



## Cassadaga Wind Project

Case No. 14-F-0490

1001.26 Exhibit 26

Effect on Communications

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## EXHIBIT 26 EFFECT ON COMMUNICATIONS

### (a) Existing Broadcast Communication Sources

This section of the Application identifies existing broadcast communication sources in the area, including:

#### (1) AM Radio

Comsearch conducted a review of Federal Communications Commission (FCC) license data and compiled a list of AM and FM radio stations within approximately 30 kilometers (18.6 miles) of the proposed Facility (see Appendix ZZ). FM radio stations are addressed below in Section (a)(2). Eight database records for AM stations were identified, consisting of three stations: WDOE, located 9.6 miles to the northwest, and WJTN and WKSN, located 11.4 miles to the south. Each of these stations is licensed separately for daytime and nighttime operations. According to Comsearch, potential interference with AM broadcast coverage could only occur if turbines were located within 3 kilometers (1.9 miles) of AM broadcast stations. Because the nearest AM broadcast station (WDOE) is located well outside of this distance, the Facility is not anticipated to result in adverse impacts to coverage of local AM stations.

#### (2) FM Radio

As described above, Comsearch conducted a review of FCC license data and compiled a list of AM and FM radio stations within approximately 30 kilometers (18.6 miles) of the proposed Facility (see Appendix ZZ). Twenty five database records were identified, 20 of which are licensed and operating. An itemized list of the database records is provided in Table 26-1 below.

Table 26-1. FM Radio Stations within 30 Kilometers of the Facility

Call Sign	Frequency (MHz)	Distance to Nearest Turbine (kilometer)	Distance to Nearest Turbine (miles)
W263CN	100.5	9.43	5.86
W235BP	94.9	11.81	7.34
WBKX	96.5	11.81	7.34
W203AW	88.5	12.15	7.55
WYRR	88.9	12.37	7.69
WWKP-LP	101.3	12.74	7.92

Call Sign	Frequency (MHz)	Distance to Nearest Turbine (kilometer)	Distance to Nearest Turbine (miles)
WUBJ	88.1	12.76	7.93
WCVF-FM	88.9	13.60	8.45
W203BV	88.5	14.82	9.21
W254AQ	98.7	14.82	9.21
WHUG	101.9	14.82	9.21
W252CG	98.3	14.86	9.23
WRFA-LP	107.9	18.88	11.73
WLKW-FM	95.3	19.00	11.81
WLKW-FM	95.3	19.00	11.81
WIHR-LP	94.1	19.14	11.89
W262BX	100.3	19.57	12.16
WOGM-LP	104.7	19.67	12.22
W211AE	90.1	19.79	12.30
WWSE	93.3	21.29	13.23
WHUG	101.9	21.29	13.23
WNJA	89.7	24.67	15.33
W252CG	98.3	26.04	16.18
WGWE	105.9	27.28	16.95
NEW	100.9	28.53	17.73

According to Comsearch, potential interference with FM broadcast coverage could only occur if turbines were located within 4 kilometers (2.5 miles) of FM broadcast stations. Because the nearest FM broadcast station (call sign W263CN, located 9.43 kilometers from the nearest turbine) is located well outside of this distance, the Facility should not result in adverse impacts to coverage of local FM stations.

### (3) Television

Off-air television stations broadcast signals from terrestrially-based facilities directly to television receivers. Off-air reception does not include cable or satellite television reception, neither of which are affected by the presence of wind turbines. Comsearch examined the coverage of television stations and communities in the area that could potentially have degraded television reception as a result of Facility operation (see Appendix AAA). There are a total of 77 television stations within 150 km (93 miles) of the proposed Facility: 62 in the U.S. and 15 in Canada. However, because Comsearch indicates television stations within 75 kilometers are those most likely to provide off-air coverage to the Facility Site and neighboring communities, Comsearch narrowed the results to those stations within 75 kilometers. A total of 39 database records for stations within approximately 75 kilometers of the

Facility Site were returned, of which 20 are currently licensed and operational. Eight of these 20 are low-power stations or translators, which serve local audiences and have limited ranges. No impact to these low-power stations or translators is anticipated as a result of the Facility.

