Wind Power GeoPlanner™

Microwave Study

Cassadaga

Prepared on Behalf of
Cassadaga Wind LLC

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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: Cassadaga

County: Chautauqua

State: New York

Number of Turbines: 58

Blade Diameter[1]: 114 meters

Hub Height: 100 meters

Figure 1: Area of Interest

[1] The actual blade diameter and hub height might vary slightly, but the maximum tip height will be no greater than 152.1 meters.

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 GHz[2]. First, we determined all microwave paths that intersect the area of interest[3] and listed them in Table 1. These paths and the area of interest that encompasses the planned turbine locations are shown in Figure 2.

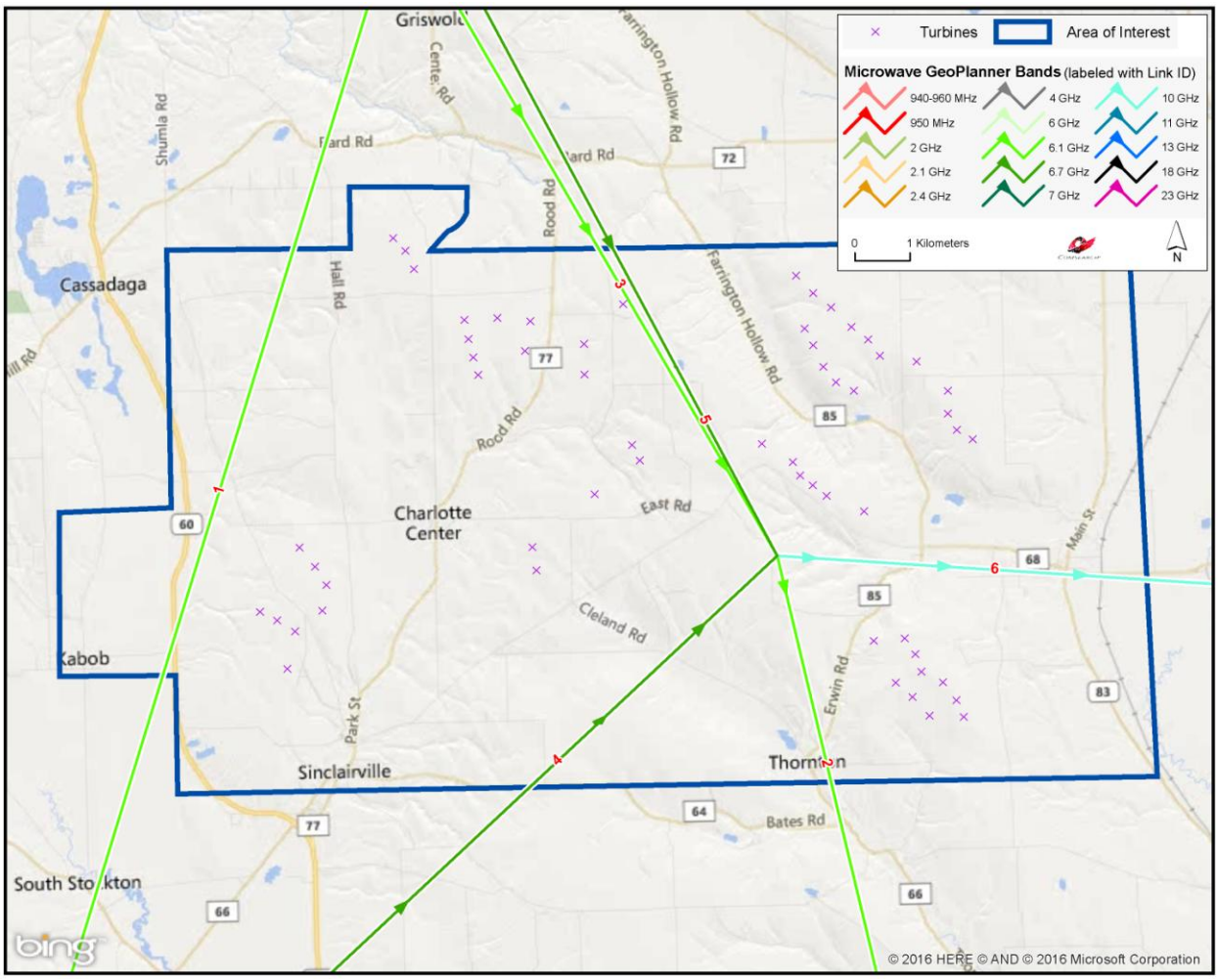


Figure 2: Microwave Paths that Intersect the Area of Interest

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

[3] 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	Licensed	WMK453	WMK454	Lower 6 GHz	27.63	New Cingular Wireless PCS, LLC (NY)
2	Licensed	WPRR461	WPRR470	Lower 6 GHz	28.50	CHAUTAUQUA COUNTY
3	Licensed	WPRR472	WPRR461	Lower 6 GHz	12.39	CHAUTAUQUA COUNTY
4	Licensed	WQFB460	WQFN592	Upper 6 GHz	19.68	New York State Office for Technology SWN
5	Licensed	WQFB461	WQFN592	Upper 6 GHz	11.94	New York State Office for Technology SWN
6	Licensed	WQFN592	WQFB457	10 GHz	11.12	New York State Office for Technology SWN

