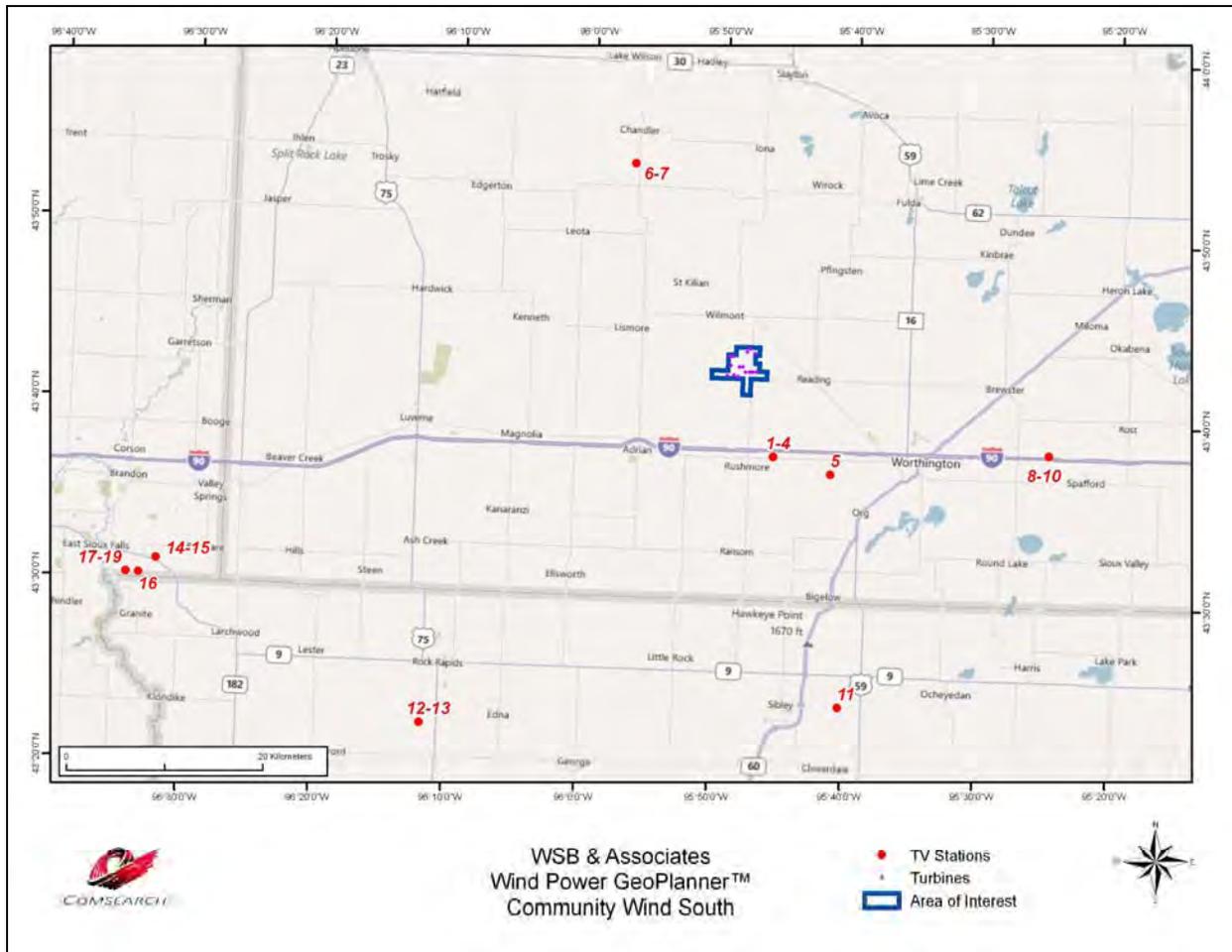


Figure 3: Plot of Off-Air TV Stations within 65 Kilometers of Project Area

ID	Call Sign	Status	Service ²	Channel	City	State	Distance to Nearest Turbine (km)
1	NEW	APP	LD	17	RUSHMORE	NM	8.87
2	NEW	APP	LD	27	RUSHMORE	NM	8.87
3	NEW	APP	LD	42	RUSHMORE	NM	8.87
4	NEW	APP	LD	50	RUSHMORE	NM	8.87
5	K22HJ	LIC	TX	22	WORTHINGTON	MN	12.92
6	KSMN	CP	DT	15	WORTHINGTON	MN	21.94
7	KSMN	LIC	DT	15	WORTHINGTON	MN	21.94
8	NEW	APP	LD	20	BREWSTER	MN	31.02
9	NEW	APP	LD	24	BREWSTER	MN	31.02
10	NEW	APP	LD	44	BREWSTER	MN	31.02
11	K26JI-D	LIC	LD	26	SIBLEY	IA	35.35
12	K43LX-D	LIC	LD	43	ROCK RAPIDS	IA	47.37
13	K43LX-D	CP	TX	25	ROCK RAPIDS	IA	47.37
14	KELO-TV	LIC	DT	11	SIOUX FALLS	SD	61.09
15	KSFY-TV	LIC	DT	13	SIOUX FALLS	SD	61.09
16	KDLT-TV	LIC	DT	47	SIOUX FALLS	SD	63.25
17	KWSD	CP	DT	36	SIOUX FALLS	SD	64.43
18	KTTW	LIC	DT	7	SIOUX FALLS	SD	64.43
19	KWSD	LIC	DT	36	SIOUX FALLS	SD	64.43

Table 1: Off-Air TV Stations within 65 Kilometers of Project Area

² Definitions of service and status codes:
 LIC – Licensed and operational station
 APP – Application for construction permit, not yet operational
 CP – Construction permit granted
 DT – Digital television broadcast station
 LD – Low power digital television broadcast station
 TX – Translator station

3. Impact Assessment

The six full-power digital stations may have disrupted reception in and around the project, primarily those areas on the opposite side of the wind turbines relative to where the station antennae are located. Since KSMN broadcasts from northwest of the project area, communities and homes directly to the south and east of the project may have reception issues after the wind turbines are installed. Similarly, stations KELO-TV, KSFY-TV, KDLT-TV, KTTW, and KWSD, which broadcast from west-southwest of the project area, may have diminished reception in communities directly to the east and north. The closest low power station or translator, K22HJ is located in Worthington, MN at a distance of 12.9 kilometers from the nearest turbine. At this distance, the turbines will be in the outermost fringe area of reception and only a few homes, if any, on the opposite side of the turbines may have reception issues.

Based on the low number of full-power TV channels available in the immediate vicinity of the project area and there distance from the project area, it is unlikely that off-air television stations are the primary mode of television service for the local communities. TV cable service, where available, and/or direct broadcast satellite service (DBS) are most likely the dominant modes of television programming delivery.

4. Recommendations

Both cable service and direct broadcast satellite service will be unaffected by the presence of the wind turbine facility and may be offered to those residents who can show that their off-air TV reception has been disrupted by the presence of the wind turbines after they are installed. Since most of the full-power TV stations are operating at distances that place the communities in the project area in the fringe reception zones for the stations it may be possible to overcome some of the reception issues after the wind turbines are installed with improved reception systems. These reception systems may require high gain antennas mounted on rotatable masts, pre-amplifiers on the antenna, and high quality transmission line interconnecting the antenna to the television receivers.