Twelve of the full-power stations (WNYB, WKBW-TV, WIVB-TV, WGRZ, WSEE-TV, WICU-TV, WQLN, WJET-TV, WNYO-TV, WUTV, WNLO, and WNED-TV), as well as Class C station WVTT-CD, may have reception disrupted in and around the Facility Site, primarily in locations where the Facility Site is located between the station and the location experiencing the degraded reception.

Communities and homes to the south and east of the Facility Site may have degraded reception of station WNYB, which will be located just north of the Facility Site, after the wind turbines are installed. Similarly, stations WKBW-TV, WIVB-TV, WGRZ, WNYO-TV, WUTV, and WNLO, which broadcast from northeast of the Facility Site, may have diminished reception in communities directly to the south and the west. In the case of station WVTT-CD, which also broadcasts from the northeast, disruption is likely to be limited to the eastern portion of the Facility Site, where the station's contour overlaps with the Facility. Any disruption of Buffalo-based station WNED-TV will be confined to the northern portion of the Facility Site due to the station's more limited range.

The reception of stations WSEE-TV, WICU-TV, WQLN, and WJET-TV, all based out of Erie, Pennsylvania to the southwest of the Facility, may be degraded in the southern and western portions of the Facility Site. For WICU-TV in particular, the station's contour overlaps with a larger part of Facility Site and extends beyond the eastern limit. Thus its reception may be impacted in the area immediately east of the Facility Site as well.

It is important to note that both cable service and direct broadcast satellite service will be unaffected by the presence of the Facility. Residents that experience degraded off-air television service after installation of the Facility can issue a formal complaint with Applicant. The Applicant takes seriously any complaint that it receives from members of the public. The Applicant will investigate the complaint in accordance with the Complaint Resolution Plan (attached as Appendix T).

#### (4) Telephone

Wireless operators are granted area-wide licenses from the FCC to deploy their cellular networks, which often include handsets with Emergency 911 capabilities. Mobile phone market boundaries differ from service to service. Therefore, Comsearch disaggregated the carriers' licensed areas down to the county level (see Appendix BB).

The type of service (e.g., cellular [CELL], advanced wireless service [AWS], personal communication service [PCS]) for each mobile phone carrier in Chautauqua County is provided below:

- AT&T: AWS, CELL, PCS
- Blue Wireless: PCS
- Sprint: PCS
- T-Mobile: AWS, PCS
- Verizon: AWS, CELL, PCS

According to Comsearch, commercial Emergency 911 communications are typically unaffected by the presence of wind turbines, and no significant adverse impacts to these services are anticipated as a result of the Facility. Wireless networks are designed to operate reliably in a non-line-of-sight environment. They 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.

#### (5) Microwave Transmission

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. Comsearch prepared a study evaluating the potential impact of the Facility wind turbines on licensed, proposed, and applied non-federal government microwave systems in the area (see Appendix CCC). The study identified seven microwave paths that intersect the Facility Site. For each of these paths, the call signs, band, and licensee are provided below in Table 26-2. A map showing locations of these microwave paths is provided in Figure 26-1.

**Table 26-2. Microwaves Paths within the Facility Site**

<b>Callsign 1</b>	<b>Callsign 2</b>	<b>Band</b>	<b>Licensee</b>
WMK453	WMK454	Lower 6 GHz	New Cingular Wireless PCS, LLC (NY)
WPRR461	WPRR470	Lower 6 GHz	Chautauqua County
WPRR472	WPRR461	Lower 6 GHz	Chautauqua County
WQFB460	WQFN592	Upper 6 GHz	New York State Office for Technology SWN
WQFB461	WQFN592	Upper 6 GHz	New York State Office for Technology SWN
WQFN592	WQFB457	10 GHz	New York State Office for Technology SWN