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

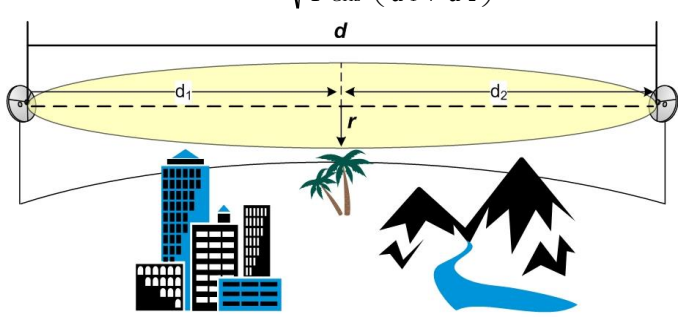
(See enclosed mw_geopl.xlsx for more information and GP_dict_matrix_description.xls for detailed field descriptions)

Verification of Coordinate Accuracy

It is possible that as-built coordinates may differ from those on the FCC license. For this project, path IDs 3 and 5 cross within close proximity of the proposed turbines and the tower locations for these paths will have a critical impact on the result. Therefore, we verified these locations using aerial photography. Some of the towers were found to be slightly off and were moved to their locations based on the aerial photos[4].

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

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



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
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

[4] See enclosed mw_geopl.shp and mw_geopl_fcc.shp for details.

In general, this is the area where the planned wind turbines should be avoided, if possible. A depiction of the Fresnel Zones for each microwave path listed can be found in Figure 3 and Figure 4, and is also included in the enclosed shapefiles[5,6].