5. Contact Us

For questions or information regarding the Off-Air TV Analysis, please contact:

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6. Appendix A

ID	Call Sign	Status	Service ³	Channel	City	State	Distance to Nearest Turbine (km)
1	NEW	APP	LD	17	RUSHMORE	NM	8.87
2	NEW	APP	LD	27	RUSHMORE	NM	8.87
3	NEW	APP	LD	42	RUSHMORE	NM	8.87
4	NEW	APP	LD	50	RUSHMORE	NM	8.87
5	K22HJ	LIC	TX	22	WORTHINGTON	MN	12.92
6	KSMN	CP	DT	15	WORTHINGTON	MN	21.94
7	KSMN	LIC	DT	15	WORTHINGTON	MN	21.94
8	NEW	APP	LD	20	BREWSTER	MN	31.02
9	NEW	APP	LD	24	BREWSTER	MN	31.02
10	NEW	APP	LD	44	BREWSTER	MN	31.02
11	K26JI-D	LIC	LD	26	SIBLEY	IA	35.35
12	K43LX-D	LIC	LD	43	ROCK RAPIDS	IA	47.37
13	K43LX-D	CP	TX	25	ROCK RAPIDS	IA	47.37
14	KELO-TV	LIC	DT	11	SIOUX FALLS	SD	61.09
15	KSFY-TV	LIC	DT	13	SIOUX FALLS	SD	61.09
16	KDLT-TV	LIC	DT	47	SIOUX FALLS	SD	63.25
17	KWSD	CP	DT	36	SIOUX FALLS	SD	64.43
18	KTTW	LIC	DT	7	SIOUX FALLS	SD	64.43
19	KWSD	LIC	DT	36	SIOUX FALLS	SD	64.43
20	K51KT-D	APP	LD	36	JACKSON	MO	65.09
21	K40LA-D	APP	LD	40	JACKSON	MN	65.09
22	K43MJ-D	APP	LD	43	JACKSON	MN	65.09
23	K17IS-D	CP	LD	17	JACKSON	MN	65.09
24	K30KQ-D	CP	LD	30	JACKSON	MN	65.09
25	K19HZ-D	LIC	LD	19	JACKSON	MN	65.09
26	K23FO-D	LIC	LD	23	JACKSON	MN	65.09
27	K35IZ-D	LIC	LD	35	JACKSON	MN	65.09
28	K36IV-D	LIC	LD	36	JACKSON	MN	65.09

³ Definitions of service and status codes :

TV – Analog television broadcast station

DT – Digital television broadcast station

DS – Digital special temporary authority (STA)

LP – Low power analog television broadcast station

LD – Low power digital television broadcast station

CA – Class A analog television broadcast station

DC – Class A digital television broadcast station

TX – Translator station

LIC – Licensed and operational station

CP – Construction permit granted

CP MOD – Modification of construction permit

APP – Application for construction permit, not yet operational

STA – Special transmit authorization, usually granted by FCC for temporary operation



ID	Call Sign	Status	Service ³	Channel	City	State	Distance to Nearest Turbine (km)
29	K40LA-D	LIC	LD	40	JACKSON	MN	65.09
30	K41EG-D	LIC	LD	41	JACKSON	MN	65.09
31	K43MJ-D	LIC	LD	43	JACKSON	MN	65.09
32	K45EH-D	LIC	LD	45	JACKSON	MN	65.09
33	K50KL-D	LIC	LD	50	JACKSON	MN	65.09
34	K51KT-D	LIC	LD	51	JACKSON	MN	65.09
35	K19HZ-D	APP	TX	19	JACKSON	MN	65.09
36	K40LA-D	APP	TX	40	JACKSON	MN	65.09
37	K51KT-D	APP	TX	51	JACKSON	MN	65.09
38	K19HZ-D	CP	TX	26	JACKSON	MN	65.09
39	K50KL-D	CP	TX	50	JACKSON	MN	65.09
40	KCSD-TV	LIC	DT	24	SIOUX FALLS	SD	68.72
41	NEW	APP	LD	20	SIOUX FALLS	SD	71.56
42	K22KD-D	CP	LD	22	SIOUX FALLS	SD	71.56
43	K56GF	LIC	TX	56	SIOUX FALLS	SD	71.56
44	NEW	APP	LD	20	SIOUX FALLS	SD	73.81
45	NEW	APP	LD	4	SIOUX FALLS	SD	74.29
46	NEW	APP	LD	6	SIOUX FALLS	SD	74.29
47	KBVK-LD	CP	LD	34	SPENCER	IA	75.09
48	NEW	APP	LD	33	SHERBURN	MN	75.40
49	NEW	APP	LD	39	SHERBURN	MN	75.40
50	KCPO-LP	LIC	TX	26	SIOUX FALLS	SD	76.37
51	KAUN-LP	LIC	TX	42	SIOUX FALLS	SD	76.62
52	KCWS-LP	LIC	TX	44	SIOUX FALLS	SD	76.62
53	KWSF-LP	APP	LD	17	SIOUX FALLS	SD	79.50
54	KWSF-LP	LIC	TX	53	SIOUX FALLS	SD	79.50
55	K17IR-D	CP	LD	17	SPENCER	IA	82.68
56	K55FL	APP	TX	55	SPENCER	IA	82.68
57	KBVK-LP	LIC	TX	52	SPENCER	IA	82.68
58	K55FL	LIC	TX	55	SPENCER	IA	82.68
59	K18IW-D	CP	LD	18	RAPID CITY	SD	86.10
60	K31KU-D	CP	LD	31	RAPID CITY	SD	86.10
61	K32JG-D	CP	LD	32	RAPID CITY	SD	86.10
62	KRWF	LIC	DT	27	REDWOOD FALLS	MN	87.23
63	K51GL	CP	LD	43	VESTA	MN	87.24
64	K51GL	LIC	TX	51	VESTA	MN	87.24
65	NEW	APP	LD	48	WENTWORTH	SD	91.20
66	K21LK-D	CP	LD	21	WENTWORTH	SD	91.20
67	K30LV-D	CP	LD	30	WENTWORTH	SD	91.20
68	K33LR-D	CP	LD	33	WENTWORTH	SD	91.20
69	K50DG	LIC	TX	50	BROOKINGS	SD	99.46
70	K40FZ	LIC	TX	40	BROOKINGS	SD	102.38



ID	Call Sign	Status	Service ³	Channel	City	State	Distance to Nearest Turbine (km)
71	K16CG	CP	LD	16	ST. JAMES	MN	104.58
72	K18IH-D	CP	LD	18	ST. JAMES	MN	104.58
73	K48AA	CP	LD	24	ST. JAMES	MN	104.58
74	K31KV-D	CP	LD	31	ST. JAMES	MN	104.58
75	K50AB	CP	LD	35	ST. JAMES	MN	104.58
76	K40BU	CP	LD	40	ST. JAMES	MN	104.58
77	K46AA	CP	LD	45	ST. JAMES	MN	104.58
78	K52AB	CP	LD	51	ST. JAMES	MN	104.58
79	K49HE	CP MOD	LD	49	ST. JAMES	MN	104.58
80	K29IE-D	LIC	LD	29	ST. JAMES	MN	104.58
81	K26CS-D	CP	TX	26	ST. JAMES	MN	104.58
82	K52AB	CP	TX	52	ST. JAMES	MN	104.58
83	K16CG	LIC	TX	16	ST. JAMES	MN	104.58
84	K19CA	LIC	TX	19	ST. JAMES	MN	104.58
85	K24CP	LIC	TX	24	ST. JAMES	MN	104.58
86	K35DC	LIC	TX	35	ST. JAMES	MN	104.58
87	K40BU	LIC	TX	40	ST. JAMES	MN	104.58
88	K42AV	LIC	TX	42	ST. JAMES	MN	104.58
89	K46AA	LIC	TX	46	ST. JAMES	MN	104.58
90	K48AA	LIC	TX	48	ST. JAMES	MN	104.58
91	K50AB	LIC	TX	50	ST. JAMES	MN	104.58
92	K52AB	LIC	TX	52	ST. JAMES	MN	104.58
93	K08OQ-D	CP	LD	8	ST. JAMES	MN	104.76
94	K13YZ-D	CP	LD	13	ST. JAMES	MN	104.76
95	K38MY-D	CP	LD	38	ST. JAMES	MN	104.76
96	K53JS-D	CP	LD	53	ST. JAMES	MN	104.76
97	K57KD-D	CP	LD	57	ST. JAMES	MN	104.76
98	K58IZ-D	CP	LD	58	ST. JAMES	MN	104.76
99	K14KE-D	LIC	LD	14	ST. JAMES	MN	104.76
100	K21DG-D	LIC	LD	21	ST. JAMES	MN	104.76
101	K26CS-D	LIC	LD	26	ST. JAMES	MN	104.76
102	K30FN-D	LIC	LD	30	ST. JAMES	MN	104.76
103	K32GX-D	LIC	LD	32	ST. JAMES	MN	104.76
104	K34JX-D	LIC	LD	34	ST. JAMES	MN	104.76
105	K41IZ-D	LIC	LD	41	ST. JAMES	MN	104.76
106	K44AD-D	LIC	LD	44	ST. JAMES	MN	104.76
107	K41IZ-D	CP	TX	41	ST. JAMES	MN	104.76
108	K49HE	LIC	TX	49	ST. JAMES	MN	104.76
109	K17IU	APP	LD	20	FAIRMONT	MN	105.45
110	K17IU	CP	TX	17	FAIRMONT	MN	105.45
111	NEW	APP	LD	17	BRERESFORD	SD	105.86
112	NEW	APP	LD	17	BRERESFORD	SD	105.86