To assure an uninterrupted line of communication, a microwave link should be clear, not only along the axis between the center point of each microwave dish, but also within a formulaically calculated distance around the center axis of the radio beam, known as the Fresnel Zone. Comsearch calculated Fresnel Zones for each of the microwave paths listed above, and mapped them in relation to the rotor-swept area of the final turbine layout. The analysis evaluated a total of 58 turbines, each with a blade diameter of 114 meters and a tower height of 100 meters. The proposed turbine locations have shifted slightly since the Comsearch analysis, and the greatest proposed rotor diameter is currently 136 meters. An updated overlay analysis of the Fresnel Zones and the updated layout with the larger rotor-swept area shows that none of the turbines would result in obstruction of the six microwave paths identified for the area.

(6) Emergency Services

Comsearch (2015c) conducted an assessment of the emergency services communication sources in the vicinity of the Facility Site to identify potential impacts from the planned turbines (Appendix BBB). Registered frequencies for the following types of first responder entities were evaluated: police, fire, emergency medical services, emergency management, hospitals, public works, transportation and other state, county, and municipal agencies. Land mobile and emergency services incumbent data were derived from the FCC's Universal Licensing System and the FCC's Public Safety & Homeland Security bureau. Comsearch identified 25 site-based licenses and 36 regional area-wide licenses designated for public safety use. The licensee, call sign, frequency bands, antenna height, and distance to nearest turbine for the site-based licenses is provided in Table 26-3, and the licensee, area of operation, and frequency band for the area-wide licenses is provided in Table 26-4.

**Table 26-3. Site-Based Licensed Communication Sources**

Licensee	Call Sign	Frequency Bands (MHz)	Antenna Height (meters)	Distance to Nearest Turbine (kilometers)
Chautauqua, County of	WQUE640	150-174	74.1	0.40
Chautauqua, County of	WQUZ436	150-174	74.1	0.40
Chautauqua, County of	WQUZ756	150-174	74.1	0.40
New York Division of State Police	KED908	25-50, 150-174	27.0	0.74
New York Division of State Police	WPMW661	220-222	27.0	0.74
NPCR, Inc.	WQAR919	800/900	83.8	1.17
National Ski Patrol System, Inc.	WNIX731	150-174	9.0	1.28
Sinclairville Volunteer Fire Co.	KYS866	25-50	17.0	2.15
New York Department of Environmental Conservation	KJU947	150-174	43.0	2.77
New York Department of Environmental Conservation	KJU947	150-174	49.0	2.77
New York Department of Environmental Conservation	KNCN264	150-174	30.0	2.77
New York Department of Environmental Conservation	WNID702	150-174	30.0	2.77
Cherry Creek Fire District	KBW774	25-50	11.0	2.84
Steuben Rural Electric Cooperative, Inc.	WNRA948	25-50	15.0	3.05
Cassadaga Valley Central School System	KVR745	25-50	30.0	3.22
Don Frame Trucking, Inc.	WNCU997	450-470	58.0	3.61
Tri James Services, Inc.	WPDQ581	450-470	6.0	3.80
Faith Broadcasting Network, Inc.	WPLR869	450-470	323.0	4.93
Chautauqua County EMS	KAN682	450-470	58.0	4.95
Chautauqua, County of	KEB392	150-174	58.0	4.95
Chautauqua, County of	KEB909	25-50	46.0	4.95
Chautauqua, County of	WPVX592	150-174	45.7	4.99
Chautauqua, County of	WQUZ320	150-174	50.3	4.99
Chautauqua, County of	WQUU282	150-174	50.3	4.99
Chautauqua, County of	WQVE292	150-174	50.3	4.99

