

Exhibit E
Off-Air TV Analysis

ComSearch

June 21, 2021

Wind Power GeoPlanner™

Off-Air TV Analysis

Emerson Creek Wind



Prepared on Behalf of
Firelands Wind, LLC

June 21, 2021



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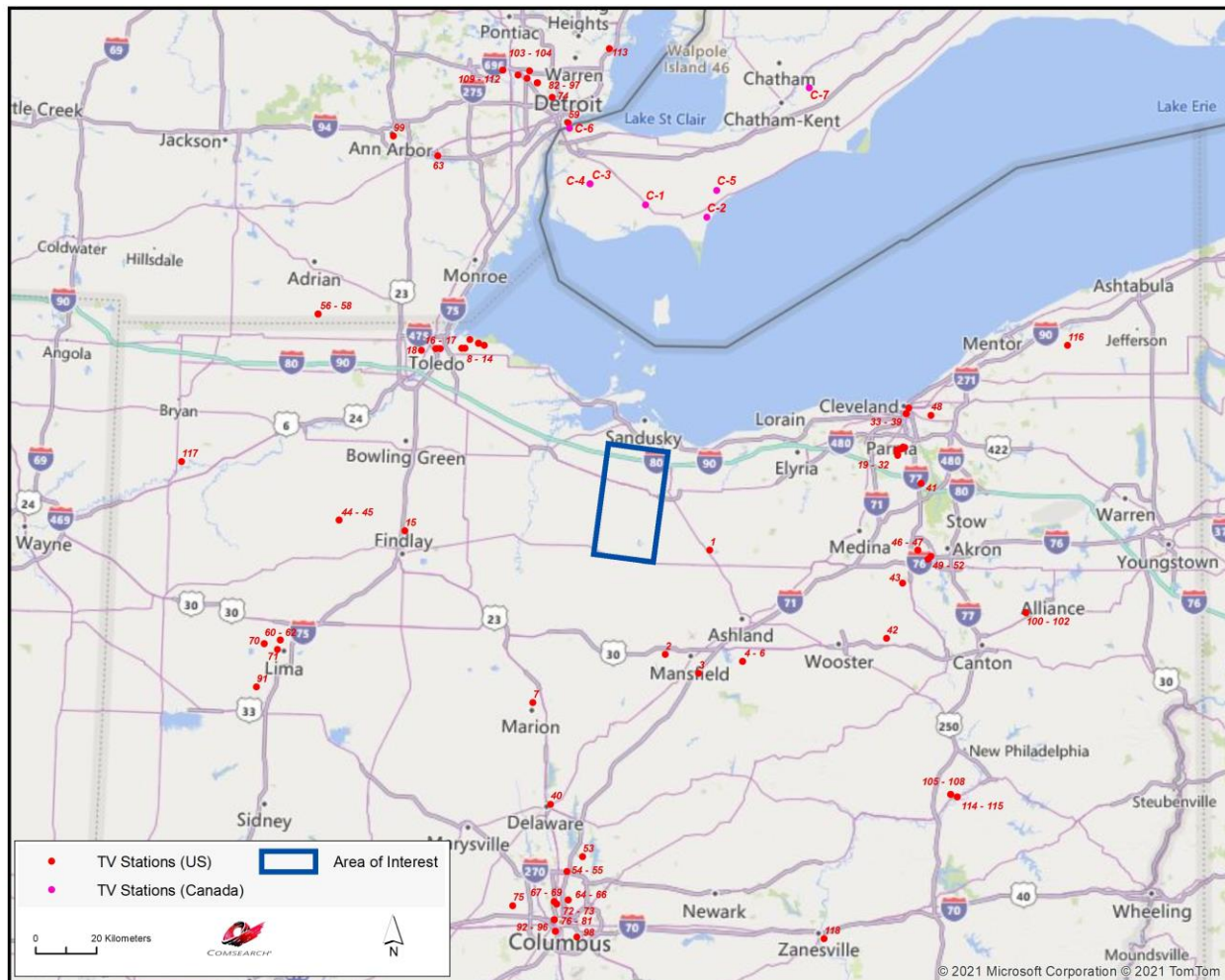
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Off-air television stations broadcast signals from terrestrially-based facilities directly to television receivers. Comsearch identified those off-air stations whose service could potentially be affected by the proposed Emerson Creek Wind project in Erie and Huron Counties, Ohio. Comsearch then examined the coverage of the stations and the communities in the area that could potentially have degraded television reception due to the location of the proposed wind turbines.