ID	Call Sign	Status	Service ³	Channel	City	State	Distance to Nearest Turbine (km)
113	K38NJ-D	CP	LD	38	BRERESFORD	SD	105.86
114	KUSD-TV	LIC	DT	34	VERMILLION	SD	106.61
115	NEW	APP	LD	33	HUMBOLDT	SD	106.92
116	NEW	APP	LD	35	HUMBOLDT	SD	106.92
117	NEW	APP	LD	38	HUMBOLDT	SD	106.92
118	NEW	APP	LD	48	HUMBOLDT	SD	106.92
119	K43GX	LIC	TX	43	MADISON	SD	108.12
120	K50KF	APP	TX	50	REDWOOD FALLS	MN	112.62
121	K17BV	LIC	TX	17	REDWOOD FALLS	MN	112.62
122	K19CV	LIC	TX	19	REDWOOD FALLS	MN	112.62
123	K28LL	LIC	TX	28	REDWOOD FALLS	MN	112.62
124	K33LB	LIC	TX	33	REDWOOD FALLS	MN	112.62
125	K36KW	LIC	TX	36	REDWOOD FALLS	MN	112.62
126	K46FY	LIC	TX	46	REDWOOD FALLS	MN	112.62
127	K48GQ	LIC	TX	48	REDWOOD FALLS	MN	112.62
128	K50KF	LIC	TX	50	REDWOOD FALLS	MN	112.62
129	K52GU	LIC	TX	52	REDWOOD FALLS	MN	112.62
130	K58AS	LIC	TX	58	REDWOOD FALLS	MN	112.62
131	K58AS	APP	TX	22	REDWOOD FALLS	MN	112.99
132	K58AS	CP	TX	22	REDWOOD FALLS	MN	112.99
133	K25II	LIC	TX	25	REDWOOD FALLS	MN	112.99
134	K39CH	LIC	TX	39	REDWOOD FALLS	MN	112.99
135	KEYC-TV	CP MOD	DT	12	MANKATO	MN	113.25
136	KEYC-TV	LIC	DT	12	MANKATO	MN	113.25
137	K08NI	CP	TX	8	MANKATO	MN	113.31
138	K27LB-D	CP	LD	27	ARLINGTON	SD	120.37
139	K38NI-D	CP	LD	38	ARLINGTON	SD	120.37
140	K42KO-D	CP	LD	42	ARLINGTON	SD	120.37
141	K45LV-D	CP	LD	45	ARLINGTON	SD	120.37
142	K18DI	APP	LD	14	GRANITE FALLS	MN	120.61
143	K26DG	APP	LD	21	GRANITE FALLS	MN	120.61
144	K63AU	APP	LD	29	GRANITE FALLS	MN	120.61
145	K67AN	APP	LD	40	GRANITE FALLS	MN	120.61
146	K69DP	APP	LD	41	GRANITE FALLS	MN	120.61
147	K47EA	APP	LD	49	GRANITE FALLS	MN	120.61
148	K18DI	CP	LD	14	GRANITE FALLS	MN	120.61
149	K16CP	CP	LD	16	GRANITE FALLS	MN	120.61
150	K19GU-D	CP	LD	19	GRANITE FALLS	MN	120.61
151	K26DG	CP	LD	21	GRANITE FALLS	MN	120.61
152	K22DO	CP	LD	22	GRANITE FALLS	MN	120.61
153	K24CS	CP	LD	24	GRANITE FALLS	MN	120.61
154	K63AU	CP	LD	29	GRANITE FALLS	MN	120.61



ID	Call Sign	Status	Service ³	Channel	City	State	Distance to Nearest Turbine (km)
155	K30JL-D	CP	LD	30	GRANITE FALLS	MN	120.61
156	K32DR	CP	LD	32	GRANITE FALLS	MN	120.61
157	K35DK	CP	LD	35	GRANITE FALLS	MN	120.61
158	K40JK-D	CP	LD	40	GRANITE FALLS	MN	120.61
159	K67AN	CP	LD	40	GRANITE FALLS	MN	120.61
160	K41KG-D	CP	LD	41	GRANITE FALLS	MN	120.61
161	K69DP	CP	LD	41	GRANITE FALLS	MN	120.61
162	K45DJ	CP	LD	45	GRANITE FALLS	MN	120.61
163	K46JH-D	CP	LD	46	GRANITE FALLS	MN	120.61
164	K48LF-D	CP	LD	48	GRANITE FALLS	MN	120.61
165	K49KM-D	CP	LD	49	GRANITE FALLS	MN	120.61
166	K47EA	CP	LD	49	GRANITE FALLS	MN	120.61
167	K53JT-D	CP	LD	53	GRANITE FALLS	MN	120.61
168	K63AU	CP	TX	23	GRANITE FALLS	MN	120.61
169	K67AN	CP	TX	28	GRANITE FALLS	MN	120.61
170	K69DP	CP	TX	39	GRANITE FALLS	MN	120.61
171	K16CP	LIC	TX	16	GRANITE FALLS	MN	120.61
172	K18DI	LIC	TX	18	GRANITE FALLS	MN	120.61
173	K22DO	LIC	TX	22	GRANITE FALLS	MN	120.61
174	K24CS	LIC	TX	24	GRANITE FALLS	MN	120.61
175	K26DG	LIC	TX	26	GRANITE FALLS	MN	120.61
176	K32DR	LIC	TX	32	GRANITE FALLS	MN	120.61
177	K35DK	LIC	TX	35	GRANITE FALLS	MN	120.61
178	K45DJ	LIC	TX	45	GRANITE FALLS	MN	120.61
179	K47EA	LIC	TX	47	GRANITE FALLS	MN	120.61
180	K63AU	LIC	TX	63	GRANITE FALLS	MN	120.61
181	K67AN	LIC	TX	67	GRANITE FALLS	MN	120.61
182	K69DP	LIC	TX	69	GRANITE FALLS	MN	120.61
183	KCWL-LD	CP	LD	35	STORM LAKE	IA	124.20
184	K43JE-D	LIC	LD	43	LAKE CRYSTAL	MN	125.00
185	K33LS-D	CP	LD	33	ELK POINT	SD	128.10
186	K35KT-D	CP	LD	35	ELK POINT	SD	128.10
187	K44KV-D	CP	LD	44	ELK POINT	SD	128.10
188	KTIV	LIC	DT	41	STORM LAKE	IA	128.49
189	KPTH	LIC	DT	49	STORM LAKE	IA	128.49
190	NEW	APP	LD	3	STORM LAKE	IA	128.49
191	NEW	APP	LD	6	STORM LAKE	IA	128.49
192	KMEG	LIC	DT	39	STORM LAKE	IA	128.50
193	KCAU-TV	LIC	DT	9	STORM LAKE	IA	128.74
194	NEW	APP	LD	45	BLUE EARTH	MN	129.89
195	KESD-TV	LIC	DT	8	BROOKINGS	SD	132.02
196	K40CO	CP	LD	18	STORM LAKE	IA	132.44

