

Wind Power GeoPlanner™

Land Mobile & Emergency Services Report

Aurora Wind Project



Prepared on Behalf of
Aurora Wind Project,
LLC

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COMSEARCH
A CommScope Company



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2. Summary of Results

Our land mobile and emergency services incumbent data¹ was derived from the FCC's Universal Licensing System (ULS) and the FCC's Public Safety & Homeland Security bureau. We identified both site-based licenses as well as regional area-wide licenses designated for public safety use.

Site-Based Licenses

The site-based licenses were imported into GIS software and geographically mapped relative to the wind energy project area of interest as defined by the customer. Each site on the map was given an ID number and associated with site information in a data table. A depiction of the fixed-site licenses in and around the project area appears in Figure 2.

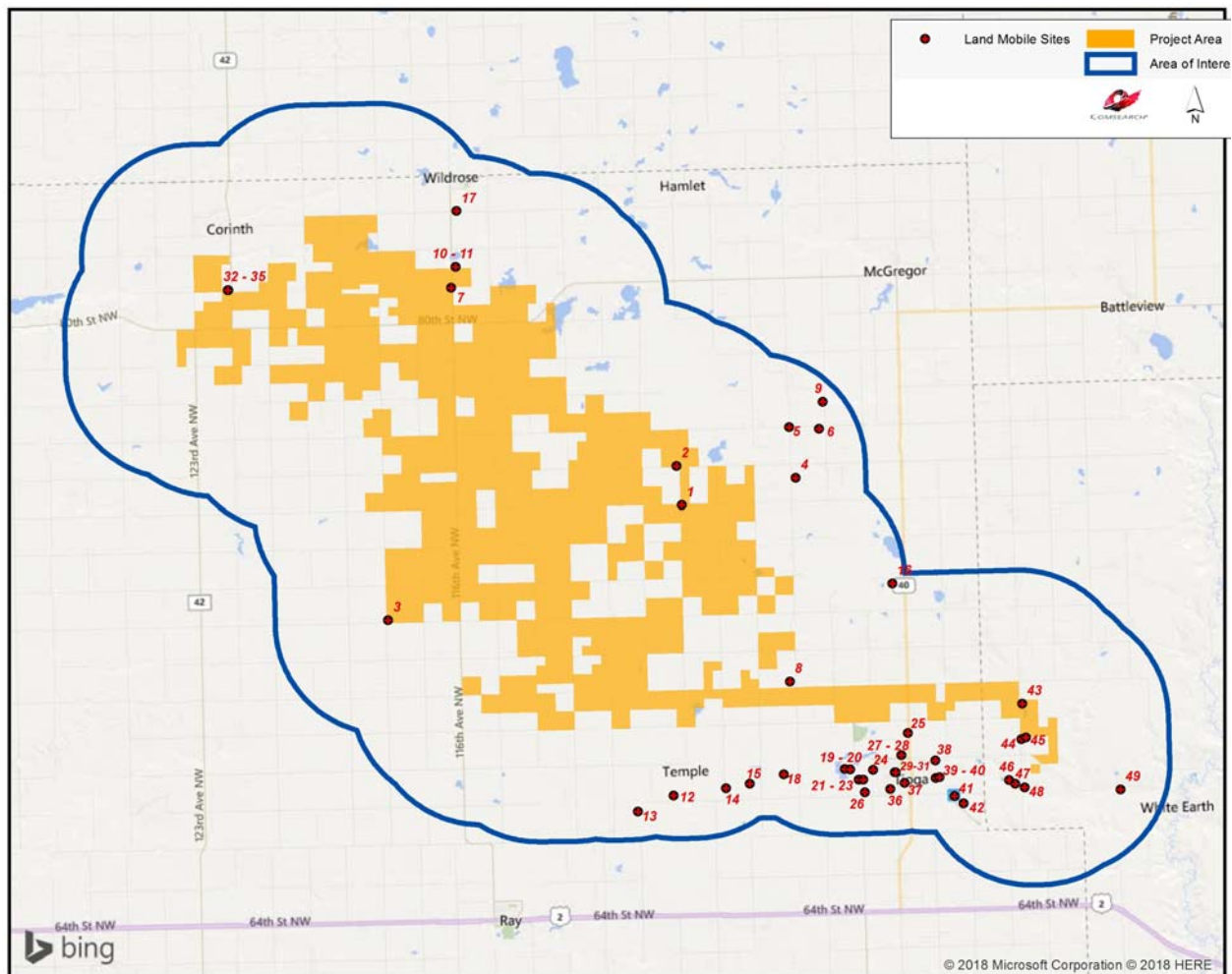


Figure 2: Land Mobile & Emergency Service Sites in Area of Interest

Figure 2 identifies forty-nine site-based licenses in and around the Aurora Wind Project area of interest. Specific information about these sites is provided in Table 1.

ID	Call Sign	Frequency Band (MHz)	Licensee	Antenna Height AGL (m)	Latitude (NAD83)	Longitude (NAD83)	Distance to Center of AOI (km)
1	WPCQ417	150-174	Sundhagen, Scott	18.0	48.502528	-103.058806	4.58
2	WPCQ417	150-174	Sundhagen, Scott	18.0	48.517806	-103.061306	4.83