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



To begin the analysis, Comsearch compiled all off-air television stations¹ within 150 kilometers of the project area of interest (AOI). TV stations at a distance of 150 kilometers or less are the most likely to provide off-air coverage to the project area and neighboring communities. These stations are listed in Table 1 and Table 2, below, and a plot depicting their locations is provided in Figure 2. There are a total of 125 database records for stations within approximately 150 kilometers of the limits of the project AOI. Of these stations, 87 are currently licensed and operating.



ID	Call Sign	Status	Service ²	Channel	Transmit ERP ³ (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine ⁴ (km)
1	WGGN-TV	LIC	DTV	3	10.0	41.075083	-82.451111	24.61
2	WMFD-TV	LIC	DTV	12	14.0	40.763889	-82.617778	38.31
3	W18ES-D	LIC	LPT	18	15.0	40.709222	-82.486278	48.58
4	WQIZ-LD	LIC	LPD	33	15.0	40.747278	-82.314889	53.97
5	W33BW	LIC	LPA	33	30.0	40.747278	-82.314889	53.97
6	W33BW	STA	LPA	33	15.0	40.747278	-82.314889	53.97
7	WXCB-CD	LIC	DCA	25	15.0	40.612778	-83.130000	58.98
8	WNWO-TV	LIC	DTV	23	275.0	41.667500	-83.356111	59.35
9	WDMY-LP	CP	LPX	6	3.0	41.672778	-83.379722	61.27
10	WTOL	CP	DTV	11	26.0	41.672778	-83.379722	61.27
11	WTOL	LIC	DTV	11	16.9	41.672778	-83.379722	61.27
12	WGTE-TV	LIC	DTV	29	49.5	41.657222	-83.431944	63.81
13	WTVG	LIC	DTV	13	20.1	41.683333	-83.413611	64.23
14	WUPW	LIC	DTV	26	65.0	41.656111	-83.444722	64.63
15	WFND-LD	LIC	LPD	19	15.0	41.111417	-83.647972	68.54
16	WMNT-CD	LIC	DCA	36	15.0	41.653361	-83.530611	70.59
17	WDTJ-LD	LIC	LPD	18	4.0	41.653361	-83.547972	71.85
18	W38DH	LIC	LPX	38	8.2	41.646861	-83.604917	75.71
19	WOIO	CP	DTV	10	20.0	41.379167	-81.719722	80.55
20	WEWS-TV	LIC	DTV	15	1000.0	41.373889	-81.717500	80.70
21	WJW	LIC	DTV	8	11.0	41.363333	-81.715833	80.78

² Definitions of service and status codes:

ACA - Analog Class A
DCA - Digital Class A
DRT - Digital Replacement Translator
DT - ETL testing
DTS - Distributed Transmission System
DTV - Full Service Television
DTX - Digital TV Auxiliary
LPA - Low Power Analog TV
LPD - Low Power Digital TV
LPT - Digital TV Translator
LPX - Analog TV Translator
TS - Legacy Service for Analog TV Auxiliary
TV - Analog TV legacy

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
AMD - Amendment

² ERP = Transmit Effective Radiated Power

⁴ Two turbines layers were considered in this study. The calculated distances to the closest turbine for each station are identical for both layers.