ID	Call Sign	Status	Service ³	Channel	City	State	Distance to Nearest Turbine (km)
197	K40CO	LIC	TX	40	STORM LAKE	IA	132.44
198	KCWL-LP	LIC	TX	57	STORM LAKE	IA	132.44
199	K23FP	LIC	TX	23	OLIVIA	MN	135.97
200	K45FR	LIC	TX	45	OLIVIA	MN	135.97
201	K47JE	CP	LD	47	OLIVIA	MN	135.99
202	K53AO	CP MOD	LD	18	OLIVIA	MN	135.99
203	K57AE	CP MOD	LD	20	OLIVIA	MN	135.99
204	K23FP	CP MOD	LD	23	OLIVIA	MN	135.99
205	K55CK	CP MOD	LD	38	OLIVIA	MN	135.99
206	K49AJ	CP MOD	LD	49	OLIVIA	MN	135.99
207	K51AL	CP MOD	LD	51	OLIVIA	MN	135.99
208	K47JE	APP	TX	47	OLIVIA	MN	135.99
209	K47JE	LIC	TX	47	OLIVIA	MN	135.99
210	K49AJ	LIC	TX	49	OLIVIA	MN	135.99
211	K51AL	LIC	TX	51	OLIVIA	MN	135.99
212	K53AO	LIC	TX	53	OLIVIA	MN	135.99
213	K55CK	LIC	TX	55	OLIVIA	MN	135.99
214	K57AE	LIC	TX	57	OLIVIA	MN	135.99
215	K22KJ-D	CP	LD	22	ELK POINT	SD	137.62
216	KSIN-TV	LIC	DT	28	SIoux CITY	IA	138.00
217	NEW	APP	LD	14	SPENCER	SD	139.09
218	NEW	APP	LD	30	SPENCER	SD	139.09
219	NEW	APP	LD	40	SPENCER	SD	139.09
220	DK51GK	LIC	TX	51	SIoux CITY	IA	140.24
221	K50KJ-D	CP	LD	50	SIoux CITY	IA	140.31
222	K14NV-D	CP	LD	14	SIoux CITY	IA	140.32
223	K45LM-D	CP	LD	45	SIoux CITY	IA	140.32
224	KSXC-LP	LIC	TX	5	SOUTH SIoux CITY	NE	140.62
225	K70DR	CP	LD	16	BLUE EARTH	MN	140.79
226	NEW	APP	LD	32	SOUTH SIoux CITY	NE	141.22
227	KSXC-LP	CP	LD	5	SOUTH SIoux CITY	NE	141.22
228	NEW	APP	LD	30	SIoux CITY	IA	141.22
229	K16JK-D	CP	LD	16	SIoux CITY	IA	141.22
230	K35GR	LIC	TX	35	BADGER	SD	141.92
231	KCAU-TV	LIC	LD	30	SIoux CITY	IA	142.68
232	KAZW-LD	CP	LD	25	SOUTH SIoux CITY	NE	145.45
233	KAZS-LD	CP	LD	43	SOUTH SIoux CITY	NE	145.45
234	KAZS-LP	LIC	TX	23	SOUTH SIoux CITY	NE	145.45

Table A: Off-Air TV Stations within 150 Kilometers of Project Area

Wind Power GeoPlanner™

AM and FM Radio Report

Community Wind South



Prepared on Behalf of
WSB & Associates

August 22, 2011





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1. Introduction

In this report, Comsearch analyzed AM and FM radio broadcast stations whose service could potentially be affected by the proposed Community Wind South wind energy project in Nobles County, Minnesota.

2. Summary of Results

AM Radio Analysis

Comsearch found one database record¹ for AM stations within 30 kilometers of the center of the project, as shown in Table 1 and Figure 1. This record represents station WDLA, which is located in Worthington, Minnesota and has a non-directional antenna. This station operates at two different power levels, a higher transmit power for daytime operations and a lower transmit power for nighttime operations.

ID	Call Sign	Status	Frequency (kHz)	Transmit ERP (kW)	City	State	Distance to Nearest Turbine (km)
1	KWOA	LIC	730	1.0 / 0.159	WORTHINGTON	MN	12.56

Table 1: AM Radio Stations

LIC = Licensed and Operational
 kHz = kiloHertz
 ERP = Transmit Effective Radiated Power
 kW = kilowatts
 km = kilometers

¹ Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data presented in this report is derived from the AM/FM station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

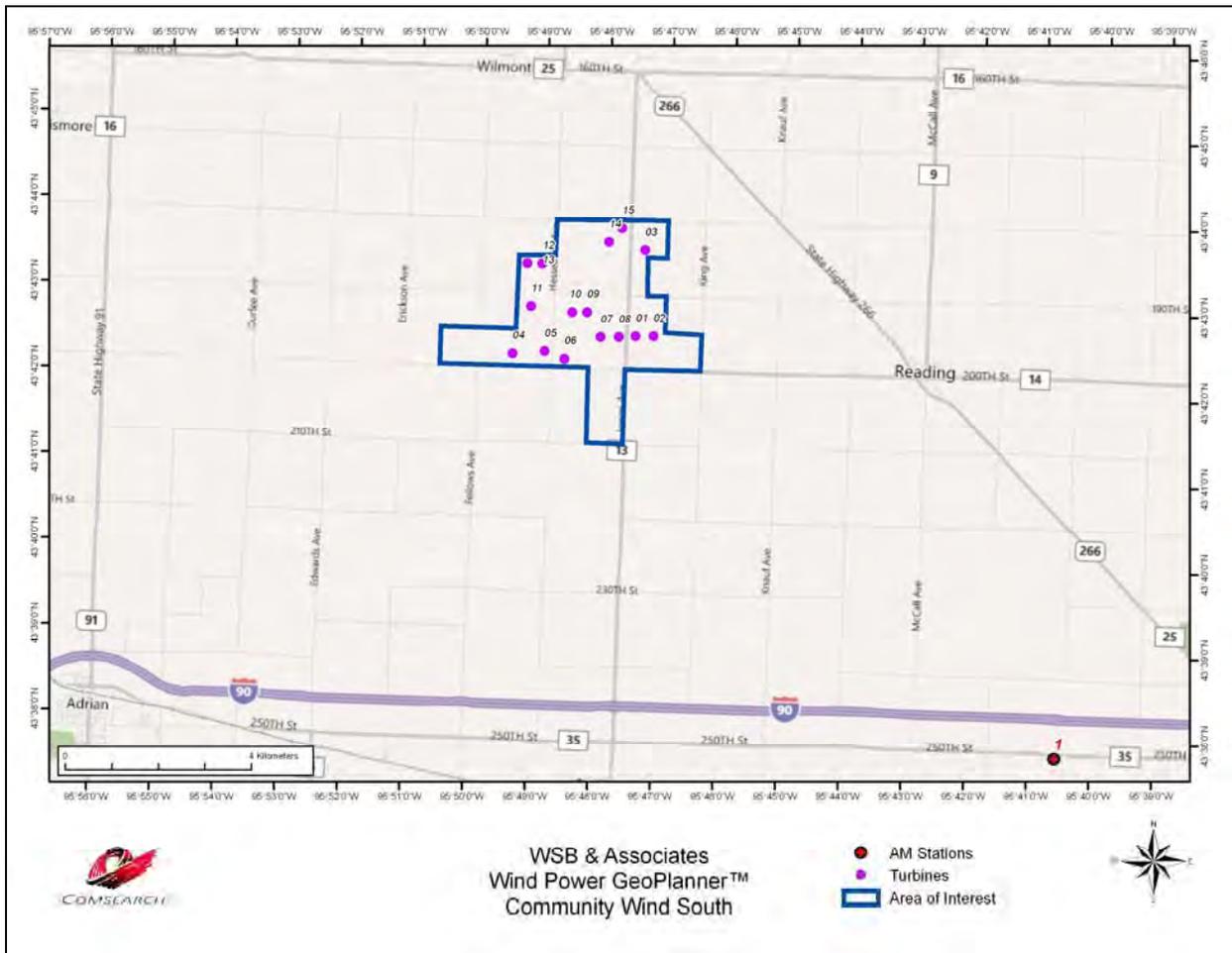


Figure 1: Plot of AM Radio Stations

FM Radio Analysis

Comsearch determined that there were seven database records for FM stations within a 30 kilometer radius of the project, as shown in Table 2 and Figure 2. One of these stations, K262AR, is a translator station that operates at low power and has limited range. The remaining six stations operate at full power and are licensed under call signs KWOA-FM, KUSQ, KRSW, KNSW, KISD, and KJOE.