3	WQOK920	450-470	Static Oilfield Service	18.0	48.460528	-103.232417	9.33
4	WNQN724	450-470	Hess Corporation	12.0	48.511972	-102.991583	9.64
5	WQPT498	450-470	Vestas American Wind Technology, Inc.	13.0	48.531889	-102.994750	9.97
6	WPXP604	150-174	Gohrick Farms	20.0	48.530861	-102.977139	11.16
7	WQCV562	450-470	Sevre, Lyle	24.0	48.589444	-103.190833	11.26
8	WRAQ862	150-174	Sagaser Farms	25.0	48.432750	-102.998111	11.72
9	WQMA573	150-174	Kutter, Rick	14.0	48.541333	-102.974667	11.74
10	WQPD309	150-174	Ross Eriksmoen, Inc.	75.0	48.597667	-103.187972	11.99
11	WQVC403	150-174	Divide, County of	68.6	48.597667	-103.187972	11.99
12	WQUA277	150-174	BNSF Railway Co.	3.7	48.389333	-103.067750	12.87
13	WPJX639	150-174	BNSF Railway Co.	8.5	48.383444	-103.089056	13.12
14	WPJX639	150-174	BNSF Railway Co.	5.5	48.391694	-103.037167	13.49
15	WQTU978	150-174	BNSF Railway Co.	10.1	48.393194	-103.023028	13.86
16	WQAP805	450-470	Hamm & Phillips Service Company	51.8	48.470000	-102.936667	13.99
17	WQJP467	150-174	Cvancara, Doug	37.0	48.619389	-103.186778	14.19
18	WQOM219	150-174	BNSF Railway Co.	15.2	48.396556	-103.003083	14.38
19	WQOL659	150-174	BNSF Railway Co.	15.2	48.398083	-102.967278	16.00
20	WQSC370	150-174	BNSF Railway Co.	13.1	48.397833	-102.964139	16.19
21	WQQP811	450-470	Hess North Dakota Export Logistics, LLC	15.0	48.393639	-102.959250	16.78
22	WQQP811	450-470	Hess North Dakota Export Logistics, LLC	15.0	48.393639	-102.959111	16.78

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 land mobile station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf



ID	Call Sign	Frequency Band (MHz)	Licensee	Antenna Height AGL (m)	Latitude (NAD83)	Longitude (NAD83)	Distance to Center of AOI (km)
23	WQQP811	450-470	Hess North Dakota Export Logistics, LLC	18.0	48.393639	-102.956667	16.91
24	WQUA277	150-174	BNSF Railway Co.	3.7	48.397333	-102.950722	16.95
25	WQVA418	150-174	Tioga Police Dept.	31.0	48.411417	-102.929889	17.18
26	WQQP811	450-470	Hess North Dakota Export Logistics, LLC	10.0	48.388778	-102.955833	17.34
27	KDV691	150-174	Tioga Medical Center	37.0	48.402806	-102.934083	17.50
28	WNRB580	150-174	Tioga Medical Center	18.0	48.402806	-102.934083	17.50
29	WQPK452	150-174	Tioga, City of	11.0	48.396139	-102.938250	17.73
30	WQVA418	150-174	Tioga Police Dept.	7.9	48.396222	-102.937778	17.75
31	WPBM404	450-470	Tioga, City of	15.0	48.396139	-102.937694	17.76
32	WQTV298	150-174	M & C Sales, Inc.	45.7	48.590528	-103.321889	17.97
33	KNEK337	150-174	Williams, County of	57.0	48.590611	-103.322111	17.99
34	WQBR535	150-174	Williams, County of	62.8	48.590611	-103.322111	17.99
35	WQWP378	150-174	Williams, County of	37.0	48.590611	-103.322111	17.99
36	WQLE363	150-174	Rehak, Dennis	6.0	48.389667	-102.941111	18.05
37	WQMF627	450-470	Continental Resources, Inc.	9.0	48.391917	-102.932667	18.35
38	WQUE654	450-470	Hess North Dakota Export Logistics, LLC	30.0	48.400361	-102.914167	18.84
39	WQTB945	150-174	BNSF Railway Co.	10.2	48.393611	-102.914167	19.29
40	WQOL659	150-174	BNSF Railway Co.	15.2	48.393778	-102.912028	19.41
41	WQIU457	450-470	Tioga Municipal Airport	4.4	48.386333	-102.903528	20.41
42	WQIU457	450-470	Tioga Municipal Airport	10.7	48.383389	-102.898472	20.91
43	WQNZ498	150-174	Knife River, Inc.	26.2	48.421667	-102.862500	20.97
44	KAD948	25-50	Montana-Dakota Utilities Co.	40.5	48.407806	-102.863528	21.59
45	WQSB262	451.075	Basin Electric Power Cooperative	73.5	48.408389	-102.860917	21.73
46	WQTB945	150-174	BNSF Railway Co.	10.2	48.391944	-102.871389	21.99
47	WPJV691	150-174	BNSF Railway Co.	10.1	48.390528	-102.867889	22.29

ID	Call Sign	Frequency Band (MHz)	Licensee	Antenna Height AGL (m)	Latitude (NAD83)	Longitude (NAD83)	Distance to Center of AOI (km)
48	WQOL659	150-174	BNSF Railway Co.	15.2	48.388972	-102.862444	22.72
49	WPJX639	150-174	BNSF Railway Co.	10.7	48.387028	-102.806306	26.41

Table 1: Land Mobile & Emergency Service Sites in Area of Interest

Area-Wide Licenses

The regional area-wide licenses were compiled from FCC data sources and identified for each county in the wind energy project area. The Aurora Wind Project is located in Williams and Mountrail Counties, North Dakota, part of Public Safety Region #32, which contains all of the counties in North Dakota. Regional public safety operations are overseen by the entity listed below.

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The chairperson for Region #32 serves as the representative for all public safety entities in the area and is responsible for coordinating current and future public safety use in the wireless spectrum. In the bands licensed by the FCC for area-wide first responders, which include 220 MHz, 700 MHz, 800 MHz and 4.9 GHz, as well as the traditional Part 90 public safety pool of frequencies, nine licenses were found for the State of North Dakota, one for the County of Mountrail, and two for the County of Williams (see Table 2). These area-wide licenses are designated for mobile use only.