**Table 26-4. Area-Wide Licensed Communication Sources**

Licensee	Area of Operation	Frequency Band (MHz)
American National Red Cross	Statewide: New York	25-50, 450-470
Bergen Volunteer Fire Department	Statewide: New York	150-174
Busti, Town of	Countywide: Chautauqua	150-174
Busti Volunteer Fire Department	Countywide: Chautauqua	25-50, 450-470
Cassadaga Valley Central School System	Countywide: Chautauqua	25-50
Central Islip Hauppauge Volunteer Ambulance, Inc.	Statewide: New York	150-174
Chautauqua, County of	Countywide: Chautauqua	25-50, 150-174, 450-470, 800/900, 2450-2500, 4940-4990
Chautauqua County Airport (Jamestown)	Countywide: Chautauqua	150-174
Chautauqua County DPF	Countywide: Chautauqua	25-50
Clymer, Town of	Countywide: Chautauqua	150-174
Dewittville Fire District	Countywide: Chautauqua	25-50
Erie, County of	Statewide: New York	25-50, 150-174, 421-430, 450-470

Licensee	Area of Operation	Frequency Band (MHz)
Massasauga Search and Rescue, Inc.	Statewide: New York	150-174
Mayville, Village of	Countywide: Chautauqua	450-470
National Ski Patrol System, Inc.	Statewide: New York	150-174
New York, City of	Statewide: New York	450-470, 800/900, 4940-4990
New York Police Department	Statewide: New York	150-174
New York, State of	Statewide: New York	0-10, 25-50, 150-174, 220-222, 450-470, 800/900, 4940-4990
New York State Department of Corrections and Community Supervision	Statewide: New York	150-174, 450-470, 4940-4990
New York State Department of Environmental Conservation	Statewide: New York	25-50, 150-174
New York State Department of Health, Bureau of EMS	Statewide: New York	25-50, 150-174, 450-470
New York State Department of Transportation	Statewide: New York	0-10, 4940-4990
New York State Division of State Police	Statewide: New York	25-50, 150-174, 450-470, 800/900, 2450-2500
New York State Emergency Management Office	Statewide: New York	0-10, 25-50, 150-174, 220-222, 4940-4990
New York State Office of Parks, Recreation, and Historic Preservation	Statewide: New York	450-470
New York State Office of Parks, Recreation, and Historic Preservation – Albany	Statewide: New York	150-174
New York State Office of Parks, Recreation, and Historic Preservation – Long Island Region	Statewide: New York	150-174
New York State Office of Parks, Recreation, and Historic Preservation – Niagara Region	Statewide: New York	150-174
Niagara Frontier Search and Rescue	Statewide: New York	150-174
Northeast Mobile Search and Rescue	Statewide: New York	150-174
Northeastern Forest Fire Protection Compact	Statewide: New York	20-50, 150-174
Ossining, Village of	Statewide: New York	25-50, 450-470
Sherman Central School District	Countywide: Chautauqua	150-174
Triborough Bridge And Tunnel Authority	Statewide: New York	4940-4990
Western New York Search Dogs, Inc.	Statewide: New York	150-174
Woodbury, Town of	Statewide: New York	4940-4990

According to Comsearch, the first responder, industrial/business land mobile sites, area-wide public safety, and commercial E-911 communications are typically unaffected by the presence of wind turbines, and no significant adverse impacts to these services are anticipated as a result of the Facility. 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 services. Each of these networks is designed to operate reliably in a non-line-of-sight 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.

According to Comsearch, 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 (254 feet) 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. The nearest land mobile-fixed base station is over one half a mile from the proposed turbine locations. Therefore, the proposed wind turbines are all in compliance with the recommended conservative setback criteria for FCC interference emissions in the land mobile bands.

Although adverse impacts to emergency services communications are not anticipated, in the unexpected event that a public safety entity believes its coverage has been compromised by the presence of the wind energy Facility, the Applicant will work with the public safety entity to remedy any interference related to the wind farm. If there was a compromise in coverage, the public safety entity would have 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 Facility Site can potentially serve as the platform for a base station or repeater site.