ID	Call Sign	Status	Frequency (MHz)	Transmit ERP (kW)	City	State	Distance to Nearest Turbine (km)
1	KWOA-FM	LIC	95.1	100.0	WORTHINGTON	MN	12.56
2	KUSQ	LIC	104.3	3.4	SIBLEY	IA	18.72
3	K262AR	LIC	100.3	0.23	WORTHINGTON	MN	19.50
4	KRSW	LIC	89.3	100.0	WORTHINGTON	MN	19.87
5	KNSW	LIC	91.7	99.0	WORTHINGTON	MN	19.87
6	KISD	LIC	98.7	100.0	PIPESTONE	MN	21.94
7	KJOE	LIC	106.1	13.0	SLAYTON	MN	21.94

Table 2: FM Radio Stations

LIC = Licensed and Operational
 MHz = megaHertz
 ERP = Transmit Effective Radiated Power
 kW = kiloWatts
 km = kilometers

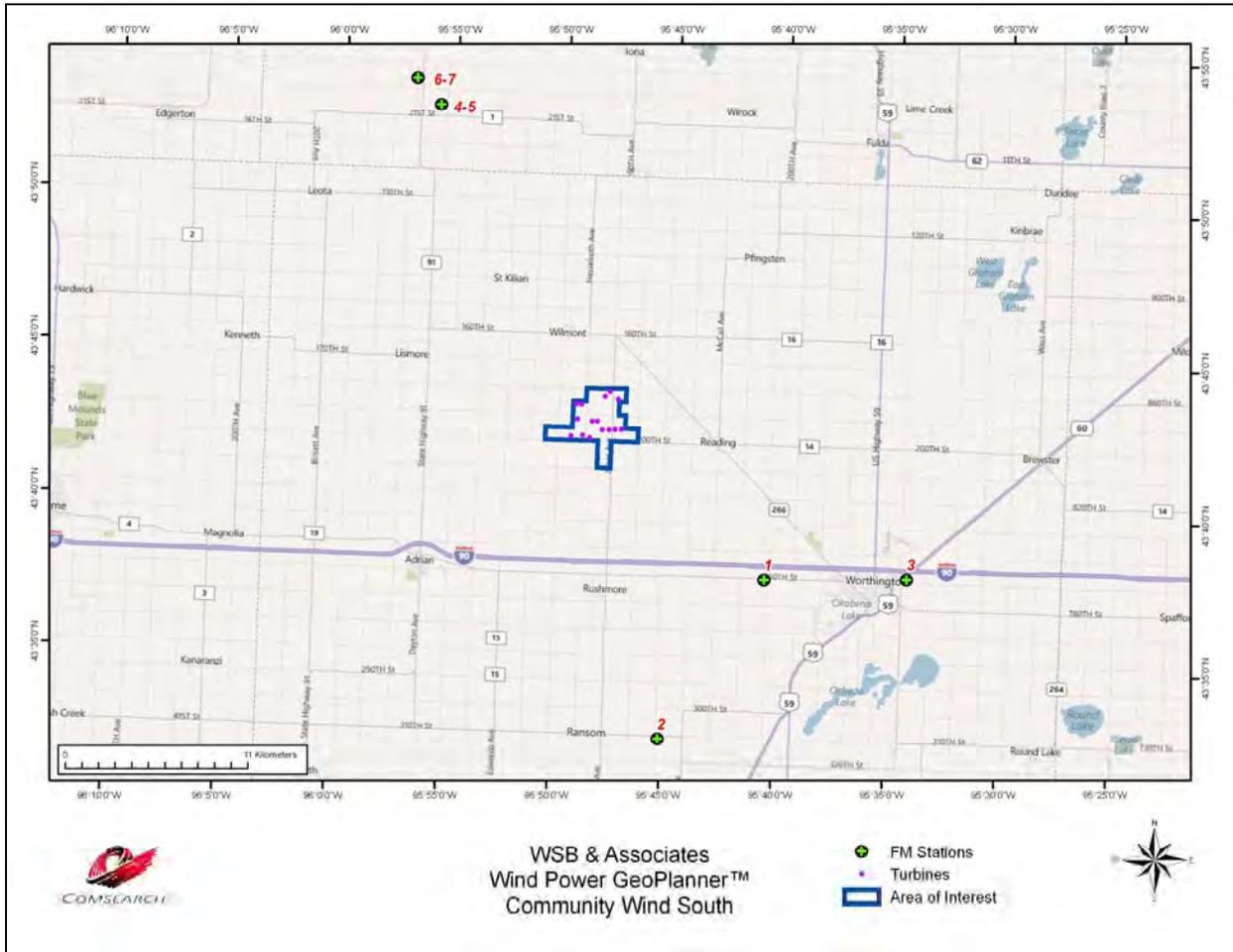


Figure 2: Plot of FM Radio Stations

3. Impact Assessment

Potential problems with AM broadcast coverage are only anticipated when AM broadcast stations with directive antennas are within 3.2 kilometers of wind turbine towers and AM broadcast stations with non-directive antennas are within 0.8 kilometers. The closest station to the Community Wind South project, KWOA, is non-directive and located more than 12.5 kilometers from the nearest turbine location. Therefore, no impact to the coverage of AM stations should result due to the presence of the proposed turbines.

The coverage of FM stations, when the stations are at distances greater than 4.0 kilometers from wind turbines, is not subject to degradation. The closest station to the Community Wind South project, KWOA-FM, is more than 12.5 kilometers from the nearest turbine location, and falls well outside the area potentially impacted by the turbines.

4. Recommendations

Since no impact on the AM or FM broadcast stations was identified in our analysis, no recommendations or mitigation techniques are required for this project.

5. Contact Us

For questions or information regarding the AM and FM Radio Report, please contact:

Contact person:	Lester Polisky
Title:	Senior Principal Engineer
Company:	Comsearch
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Wind Power GeoPlanner™ Licensed Microwave Report

Community Wind South



Prepared on Behalf of
WSB & Associates

August 15, 2011





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1. Introduction

The use of wind energy, one of the oldest forms of harnessing a natural energy source, is now one of the world's fastest growing alternative energy sources. The United States is committed to the use of wind energy, and over the next several years billions of dollars will be spent on wind power projects. However, as new wind turbine generators are installed around the country, it is important to note that they may pose an interference threat to existing microwave systems and broadcast stations licensed to operate in the United States.

Wind turbines can interfere with microwave paths by physically blocking the line-of-sight between two microwave transmitters. Additionally, wind turbines have the potential to cause blockage and reflections (“ghosting”) to television reception. Blockage is caused by the physical presence of the turbines between the television station and the reception points. Ghosting is caused by multipath interference that occurs when a broadcast signal reflects off of a large reflective object—in this case a wind turbine—and arrives at a television receiver delayed in time from the signal that arrives via direct path.

Many states and other jurisdictions recognize the need for regulations addressing interference to radio signal transmissions from the wind turbine installations. Specifically, local planning authorities typically require project developers to ensure wind turbines will not cause interference. In some cases they require developers to notify the telecommunication operators in the area of the proposed wind turbine installation. Other factors prompting developers to undertake proactive investigation into potential interference include the need to prevent legal and regulatory problems and the desire to promote goodwill within the community—a good neighbor approach.

Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services.

This report focuses on the potential impact of wind turbines on licensed non-federal government microwave systems. Comsearch provides additional wind energy services, a description of which is available upon request.

2. Summary of Results

An overall summary of results appears below.

Project Information

Name: Community Wind South

County: Nobles

State: Minnesota

Total Microwave Paths	Paths with Obstructions	Total Turbines	Turbine Obstructions
1	1	15	1

Methodology

Our obstruction analysis was performed using Comsearch's proprietary microwave database, which contains all non-government licensed paths from 0.9 - 23 GHz¹. First, we determined all microwave paths that intersect the area of interest². The area of interest was defined by the client and encompasses the planned turbine locations. Next, for each microwave path that intersected the project area, we calculated a Worst Case Fresnel Zone (WCFZ). The mid-point of a full microwave path is the location where the widest (or worst case) Fresnel zone occurs. Fresnel zones were calculated for each path using the following formula.

$$R_n \cong 17.3 \sqrt{\frac{n}{F_{GHz}} \left(\frac{d_1 d_2}{d_1 + d_2} \right)}$$

Where,

- R_n = Fresnel Zone radius at a specific point in the microwave path, meters
- n = Fresnel Zone number, 1
- F_{GHz} = Frequency of microwave system, GHz
- d_1 = Distance from antenna 1 to a specific point in the microwave path, kilometers
- d_2 = Distance from antenna 2 to a specific point in the microwave path, kilometers

For worst case Fresnel zone calculations, $d_1 = d_2$

¹ Please note that this analysis does not include unlicensed microwave paths or federal government paths that are not registered with the FCC.