ID	Licensee	Area of Operation	Frequency Band (MHz)
1	American National Red Cross	Statewide: North Dakota	25-50
2	Metro Area Ambulance Service, Inc.	Statewide: North Dakota	150-174
3	Minot Police Department	Statewide: North Dakota	450-470, 2450-2500
4	Mountrail County Dept. of Roads & Bridges	Countywide: Mountrail	150-174
5	National Ski Patrol System, Inc.	Statewide: North Dakota	150-174
6	North Dakota, State of	Statewide: North Dakota	0-10, 150-174, 450-470

ID	Licensee	Area of Operation	Frequency Band (MHz)
7	North Dakota Department of Health	Statewide: North Dakota	150-174
8	North Dakota Department of Transportation	Statewide: North Dakota	150-174, 4940-4990
9	North Dakota Division of State Radio Communications	Statewide: North Dakota	150-174, 450-470
10	North Dakota EMS Association	Statewide: North Dakota	450-470
11	Williams, County of	Countywide: Williams	150-174
12	Williston Fire Department, Station 1	Countywide: Williams	150-174

Table 2: Regional Licenses

E911 Operators

Wireless operators are granted area-wide licenses from the FCC to deploy their cellular networks, which often include handsets with E911 capabilities. Since mobile phone market boundaries differ from service to service, we disaggregated the carriers' licensed areas down to the county level. We have identified the type of service for each carrier in Mountrail and Williams Counties, North Dakota in Table 3.

Mobile Phone Carrier	Service ²	
	Mountrail County, North Dakota	Williams County, North Dakota
AT&T	AWS, Cellular, PCS, WCS, 700 MHz	AWS, Cellular, PCS, WCS, 700 MHz
Commnet Wireless	PCS	-
DISH Network	AWS, 700 MHz	AWS, 700 MHz
Infrastructure Networks	700 MHz	700 MHz
Kurian, Beulah T.	AWS	AWS
Nemont Telephone (Sagebrush Cellular)	700 MHz	PCS, 700 MHz
Sprint	PCS	PCS

² AWS: Advanced Wireless Service at 1.7/2.1 GHz
CELL: Cellular Service at 800 MHz
PCS: Personal Communication Service at 1.9 GHz
WCS: Wireless Communications Service at 2.3 GHz
700 MHz: Lower 700 MHz Service

Mobile Phone Carrier	Service ²	
	Mountrail County, North Dakota	Williams County, North Dakota
Standing Rock Telecommunications	PCS	PCS
T-Mobile	AWS, PCS	AWS, PCS
Verizon	AWS, Cellular, PCS, 700 MHz	AWS, Cellular, PCS, 700 MHz

Table 3: Mobile Phone Carriers in Area of Interest with E911 Service

3. Impact Assessment

The first responder, industrial/business land mobile sites, area-wide public safety, and commercial E-911 communications 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 in the Aurora Wind Project area. Although each of these services operates in different frequency ranges and provides different types of service including voice, video and data applications, there is commonality among these different networks in regards to the impact of wind turbines on their service. Each of these networks is designed to operate reliably in a non-line-of-sight (NLOS) environment. Many land mobile systems are designed with multiple base transmitter stations covering a large geographic area with overlap between adjacent transmitter sites in order to provide handoff between cells. Therefore, any signal blockage caused by the wind turbines does not materially degrade the reception because the end user is likely receiving signals from multiple transmitter locations. Additionally, 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.

When planning the wind energy turbine locations in the area of interest, a conservative approach would dictate not locating any turbines within 77.5 meters of land mobile fixed-base stations to avoid any possible impact to the communications services provided by these stations. This distance is based on FCC interference emissions from electrical devices in the land mobile frequency bands. As long as the turbines are located more than 77.5 meters from the land mobile stations, they will meet the setback distance criteria for FCC interference emissions in the land mobile bands.

4. Recommendations

In the event that a public safety entity believes its coverage has been compromised by the presence of the wind energy facility, it has many options to improve its 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 base station or repeater site.

5. Contact

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

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