

Attachment 2.12

Comsearch Microwave Study

Wind Power GeoPlanner™

Microwave Study

Overland Pass East Energy



Prepared on Behalf of
Overland Pass East
Energy, LLC.

December 19, 2023



COMSEARCH
A CommScope Company

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1. Introduction

Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. 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, proposed and applied non-federal government microwave systems.

2. Project Overview

Project Information

Name: Overland Pass East Energy

County: Sedgwick

State: Colorado

Number of Turbines: TBD

Blade Diameter: 163

Hub Height: 110

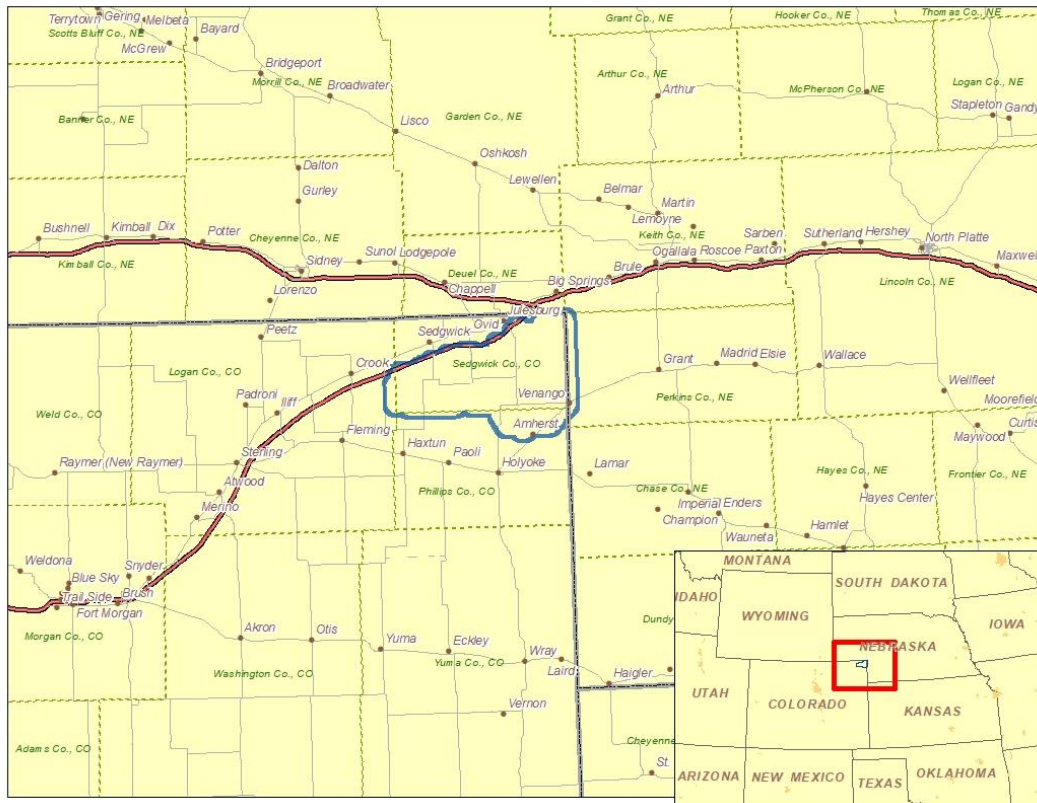


Figure 1: Area of Interest

3. Fresnel Zone Analysis

Methodology

Our obstruction analysis was performed using Comsearch’s proprietary microwave database, which contains all non-government licensed, proposed and applied paths from 0.9 - 23 GHz¹. First, we determined all microwave paths that intersect the area of interest² and listed them in Table 1. The Area of Interest is defined as two miles from the project area which encompasses the planned turbines, shown in Figure 2.