² We use FCC-licensed coordinates to determine which paths intersect the area of interest. It is possible that as-built coordinates may differ slightly from those on the FCC license.

The calculated WCFZ radius, giving the linear path an area or swath, buffers each microwave path in the project area. See the Tables and Figures section for a summary of paths and WCFZ distances. In general, this is the two-dimensional area where the planned wind turbines should be avoided, if possible. A depiction of the WCFZ can be found in the Tables and Figures section, and is also included on the enclosed spreadsheet and shapefiles^{3,4}.

Discussion of Potential Obstructions

For this project, 15 turbines were considered in the analysis, each with a blade diameter of 92 meters and turbine hub height of 100 meters. Of those turbines, one was found to have a potential conflict with one microwave path. The next section contains a detailed depiction of the potential obstruction scenarios and a tabular summary of the affected turbines and microwave paths.

When turbines fall within the two-dimensional WCFZ, Comsearch offers and recommends a detailed clearance study, which considers the vertical Z-height clearance objectives. The results of the detailed study may clear the potential conflict without requiring turbine relocation. Please contact Denise Finney at (703) 726 – 5650 to request a detailed study.

³ The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 15 projected coordinate system.

⁴ Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

3. Tables and Figures

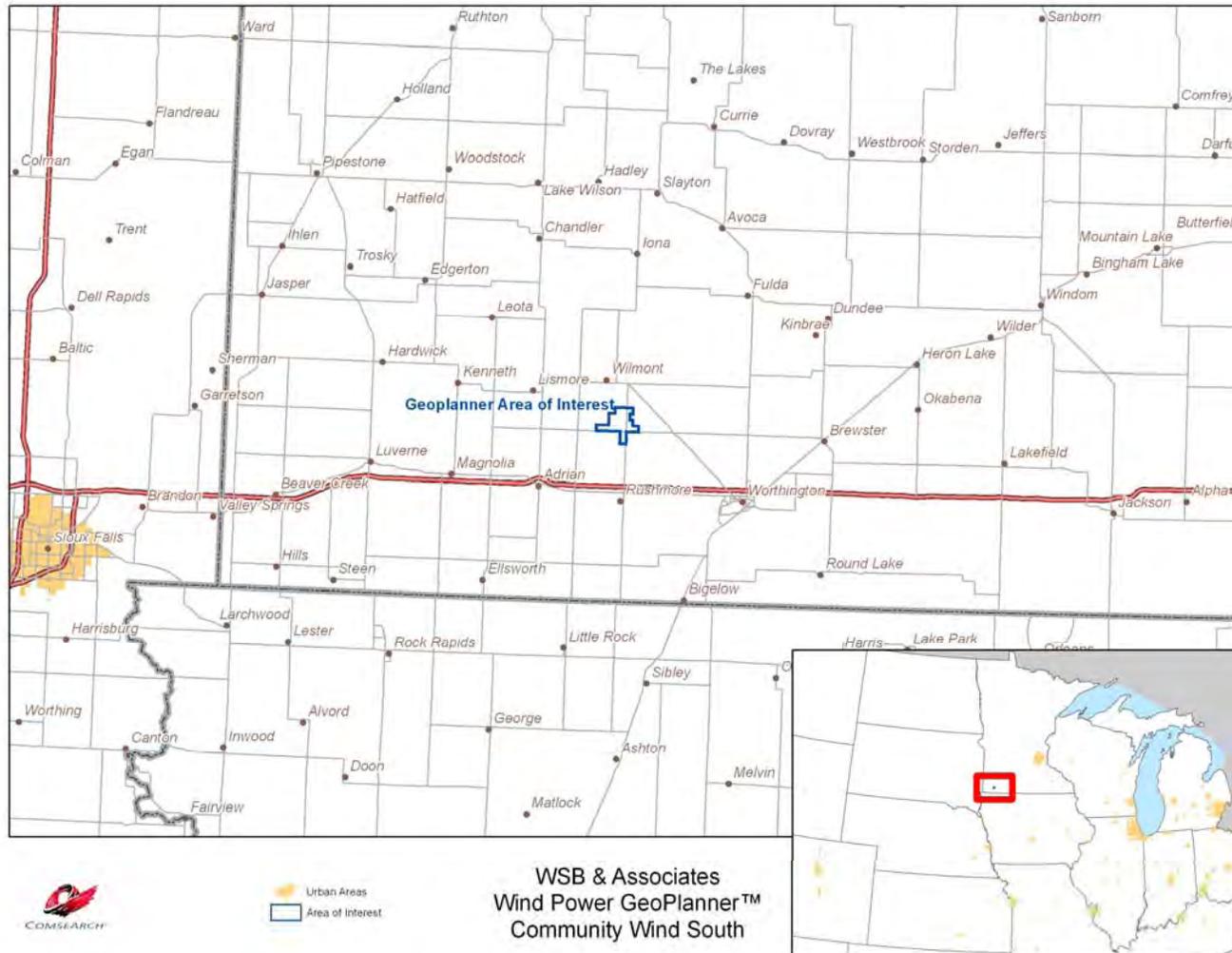


Figure 1: Area of Interest

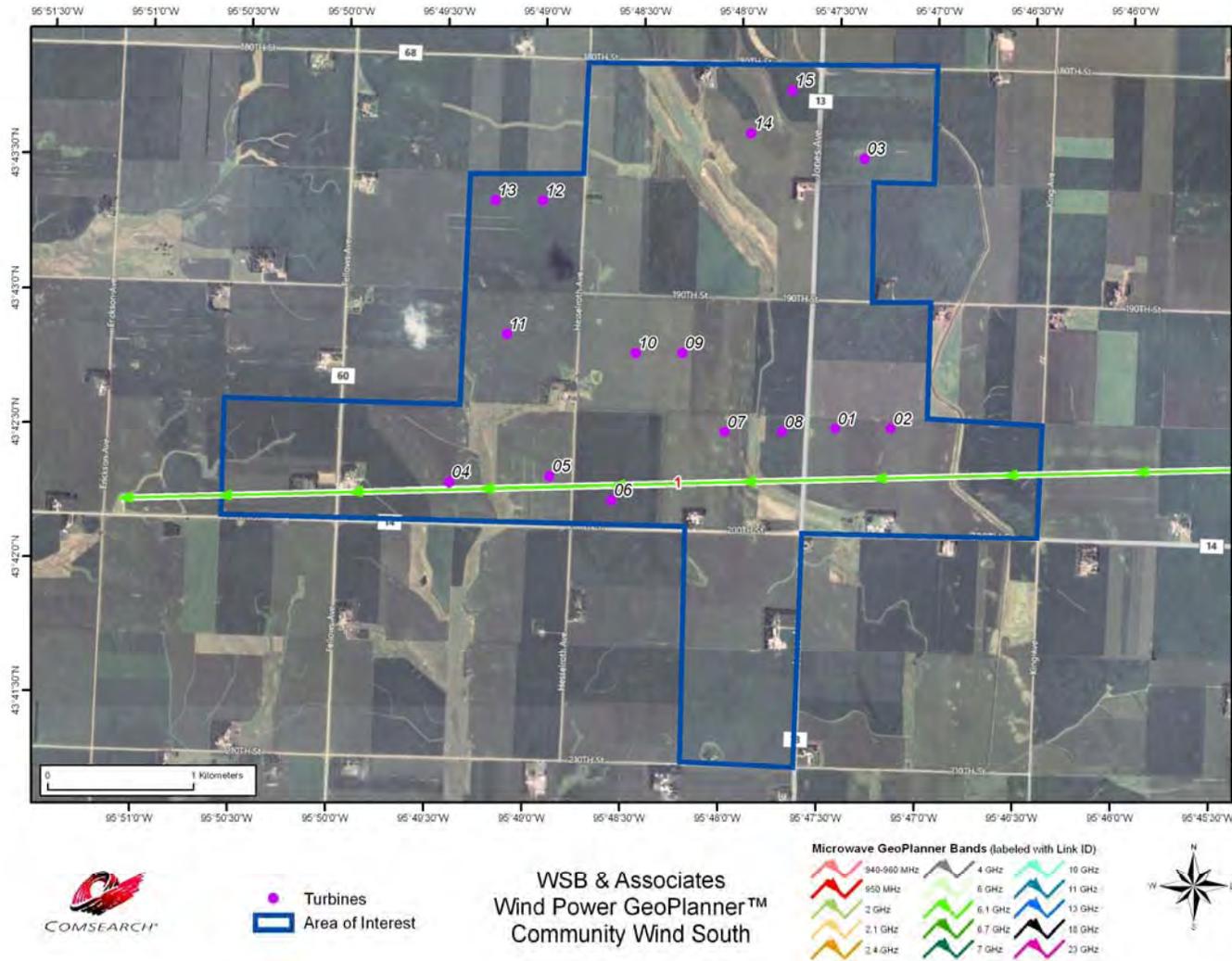


Figure 2: Microwave Paths that Intersect the Area of Interest

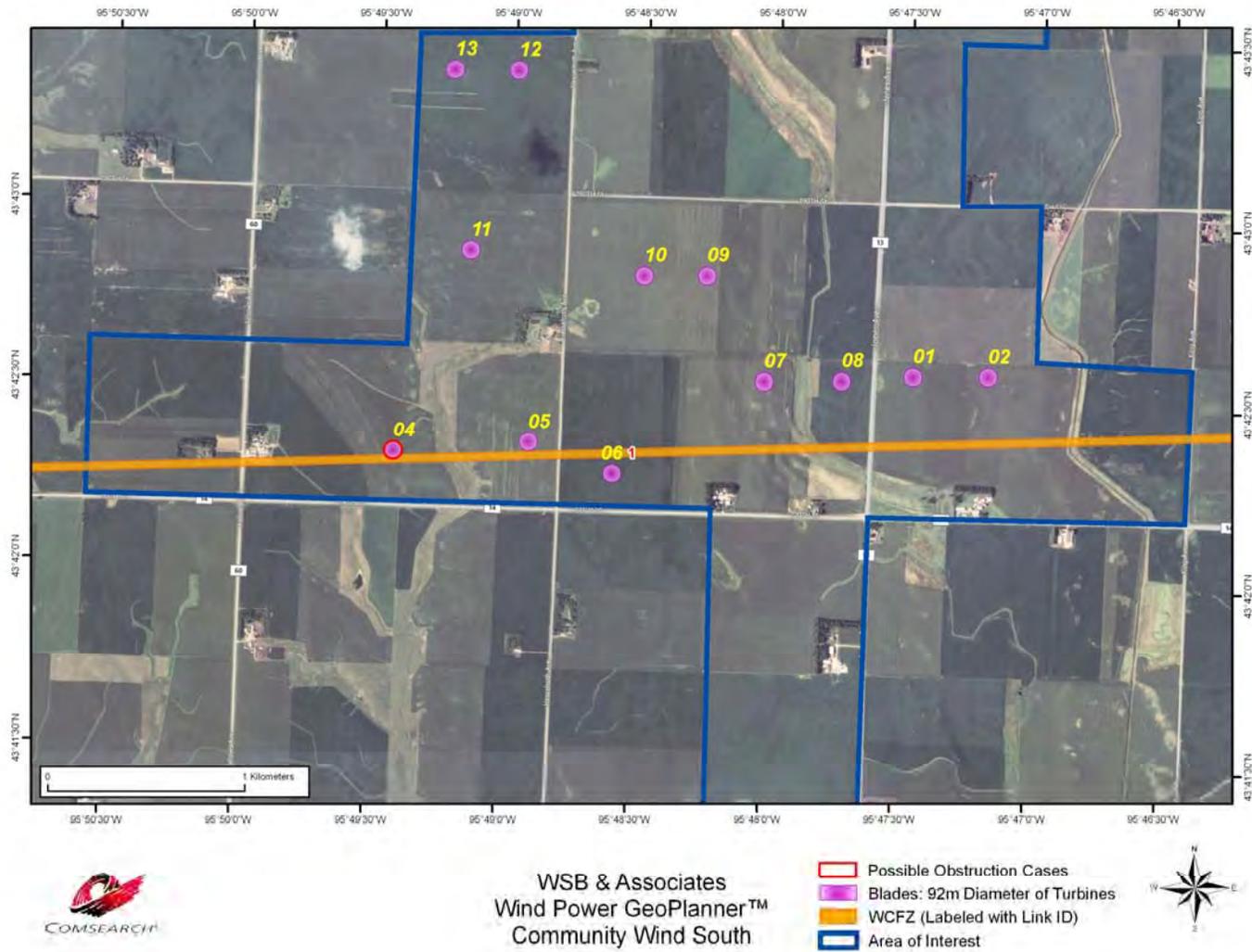


Figure 3: Microwave Paths with WCFZ Buffers

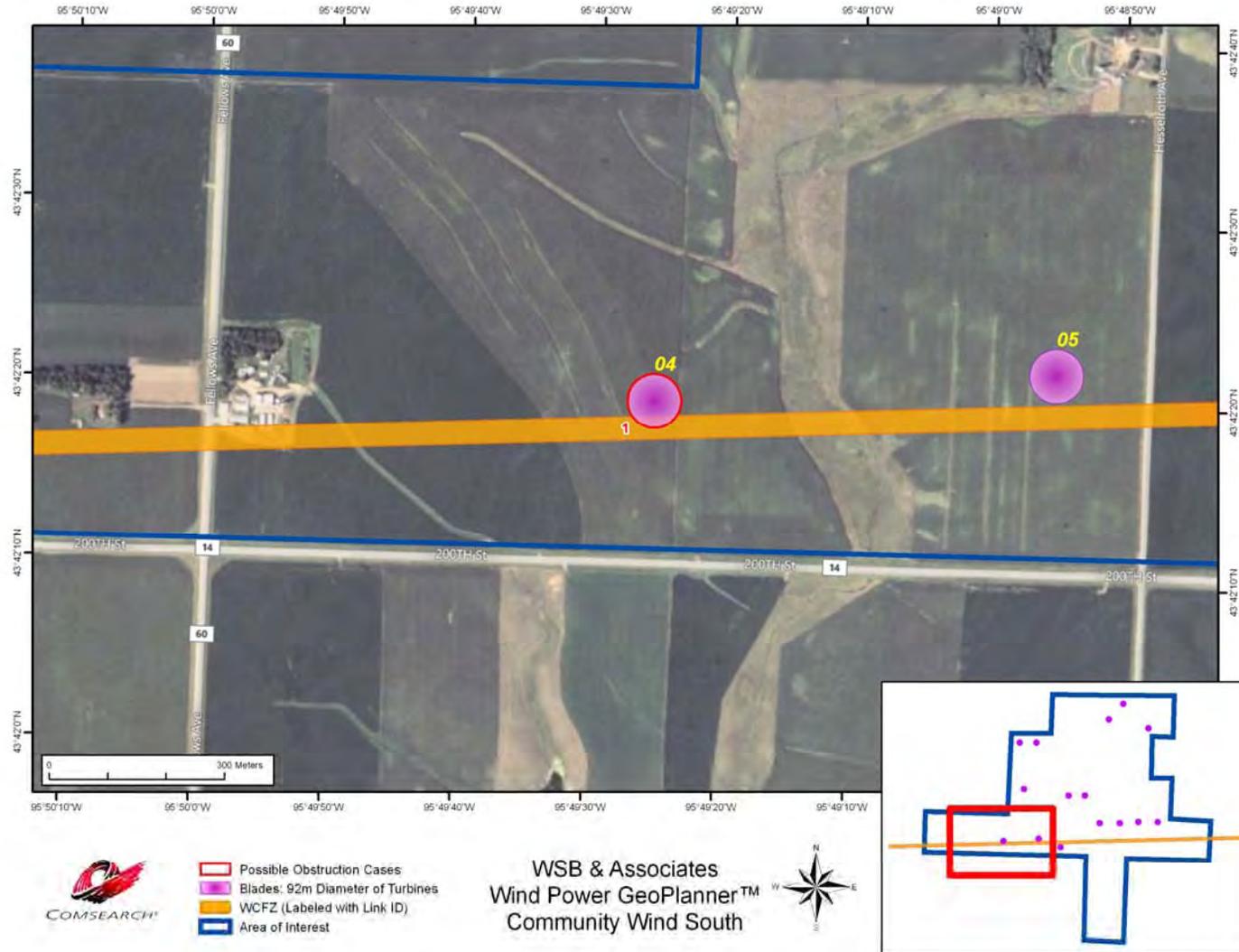


Figure 4: Potential Obstruction Scenario



ID	Site Name 1	Site Name 2	Callsign 1	Callsign 2	Band	Licensee	WCFZ (m)
1	BREWSTER	RUSHMORE	WPYH767	WQAU442	Lower 6 GHz	Minnesota, State of (DOT)	20.06