ID	Call Sign	Status	Service ²	Channel	Transmit ERP ³ (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine ⁴ (km)
22	WLFM-LP	STA	LPA	6	0.003	41.382778	-81.701667	82.08
23	WLFM-LD	LIC	LPD	20	15.0	41.382778	-81.701667	82.08
24	WQHS-DT	LIC	DTV	36	780.0	41.382778	-81.701667	82.08
25	WCDN-LD	LIC	LPD	7	0.3	41.383889	-81.695278	82.62
26	WRAP-LD	CP	LPD	16	15.0	41.383889	-81.695278	82.62
27	WBNX-TV	LIC	DTV	17	505.0	41.383889	-81.695278	82.62
28	W27EA-D	LIC	DCA	27	15.0	41.383889	-81.695278	82.62
29	WUAB	LIC	DTV	10	9.5	41.387500	-81.695000	82.67
30	WOIO	LIC	DTV	10	9.5	41.387500	-81.695000	82.67
31	WKYC	LIC	DTV	19	1000.0	41.386083	-81.689083	83.16
32	WVIZ	LIC	DTV	35	219.5	41.386083	-81.689083	83.16
33	WQDI-LD	LIC	LPD	21	5.0	41.487000	-81.683639	85.15
34	KONV-LD	LIC	LPD	23	4.0	41.487000	-81.683639	85.15
35	WUEK-LD	LIC	LPD	25	7.0	41.487000	-81.683639	85.15
36	WEKA-LD	AMD	LPD	26	5.0	41.487000	-81.683639	85.15
37	WEKA-LD	STA	LPD	26	0.075	41.487000	-81.683639	85.15
38	WEKA-LD	LIC	LPD	27	5.0	41.487000	-81.683639	85.15
39	WVIZ	CP	DRT	30	8.5	41.503333	-81.674722	86.27
40	WOCB-CD	LIC	DCA	22	15.0	40.313056	-83.051111	88.29
41	WEKA-LD	CP	LPD	26	5.0	41.280556	-81.622500	88.69
42	WOHZ-CD	LIC	DCA	20	4.0	40.820000	-81.753778	89.08
43	WIVX-LD	LIC	LPD	13	3.0	40.985000	-81.692778	89.15
44	WBGU-TV	LIC	DTV	22	137.0	41.136667	-83.906667	90.18
45	WPNM-LD	LIC	LPD	27	15.0	41.136667	-83.906667	90.18
46	WEAO	LIC	DTV	24	191.0	41.082917	-81.633778	91.37
47	WRLM	LIC	DTV	24	191.0	41.082917	-81.633778	91.37
48	WRAP-LP	LIC	LPA	32	0.07	41.482528	-81.585667	93.09
49	WVPX-TV	LIC	DTV	22	950.0	41.055556	-81.593611	95.46
50	WDLI-TV	LIC	DTV	22	950.0	41.055556	-81.593611	95.46
51	WAKN-LP	LIC	LPA	11	1.5	41.064639	-81.582861	96.04
52	WOIO	LIC	DRT	18	15.0	41.064639	-81.582861	96.04
53	WOSU-TV	LIC	DTV	16	675.0	40.159167	-82.922972	103.53
54	WCBZ-CD	STA	DCA	18	9.0	40.114944	-82.982028	108.95
55	WCBZ-CD	LIC	DCA	18	15.0	40.114944	-82.982028	108.95
56	WLMB	CP	DTV	5	10.0	41.744722	-84.018333	111.37
57	WLMB	LIC	DTV	5	10.0	41.744722	-84.018333	111.37
58	WDMY-LD	APP	LPT	6	1.5	41.744722	-84.018333	111.37
59	WLPC-CD	LIC	LPD	28	4.0	42.331944	-83.045000	112.39
60	WLIO	LIC	DTV	8	40.0	40.775444	-84.120611	114.64
61	WOHL-CD	LIC	DCA	15	15.0	40.775444	-84.120611	114.64
62	WLQP-LP	STA	LPA	25	7.5	40.747556	-84.131750	116.56
63	WFHD-LP	APP	LPT	2	3.0	42.224750	-83.561861	117.30