#### (7) Municipal/School District Services

Municipal and school district communication sources were included in the assessment of emergency services communication sources described above in 1001.26(a)(6). Comsearch (2015c) identified one site-based and two area-wide licenses issued to school districts. The site-based communication source is a 30-meter (98-foot) antenna licensed to the Cassadaga Valley Central School District. Comsearch also identified numerous communication sources licensed to municipalities, including local Towns and Villages. Tables 26-3 and 26-4 in 1001.26(a)(6) above provide a full listing of site-based and area-wide communication sources in the area, identified by licensee.

According to Comsearch, land mobile sites and area-wide public safety communications are typically unaffected by the presence of wind turbines, and no significant adverse impacts to these services are anticipated as a result

of the Facility. The municipal and school communications sources fall under these categories; therefore, very little, if any, change in reception of these services is anticipated as a result of the Facility.

#### (8) Public Utility Services

The Article 10 Application will identify public utility communication sources within 2 miles of the proposed Facility and interconnection.

The Applicant requested data from GeoTel on locations of underground fiber optic cable within two miles of the Facility Site. Ion, Time Warner Cable, and Windstream all have buried fiber optic cables within 2 miles of the Facility Site. No impacts to these resources are anticipated, because none are buried directly beneath proposed locations of Facility components. Please see Figure 4-3 in Exhibit 4 for locations of these cables.

#### (9) Doppler/Weather Radar

NEXRAD (next-generation radar) or Doppler weather radar are operated by the National Weather Service (an agency of the National Oceanic and Atmospheric Administration [NOAA]), the Federal Aviation Administration (FAA), and the U.S. Air Force. NEXRAD detects precipitation, winds, and temperature and humidity discontinuities. From these data, computer algorithms generate a suite of meteorological and hydrological products and alerts used for determining short-term forecasts, advisories, and warnings for significant weather events such as tornadoes, large hail, wind shear, downbursts, flash floods, and other weather phenomena. The data are also used by FAA air traffic controllers for the safe and efficient operation of the National Airspace System.

Wind turbine and weather spectra can span the same Doppler frequencies and share a similar dynamic range, causing conventional radar clutter filtering algorithms, which only filter energy returned from nearly stationary objects (buildings, terrain, etc.), to fail in isolating the weather signal. When wind farms are located in a NEXRAD radar beam/radar line of sight, the spinning blades can reflect unfilterable energy back to the radar system and appear as clutter in the base data. The unfiltered wind turbine clutter can adversely impact radar data quality and the performance of the radar's internal weather detection algorithms. Turbines sited within 18 kilometers (11.2 miles) of a NEXRAD begin to impact multiple elevation scanning angles and create multipath scattering returns that show up as spikes of enhanced reflectivity down range of the wind farm (Vogt et al., 2011; Norin and Haase, 2012). KBUF, the NEXRAD closest to the proposed Facility, is located more than 60 miles from the proposed Facility; therefore, impacts are not anticipated.

The Applicant sent a written notification of the proposed Facility to the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce. The NTIA provided plans for the proposed Facility to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC), which include the NOAA, FAA, and U.S. Air Force, among other agencies. The NTIA's review found that the Buffalo WSR-88D radar is approximately 76.1 kilometer from the nearest wind turbine, and 56 of the wind turbines in the proposed Facility would be in the radar's line of sight. However, due to the distance and terrain drop-off from the radar, impacts to radar data should be low and confined to the area where the Facility would be located. The response from NTIA concluded that mitigation for impacts to the radar were not necessary. However, the Radar Operations Center indicated that it would like to track progress on the Facility to its completion, and be notified if any changes to the Facility were proposed (e.g., if the turbines were to be raised by more than 10 meters, or if "a number of turbines are moved a significant distance"). The Applicant provided a turbine layout with more turbines (75), than what are currently proposed in the Application and at a higher tip height (165 meters), than what is currently proposed. The turbines are still within the same "Project boundary" (as defined through correspondence with the NTIA) as what was previously provided to the NTIA. The Applicant has provided the Radar Operations Center turbine locations/heights associated with the proposed Facility, and has recently notified the NTIA of the proposed Facility layout. NTIA correspondence is attached as Appendix YY.