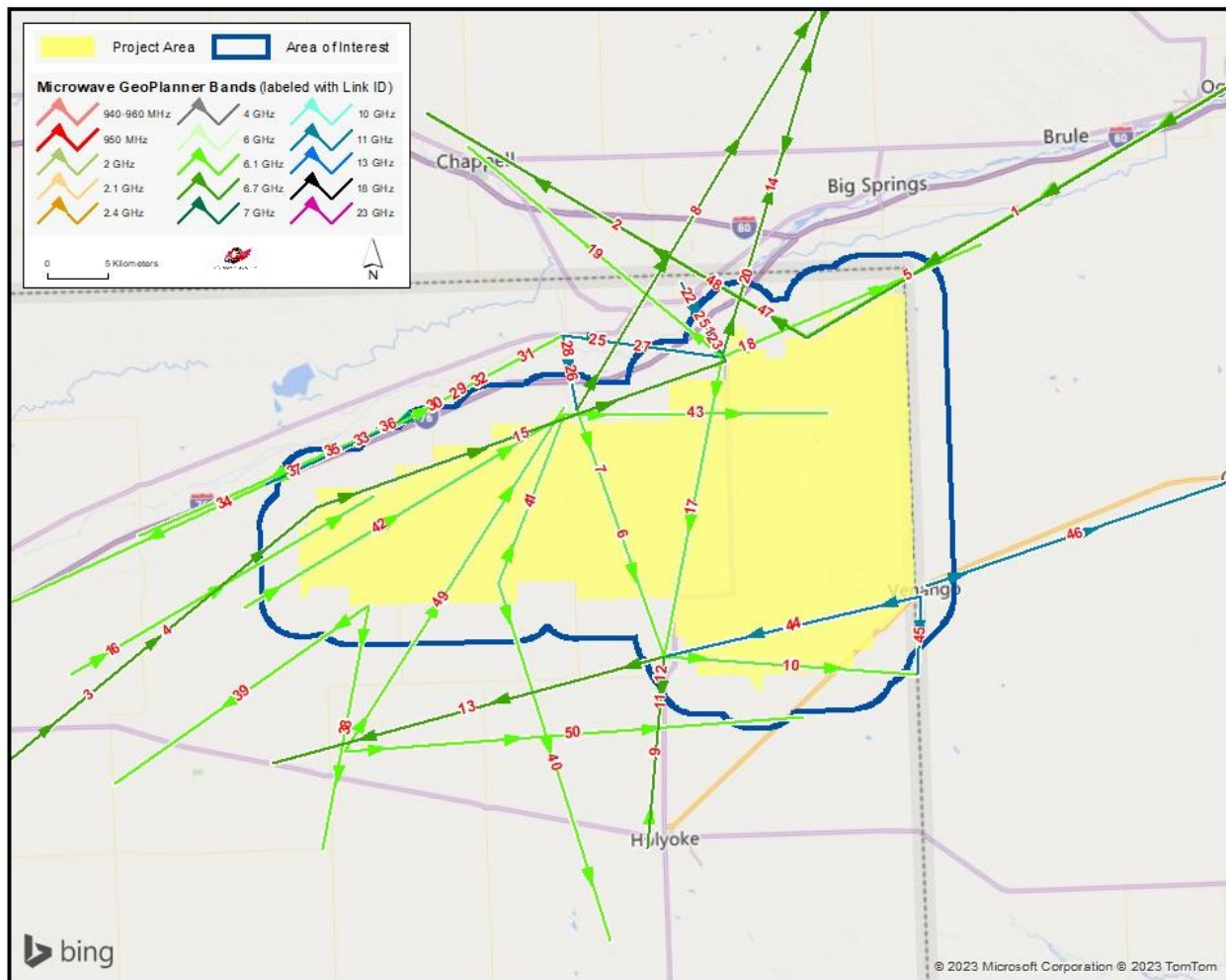


Figure 2: Microwave Paths that Intersect the Area of Interest

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.