ID	Call Sign	Status	Service ²	Channel	Transmit ERP ³ (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine ⁴ (km)
64	WGCT-CD	LIC	DCA	8	0.19	40.031111	-82.974889	118.12
65	WGCT-CD	CP	DCA	8	0.646	40.031111	-82.974889	118.12
66	WGCT-CD	STA	DCA	8	0.41	40.031111	-82.974889	118.12
67	WCPX-LP	APP/STA	LPD	25	15.0	40.025167	-83.029222	119.38
68	WCPX-LD	CP	LPD	25	15.0	40.025167	-83.029222	119.38
69	WCPX-LP	STA	LPA	25	15.0	40.025167	-83.029222	119.38
70	WTLW	LIC	DTV	4	10.0	40.763056	-84.183611	120.13
71	WOIW-LD	LIC	LPD	17	15.0	40.763056	-84.183611	120.13
72	WCSN-LD	LIC	LPD	26	15.0	40.017222	-83.019722	120.13
73	WCPX-LP	LIC	LPA	48	150.0	40.017222	-83.019722	120.13
74	WHPS-CD	LIC	DCA	15	15.0	42.406111	-83.112222	121.57
75	WOOH-LD	CP	LPD	29	15.0	40.010194	-83.188556	123.74
76	WCMH-TV	LIC	DTV	14	902.0	39.971111	-83.027778	125.30
77	W17EB-D	CP	LPD	17	15.0	39.971111	-83.027778	125.30
78	WCLL-CD	LIC	DCA	19	15.0	39.971111	-83.027778	125.30
79	WSFJ-TV	LIC	DTV	19	15.0	39.971111	-83.027778	125.30
80	WBNS-TV	LIC	DTV	21	1000.0	39.971111	-83.027778	125.30
81	W44DC-D	LIC	LPD	44	15.0	39.971111	-83.027778	125.30
82	WHNE-LD	STA	LPD	3	6.5	42.447917	-83.173083	127.25
83	WHNE-LD	LIC	LPD	3	3.0	42.447917	-83.173083	127.25
84	WHNE-LD	APP	LPD	3	6.5	42.447917	-83.173083	127.25
85	WUDT-LD	CP	LPD	8	3.0	42.447917	-83.173083	127.25
86	WTVS	LIC	DTV	20	345.0	42.447917	-83.173083	127.25
87	WWJ-TV	LIC	DTV	21	380.0	42.447917	-83.173083	127.25
88	WUDT-LD	LIC	LPD	23	15.0	42.447917	-83.173083	127.25
89	WMYD	LIC	DTV	31	935.0	42.447917	-83.173083	127.25
90	WUDL-LD	LIC	LPD	35	10.0	42.447917	-83.173083	127.25
91	WLQP-LP	LIC	LPA	18	7.7	40.634194	-84.208000	127.29
92	WQMC-LD	LIC	LPD	15	15.0	39.937222	-83.021111	128.95
93	WWHO	LIC	DTV	23	885.0	39.937222	-83.021111	128.95
94	WDEM-CD	LIC	DCA	24	15.0	39.937222	-83.021111	128.95
95	WTTE	LIC	DTV	27	1000.0	39.937222	-83.021111	128.95
96	WSYX	LIC	DTV	28	677.0	39.937222	-83.021111	128.95
97	WJBK	LIC	DTV	7	27.2	42.460556	-83.213889	129.47
98	WOOH-LD	LIC	LPD	29	1.39	39.921667	-82.937778	129.91
99	WFHD-LP	LIC	LPX	27	1.5	42.278056	-83.742222	130.72
100	W27DG-D	LIC	LPT	27	2.0	40.898611	-81.210000	130.84
101	W27DG-D	CP	LPT	27	10.3	40.898611	-81.210000	130.84
102	WIVM-LD	LIC	LPD	34	4.5	40.898611	-81.210000	130.84
103	WXYZ-TV	LIC	DTV	25	765.0	42.470556	-83.250278	131.38
104	WDIV-TV	LIC	DTV	32	720.0	42.482778	-83.205278	131.67
105	WIVN-LD	CP	LPD	5	0.015	40.358833	-81.500417	133.91

ID	Call Sign	Status	Service ²	Channel	Transmit ERP ³ (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine ⁴ (km)
106	WIVD-LD	CP	LPD	26	15.0	40.358833	-81.500417	133.91
107	WIVD-LD	LIC	LPD	26	15.0	40.358833	-81.500417	133.91
108	WIVN-LD	LIC	LPD	29	7.4	40.358833	-81.500417	133.91
109	WDWO-CD	LIC	DCA	22	15.0	42.483611	-83.312222	134.31
110	WDWO-CD	CP	DCA	22	15.0	42.483611	-83.312222	134.31
111	WPXD-TV	LIC	DTV	24	370.0	42.483611	-83.312222	134.31
112	WKBD-TV	LIC	DTV	34	285.0	42.483611	-83.312222	134.31
113	WADL	LIC	DTV	27	605.0	42.554167	-82.887500	135.37
114	W18EY-D	CP	LPD	18	15.0	40.352194	-81.474056	136.12
115	W32ED-D	CP	LPD	32	6.0	40.352194	-81.474056	136.12
116	W34FP-D	LIC	LPT	34	9.2	41.691167	-81.046472	142.19
117	WNHO-LD	LIC	LPD	35	15.0	41.292417	-84.533806	142.63
118	WHIZ-TV	LIC	DTV	30	500.0	39.928333	-81.985278	145.09

Table 1: Off-Air TV Stations within 150 Kilometers of Project Area (US)

ID	Call Sign	Status	Class ⁵	Channel	Transmit ERP (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine (km)
C-1	CIII-DT-22	OP	R	33	36.000	42.061389	-82.484722	82.79
C-2	CFTV-DT(1)	AU	LP	30	0.584	42.093889	-82.730000	84.23
C-3	CBET-DT	OP	R	9	26.000	42.153333	-82.953056	91.57
C-4	CICO-DT-32	OP	R	19	14.200	42.153333	-82.953056	91.57
C-5	CHWI-DT	OP	R	16	3.400	42.141667	-82.446667	92.16
C-6	CHWI-DT-60	OP	R	17	0.161	42.316111	-83.040000	110.58
C-7	CICO-DT-59	OP	R	34	1.000	42.449444	-82.083611	133.86