#### (10) Air Traffic Control

The closest air traffic control tower is located approximately 47 miles north-northeast of the Facility Site at the Buffalo Niagara International Airport (AirNav.com, 2016). The FAA is the organization in the United States government responsible for air traffic control and for evaluating and issuing determinations on petitions for objects that penetrate the nation's airspace. The Applicant has submitted the proposed Facility layout to the FAA so that aeronautical studies of locations of each proposed turbine can be conducted under the provisions of Title 49 of the U.S. Code, Section 44718. The FAA can issue two types of determinations, one that identifies a presumed hazard and another that identifies no hazard. On November 18, 2015, the Facility received Determinations of No Hazard to Air Navigation (DNH) for 62 turbine locations. The DNHs are valid until May 18, 2017 prior to which one 18-month extension can be filed.

In addition, the FAA is one of the federal agencies represented in the IRAC, which has reviewed the proposed Facility as part of the NTIA review. The NTIA has reviewed the proposed Facility and no concerns with air traffic control or other federal communication systems were identified. The response letter from NTIA is included in Appendix YY.

#### (11) Armed Forces

The Department of Defense (DoD), through its Siting Clearinghouse, can either respond informally or formally to a project. Informal consultations may be initiated by a project proponent. Formal consultations may be initiated either by the FAA or project proponent. The Applicant coordinated with the DoD, including the North American Aerospace Defense Command (NORAD), while the FAA was reviewing the turbine applications. In an e-mail dated October 6, 2015, NORAD confirmed it had no issues with the Facility, stating that: "We have reviewed the updated project (attached) and conclude that NORAD has no issues at this time". At the time, the Facility was proposed to have more turbines and at a taller height than what is currently proposed. No other DoD department raised any issues. Subsequently, the FAA issued DNHS for 62 turbine locations.

According to the *Military Bases* GIS dataset maintained by the Department of Transportation, the nearest Armed Forces installation to the Facility Site is the Niagara Falls Air Force Reserve, located approximately 54 miles north of the proposed Facility (Data.gov, 2015). As described above, the Applicant sent a written notification of the proposed Facility to the NTIA on February 23, 2015. Upon receipt of this notification, the NTIA provided plans for the proposed Facility to the federal agencies represented in the IRAC, which include the Department of Homeland Security, U.S. Air Force, U.S. Army, U.S. Navy, U.S. Coast Guard, and Department of Veteran Affairs. The NTIA has reviewed the proposed Facility, and no concerns regarding military or other federal communication systems were identified. The response letter from NTIA is included in Appendix YY.

#### (12) GPS

Global Positioning System (GPS) is a U.S.-owned utility that provides users with positioning, navigation, and timing services. This system consists of three segments: the space segment, the control segment, and the user segment. The U.S. Air Force develops, maintains, and operates the space and control segments. The GPS control segment consists of a global network of ground facilities that track the GPS satellites, monitor their transmissions, perform analyses, and send commands and data to the constellation. The GPS ground facility located closest to the proposed Facility is the Air Force Satellite Control Network remote tracking station located in New Hampshire. The National Executive Committee coordinates GPS-related matters across multiple federal agencies to ensure the system addresses national priorities as well as military requirements. The National Executive Committee is chaired jointly by the Deputy Secretaries of Defense and Transportation, and membership includes top leaders from the Departments of State, the Interior, Agriculture, Commerce, and Homeland Security, the Joint Chiefs of Staff, and NASA (National Coordination Office for Space-Based Positioning, Navigation, and Timing, 2015).

Each of the agencies represented in the National Executive Committee are also represented in the IRAC. The NTIA has reviewed the proposed Facility, and did not identify any concerns with GPS or other federal communication systems. Therefore, adverse impacts are not anticipated. The response letter from NTIA is included in Appendix YY.