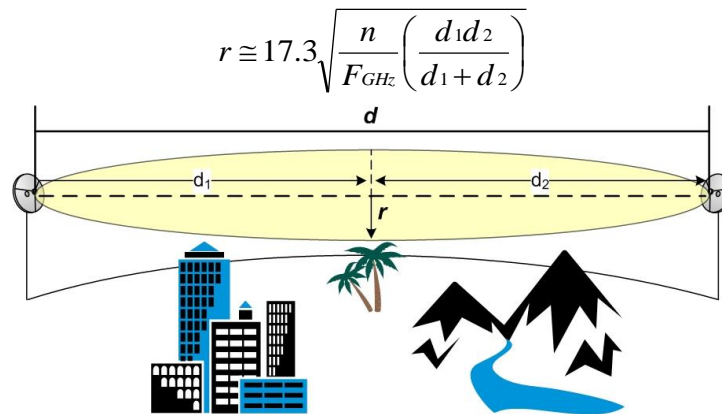
ID	Status	Callsign 1	Callsign 2	Band	Path Length (km)	Licensee
1	Applied	KBA37	KBA38	6.7 GHz	48.61	Union Pacific Railroad Company
2	Licensed	KBA38	KBA39	6.7 GHz	36.42	Union Pacific Railroad Company
3, 4	Licensed	KUX28	WPUY227	6.7 GHz	42.76	State of Colorado
5	Licensed	WEG306	WRNX304	6.1 GHz	48.53	Union Pacific Railroad Company
6, 7	Licensed	WMQ809	WPJD815	6.1 GHz	21.53	NE Colorado Cellular, Inc.
8	Licensed	WMQ809	WPRW201	6.7 GHz	40.95	NE Colorado Cellular, Inc.
9	Licensed	WMQ811	WPJD815	6.1 GHz	15.84	NE Colorado Cellular, Inc.
10	Licensed	WPJD815	WQSU466	6.1 GHz	20.98	NE Colorado Cellular, Inc.
11	Licensed	WPJD815	WMQ811	6.1 GHz	15.84	NE Colorado Cellular, Inc.
12	Licensed	WPJD815	WMQ811	6.7 GHz	15.84	NE Colorado Cellular, Inc.
13	Licensed	WPJD815	WPJB298	6.7 GHz	33.47	NE Colorado Cellular, Inc.
14	Licensed	WPRW201	WQBK651	6.7 GHz	32.08	NE Colorado Cellular, Inc.
15	Licensed	WPUY227	WRCB297	6.7 GHz	35.85	State of Colorado
16	Licensed	WPXN791	WPXN795	6.1 GHz	28.95	Cellular Inc. Network Corporation
17	Licensed	WQBK651	WPJD815	6.1 GHz	25.13	NE Colorado Cellular, Inc.
18	Licensed	WQBK651	WQRF903	6.1 GHz	23.32	NE Colorado Cellular, Inc.
19	Licensed	WQBK651	WQRF612	6.1 GHz	27.22	NE Colorado Cellular, Inc.
20	Licensed	WQBK651	WPRW201	6.7 GHz	32.08	NE Colorado Cellular, Inc.
21	Licensed	WQPS742	WQBK651	6.1 GHz	7.09	NE Colorado Cellular, Inc.
22	Licensed	WQPS742	WQBK651	11 GHz	7.09	NE Colorado Cellular, Inc.
23	Applied	WQPS742	WQBK651	11 GHz	7.09	NE Colorado Cellular, Inc.
24	Questionable	WQPS742	WQBK651	11 GHz	7.09	NE Colorado Cellular, Inc.
25	Licensed	WQPS743	WQBK651	11 GHz	13.24	NE Colorado Cellular, Inc.
26	Licensed	WQPS743	WMQ809	11 GHz	6.21	NE Colorado Cellular, Inc.
27	Applied	WQPS743	WQBK651	11 GHz	13.24	NE Colorado Cellular, Inc.
28	Proposed	WQPS743	WMQ809	11 GHz	6.21	NE Colorado Cellular, Inc.
29	Licensed	WQQR694	WQPS743	6.1 GHz	15.92	NE Colorado Cellular, Inc.
30, 31	Licensed	WQQR694	WQPS743	11 GHz	15.92	NE Colorado Cellular, Inc.
32	Licensed	WQQR694	WQPS743	6.1 GHz	15.92	NE Colorado Cellular, Inc.
33	Licensed	WQWI651	WQWH372	6.1 GHz	15.31	AT&T Wireless Services 3 LLC - CO
34	Licensed	WQWI651	WQWH373	6.1 GHz	38.99	AT&T Wireless Services 3 LLC - CO
35	Licensed	WQWI651	WQWH371	6.1 GHz	26.54	AT&T Wireless Services 3 LLC - CO
36	Licensed	WQWI651	WQWH371	6.1 GHz	26.54	AT&T Wireless Services 3 LLC - CO
37	Licensed	WQWI651	WQWH372	11 GHz	15.31	AT&T Wireless Services 3 LLC - CO
38	Licensed	WRAJ467	WPRT724	6.1 GHz	20.46	NE Colorado Cellular, Inc.
39	Licensed	WRAK856	WQQN475	6.1 GHz	25.63	NE Colorado Cellular, Inc.
40	Licensed	WRDB284	WQXG236	6.1 GHz	30.84	Highline Electric Association
41	Licensed	WRDB284	WRDB761	6.1 GHz	14.97	Highline Electric Association
42	Licensed	WRDB285	WRDB761	6.1 GHz	30.87	Highline Electric Association
43	Licensed	WRDB761	WRDB760	6.1 GHz	21.62	Highline Electric Association
44	Licensed	WRHX421	WPJD815	11 GHz	21.80	NE Colorado Cellular, Inc.
45	Licensed	WRHX421	WQSU466	11 GHz	6.49	NE Colorado Cellular, Inc.
46	Licensed	WRJZ420	WRJZ411	11 GHz	27.63	Inventive Wireless of Nebraska, LLC