*Table 1: Microwave Paths that Intersect the Area of Interest
(See enclosed mw_geopl.xls for more information and
GP_dict_matrix_description.xls for detailed field descriptions)*

Turbine ID	Latitude (NAD83)	Longitude (NAD83)	Affected Microwave Link IDs
04	43.705400	-95.823600	1

Table 2: Turbines that Cause Potential Obstructions



4. Contact Us

For questions or information regarding the Licensed Microwave Report, contact:

Contact person:	Denise Finney
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Wind Power GeoPlanner™

Land Mobile Report

Community Wind South



Prepared on Behalf of
WSB & Associates

September 8, 2011



COMSEARCH
A CommScope Company



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1. Introduction

Comsearch compiles and provides information on land mobile sites identified within or near a defined area of interest related to proposed wind energy facilities. This information is useful in the planning stages of the wind energy facilities to identify fixed land mobile stations where critical telecommunication services are provided such as emergency (police, fire, 911, e.g.) response, public safety and local government communications, or industrial and business wireless radio operations. This data can be used in support of the wind energy facilities communications needs or to avoid any potential impact to the current land mobile services provided in that region.

2. Summary of Results

Methodology

Our land mobile report is derived from the FCC's Universal Licensing System (ULS). The data is imported into GIS software and the land mobile sites are geographically mapped with the wind energy area of interest defined by the customer. Each site on the map is identified with an ID number associated with site information provided in a data table.

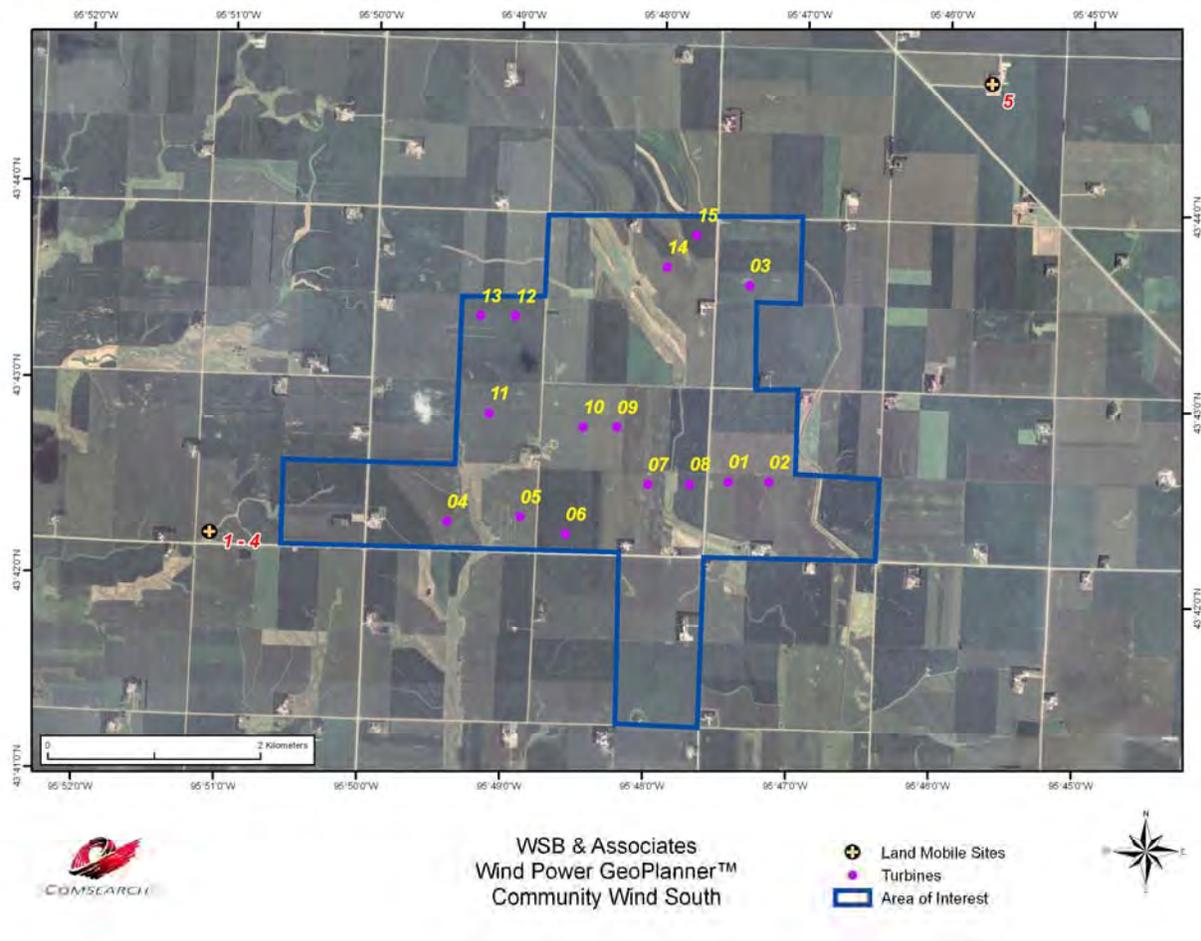


Figure 1: Land Mobile Sites near the Area of Interest

Results

Figure 1 identifies five land mobile sites in the vicinity of the wind energy area of interest using the data sources described in our methodology above. Specific information about these sites is provided in Table 1 including location coordinates, frequency band, antenna height above ground level, and licensee name. Most of the land mobile sites licensed to county and state entities are providing critical public safety and emergency communications.

ID	Callsign	Frequency Band (MHz)	Licensee	Antenna Height AGL (m)	City	Latitude (NAD83)	Longitude (NAD83)
1	KAC379	150-174	NOBLES, COUNTY OF	39	RUSHMORE, MN	43.70386111	-95.85125000
2	WPZW952	150-174	MINNESOTA, STATE OF	100.6	RUSHMORE, MN	43.70386111	-95.85125000
3	WQCE541	800/900	MINNESOTA, STATE OF	105.8	RUSHMORE, MN	43.70386111	-95.85125000
4	WQKZ788	800/900	MINNESOTA, STATE OF	104.3	RUSHMORE, MN	43.70386111	-95.85125000
5	WYP715	450-470	Penning Bros.	30	WILMONT, MN	43.74413889	-95.76166667

Table 1: Summary of Land Mobile Sites

The land mobile sites as described in this report are typically unaffected by the presence of wind turbines and we do not anticipate any significant harmful effect to these services. The frequencies of operation for these services have characteristics that allow the signal to propagate through wind turbines. As a result, very little, if any, change in their coverage should occur when the wind turbines are installed. The closest turbine in the Community Wind South Project area is 2.2 kilometers from the nearest land mobile site. This distance exceeds the distance criteria based on FCC interference emissions from electrical devices in the land mobile frequency bands. Thus there should not be any negative impact on the land mobile communications services in the wind project area.

In the unlikely event that a land mobile licensee believes their coverage has been compromised by the presence of the wind energy facility, they have many options to improve their signal coverage to the area through optimization of a nearby base station or even adding a repeater site. Utility towers, meteorological towers or even the turbine towers within the wind project area can serve as the platform for a land mobile base station or repeater site.



3. Contact Us

For questions or information regarding the Land Mobile Report, please contact:

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