(13) LORAN

LORAN was a long range navigation system developed during World War II that has since been deemed obsolete. Radio signals were sent through a series of towers across long distances as an aid to keep ships and aircraft on course. In accordance with the 2010 Department of Homeland Security Appropriations Act, the U.S. Coast Guard terminated the transmission of all U.S. LORAN signals in 2010. Therefore, no further discussion of LORAN is provided in this Application.

(14) Amateur Radio Licenses

Database searches of all amateur radio licenses registered to users with zipcodes overlapping a two-mile radius of the Facility was conducted via the FCC License Data Search on the website of the American Radio Relay League (AARL, 2015) and via RadioQTH's database of call signs (Lewis, 2015). Forty-eight database records were returned. Because the data are organized by zipcode, some of these records may be greater than 2 miles from the Facility Site, but within a zipcode that is within 2 miles of the Facility Site. The call sign, expiration date, and operator class for each of the amateur radio licenses is provided below in Table 26-5.

**Table 26-5. Amateur Radio Licenses within the Vicinity of the Facility Site**

Call Sign	Expiration Date	Operator Class
K2RDC	8/30/2025	Advanced
KA2ONW	8/30/2017	Technician
KC2TGY	4/24/2018	General
KA2BEX	5/1/2020	Advanced
KA2KGP	1/25/2024	General
KB2AOK	8/10/2016	Novice
KC2SDJ	9/10/2017	General
KC2SDK	9/10/2017	Technician
KD2ERH	9/12/2023	Technician
N2KQJ	4/10/2021	Technician
N2KSV	7/10/2020	Amateur Extra
N2VZO	8/24/2013	Technician

Call Sign	Expiration Date	Operator Class
N2YDH	3/8/2024	Technician
WA2OJY	3/22/2014	General
WB2BSL	5/30/2017	General
WB2DFM	6/12/2020	Amateur Extra
KC2CUY	12/19/2017	Technician
KD2IJJ	3/27/2025	Technician
KJ2L	2/1/2018	Amateur Extra
N2JIT	4/28/2022	General
N2RGT	1/25/2024	General
N2VQN	6/29/2023	Technician
N2VZJ	8/24/2013	Technician
KC2HVI	4/10/2021	Technician
KC5TFL	7/2/2025	Amateur Extra
KD2DEH	12/6/2022	Amateur Extra
KC2PMB	4/3/2016	Technician
KC2TRS	7/17/2018	General
KD2HLV	11/6/2024	Technician
N2TVC	2/16/2023	Technician
N2WEA	9/12/2023	General
N2PCQ	1/21/2022	Technician
N2WJS	1/14/2025	Amateur Extra
N3VXK	8/23/2015	General
W2RDT	12/28/2017	Amateur Extra
WA2TCD	8/1/2018	Amateur Extra
WB2GPO	1/17/2017	Technician
AC2JC	5/13/2018	Amateur Extra
KA2CMA	7/6/2023	Amateur Extra
KC2RLB	4/30/2017	Technician
KC2RLC	4/30/2017	Technician
KC2RLF	4/30/2017	Technician
KC2RLJ	4/30/2017	Technician
KC2WDG	11/23/2019	Technician
W3UAJ	5/19/2018	Advanced
KC2TCX	3/26/2018	Technician
N2BUA	11/28/2015	General
WA2VXB	11/30/2023	General

(b) Existing Underground Cable and Fiberoptic Lines within Two Miles

GeoTel provided data on locations of underground fiber optic cable within two miles of the Facility Site. Ion, Time Warner Cable, and Windstream all have buried fiber optic cables within 2 miles of the Facility Site. No impacts to these resources are anticipated, because none of them are buried directly beneath proposed locations of Facility components. Please see Figure 4-3 in Exhibit 4 for locations of these cables.