ID	Status	Callsign 1	Callsign 2	Band	Path Length (km)	Licensee
47, 48	Licensed	WRNX304	WRNX309	6.1 GHz	36.30	Union Pacific Railroad Company
49	Licensed	WRVH702	WRVH676	6.1 GHz	33.62	T-Mobile License LLC
50	Licensed	WRVH702	WRYW569	6.1 GHz	37.86	T-Mobile License LLC
51	Licensed	WRZS877	WRZS878	11 GHz	6.36	Sedgwick, County of

Table 1: Summary of Microwave Paths that Intersect the Area of Interest

(See enclosed *mw_geopl.xlsx* for more information and
GP_dict_matrix_description.xls for detailed field descriptions)

Next, we calculated a Fresnel Zone for each path based on the following formula:



Where,

- r = Fresnel Zone radius at a specific point in the microwave path, meters
- n = Fresnel Zone number, 1
- F_{GHz} = Frequency of microwave system, GHz
- d₁ = Distance from antenna 1 to a specific point in the microwave path, kilometers
- d₂ = Distance from antenna 2 to a specific point in the microwave path, kilometers

The calculated Fresnel Zone shows the narrow area of signal swath and is calculated for each microwave path in the project area. In general, this is the area where the planned wind turbines should be avoided, if possible. Likewise, Comsearch recommends that an area directly in front of each microwave antenna should be avoided. This corresponds to the Consultation Zone which measures 1 kilometer along the main beam of the antenna and 24 ft (7.3 meters) wide. A depiction of the individual Fresnel and Consultation Zones is shown in Figure 3, and is also included in the shapefiles^{3,4}.

³ The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 13 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.