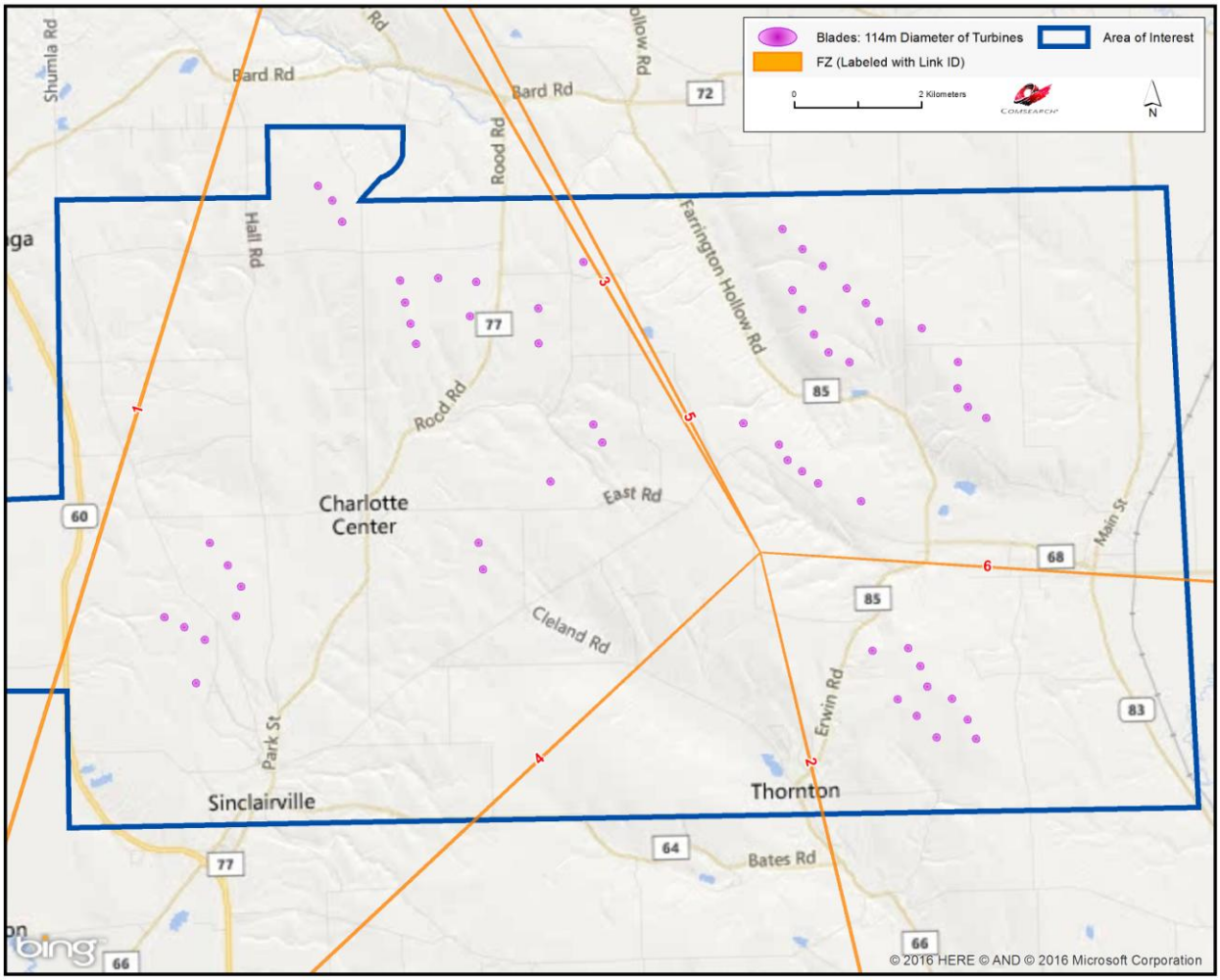


Figure 3: Microwave Paths with Fresnel Zones

[5] The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 17 projected coordinate system.

[6] 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.

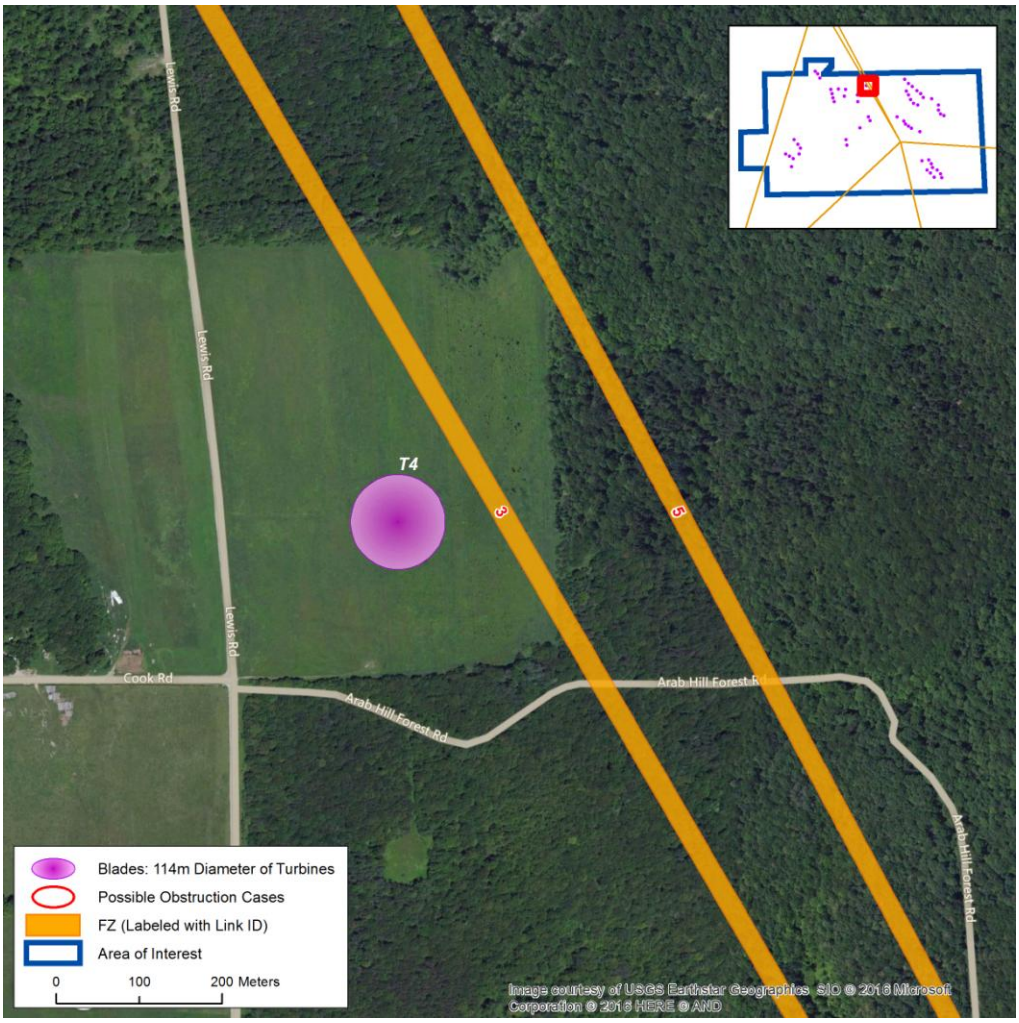


Figure 4: Microwave Paths with Fresnel Zones (turbine T4)

4. Conclusion

Total Microwave Paths	Paths with Affected Fresnel Zones	Total Turbines	Turbines intersecting the Fresnel Zones
6	0	58	0

Table 2: Fresnel Zone Analysis Result

Our study identified six microwave paths intersecting the Cassadaga area of interest. The Fresnel Zones for these microwave paths were calculated and mapped in order to assess the potential impact from the turbines. A total of 58 turbines were considered in the analysis, each with a blade diameter of 114 meters and turbine hub height of 100 meters. Of those turbines, none were found to have potential obstruction with the microwave systems in the area.

5. Contact

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

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