Table 2: Off-Air TV Stations within 150 Kilometers of Project Area (Canada)

⁵ Definitions of class and status codes:
R – Regular VHF Television Broadcast Station
A – NTSC UHF station
OP – Licensed and operational station
TO – Temporary operation
AU – Authorized; not yet operational

3. Impact Assessment

Based on a contour analysis of the licensed stations within 150 kilometers of the Emerson Creek Wind project, for both turbines layers considered in this study, it was determined that twenty of the full-power digital stations, identified below in Table 3, along with three low-power digital stations, may have their reception disrupted in and around the project. The areas primarily affected would include TV service locations within 10 kilometers of the wind energy project that have clear line-of-sight (LOS) to a proposed wind turbine but not to the respective station. After the wind turbines are installed, communities and homes in these locations may have degraded reception of these stations. This is due to multipath interference caused by signal scattering as TV signals are reflected by the rotating wind turbine blades and mast.

ID	Call Sign	Status	Service ⁶	Channel	Transmit ERP ⁷ (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine (km)
1	WGGN-TV	LIC	DTV	3	10.0	41.075083	-82.451111	24.61
2	WMFD-TV	LIC	DTV	12	14.0	40.763889	-82.617778	38.31
3	W18ES-D	LIC	LPT	18	15.0	40.709222	-82.486278	48.58
4	WQIZ-LD	LIC	LPD	33	15.0	40.747278	-82.314889	53.97
5	W33BW	LIC	LPA	33	30.0	40.747278	-82.314889	53.97
8	WNWO-TV	LIC	DTV	23	275.0	41.667500	-83.356111	59.35
11	WTOL	LIC	DTV	11	16.9	41.672778	-83.379722	61.27
12	WGTE-TV	LIC	DTV	29	49.5	41.657222	-83.431944	63.81
13	WTVG	LIC	DTV	13	20.1	41.683333	-83.413611	64.23
14	WUPW	LIC	DTV	26	65.0	41.656111	-83.444722	64.63
20	WEWS-TV	LIC	DTV	15	1000.0	41.373889	-81.717500	80.70
21	WJW	LIC	DTV	8	11.0	41.363333	-81.715833	80.78
24	WQHS-DT	LIC	DTV	36	780.0	41.382778	-81.701667	82.08
27	WBNX-TV	LIC	DTV	17	505.0	41.383889	-81.695278	82.62
29	WUAB	LIC	DTV	10	9.5	41.387500	-81.695000	82.67
30	WOIO	LIC	DTV	10	9.5	41.387500	-81.695000	82.67
31	WKYC	LIC	DTV	19	1000.0	41.386083	-81.689083	83.16
32	WVIZ	LIC	DTV	35	219.5	41.386083	-81.689083	83.16
44	WBGU-TV	LIC	DTV	22	137.0	41.136667	-83.906667	90.18
49	WVPX-TV	LIC	DTV	22	950.0	41.055556	-81.593611	95.46
50	WDLI-TV	LIC	DTV	22	950.0	41.055556	-81.593611	95.46
52	WOIO	LIC	DRT	18	15.0	41.064639	-81.582861	96.04
53	WOSU-TV	LIC	DTV	16	675.0	40.159167	-82.922972	103.53

Table 3: Licensed Off-Air TV Stations Subject to Degradation

⁶ Definitions of service and status codes:

DT – Digital television broadcast station

LD – Low power digital television broadcast station

LIC – Licensed and operational station

⁷ ERP = Transmit Effective Radiated Power

4. Recommendations

While TV signals are reflected by wind turbines, which can cause multipath interference to the TV receiver, modern digital TV receivers have undergone significant improvements to mitigate the effects of signal scattering. When used in combination with a directional antenna, it becomes even less likely that signal scattering from wind farms will cause interference to digital TV reception.

Nevertheless, signal scattering could still impact certain areas currently served by the TV station mentioned above, especially those that would have line-of-sight to at least one wind turbine but not to the station antenna. In the unlikely event that interference is observed in any of the TV service areas, it is recommended that a high-gain directional antenna be used, preferably outdoors, and oriented towards the signal origin in order to mitigate the interference. 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.

5. Contact

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

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Summary: Application - 7 of 13 (Exhibit E – Off-Air TV Analysis) electronically filed
by Christine M.T. Pirik on behalf of Firelands Wind, LLC