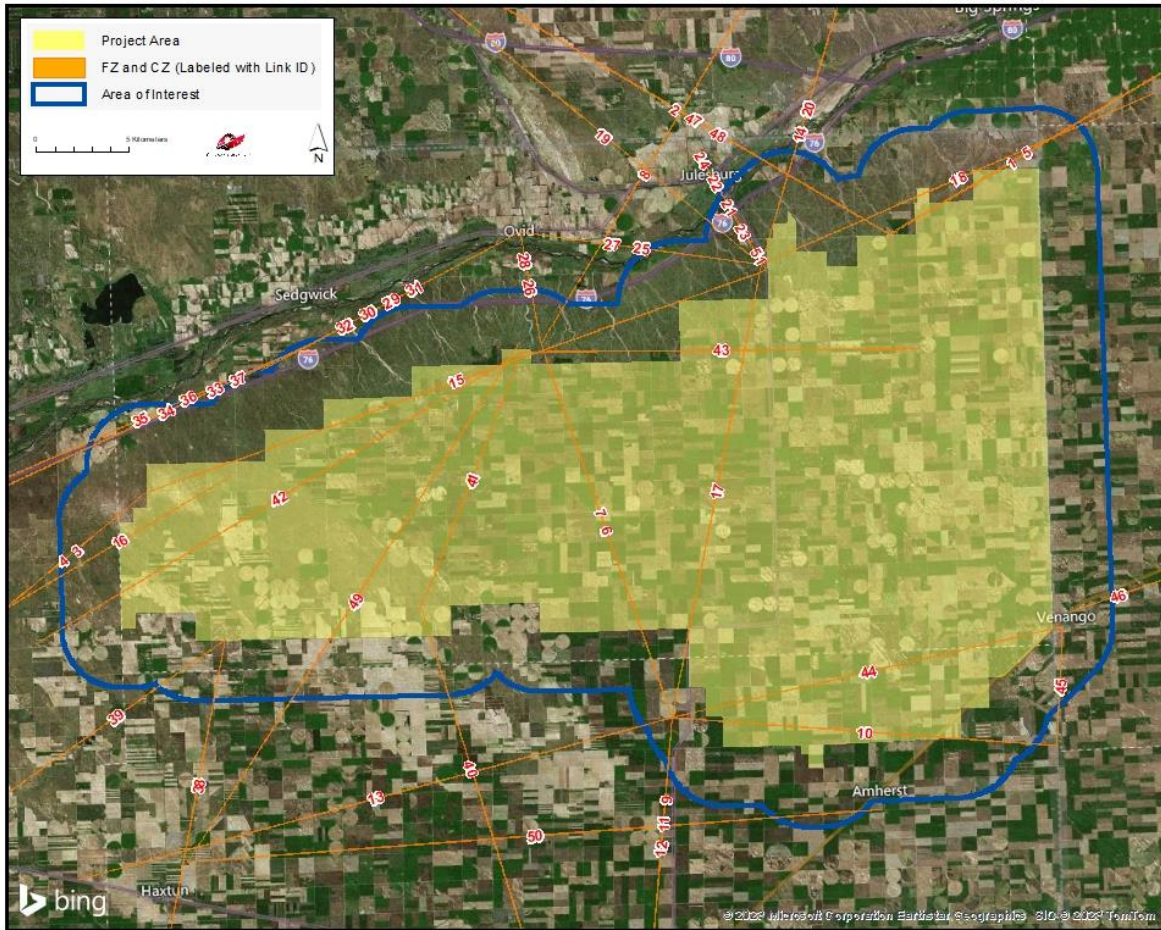


Figure 3: Fresnel and Consultation Zones in the Area of Interest

Discussion of Potential Obstructions

Total Microwave Paths	Paths with Affected Fresnel Zones	Total Turbines	Turbines intersecting Fresnel Zones
51	N/A	N/A	N/A

For this project, turbine locations were not provided; thus we could not determine if any potential obstructions exist between the planned wind turbines and the incumbent microwave paths. If the latitude and longitude values for turbine locations are provided, Comsearch can identify where a potential conflict might exist.

4. Conclusion

Our study identified 51 microwave paths within two miles of the Overland Pass East Energy project area. The Fresnel and Consultation Zones for these microwave paths were calculated and mapped. We recommend that all turbines be sited in locations that will not encroach on these exclusion zones.

5. Contact

For questions or information regarding the Microwave Study, please contact:

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