(c) Anticipated Effects on Communication Systems

Section (a) above provides a description of the communication systems in and around the Facility and any expected impacts to those systems. The subsections below provide a more general discussion of the anticipated effects of the proposed Facility and the electric interconnection on the communication systems identified above in Sections (a) and (b).

(1) Potential Structure Interference with Broadcast Patterns

Twelve of the licensed full-power stations and one Class C station may have their reception disrupted in and around the Facility, primarily in locations on the opposite side of the Facility Site relative to the station antennas (Appendix AAA). A full discussion of the identity of these stations and where reception is expected to be diminished is provided above in 1001.22(a)(3).

(2) Potential for Structures to Block Lines-of-sight

Microwave telecommunication systems are wireless point-to-point links that communicate between two sites (antennas) and require clear line-of-sight conditions between each antenna. To assure an uninterrupted line of communication, a microwave link should be clear, not only along the axis between the center point of each microwave dish, but also within a formulaically calculated distance around the center axis of the radio beam, known as the Fresnel Zone. Comsearch calculated the Fresnel Zone for each of the microwave paths identified in the vicinity of the proposed Facility (see Appendix CCC). An overlay analysis was conducted using these Fresnel Zones and the final Facility layout, assuming turbines would be built with 136-meter diameter rotors. This analysis showed that Fresnel Zones will not overlap the rotor-swept area of any of the wind turbines in the proposed Facility layout. Consequently, there will be no impact to microwave communications.

### (3) Physical Disturbance by Construction Activities

Physical disturbance to communication infrastructure (e.g., towers, buried cables, etc.) is not anticipated. The location any such infrastructure adjacent to the Facility will be indicated on construction drawings and reviewed by the contractor prior to construction. The Applicant will also coordinate with Dig Safely New York prior to the commencement of any construction activities.

### (4) Adverse Impacts to Co-located Lines due to Unintended Bonding

All Facility construction and maintenance work that requires excavation will be preceded by the following the One Call process with Dig Safely New York, Inc. This process helps prevent damage by alerting the excavator to the locations of underground utilities, including electric, gas, oil, steam, water, sewer, and communications lines. The process starts by the excavator flagging the area to be excavated. The excavator will then provide information to Dig Safe New York about the company performing the excavation, the duration of the job, the locations of digging, the depth of the excavation, and other information. Dig Safely New York members, who are utility operators, respond to the request either by noting that the area is clear, or by providing the locations of their facilities. These facilities are then marked above ground, and either avoided or protected during the excavation. If an underground facility is unable to be avoided and needs to be exposed, the excavator will provide proper support and protection so that the facility isn't damaged. Upon completion of work, the excavator backfills around any exposed utilities. Therefore, the Applicant does not believe that there is significant potential for the proposed Facility and electrical interconnection to adversely impact co-located lines, to the extent co-located lines are even present, due to unintended bonding.

### (5) Other Potential for Interference

FM stations are not subject to degradation when the stations are at distances greater than 4.0 kilometers (2.5 miles) from wind turbines. The closest FM station to the proposed Facility, W263CN, is located approximately 8 miles from the nearest turbine, and falls well outside the area potentially impacted by the Facility. The exclusion distance for AM broadcast stations varies as a function of the antenna type and broadcast frequency. Potential problems with AM broadcast coverage are only anticipated when AM broadcast stations are located within their respective exclusion distance limit from wind turbines; the maximum possible exclusion distance is 3 km (1.9 miles). The closest AM station to the Facility, WDOE, is approximately 13 miles from the nearest turbine. Consequently, there will be no impact to AM or FM radio broadcast coverage (see Appendix ZZ).

First responder, municipal/school district services, industrial/business land mobile sites, area-wide public safety, and mobile telephone communications are typically unaffected by the presence of wind turbines. Harmful effects to these services in the vicinity of the proposed Facility are not anticipated. This is because each of these networks is designed to operate reliably in a non-line-of-sight 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 (see Appendix BBB).

(d) Evaluation of Design Configuration

A map illustrating Facility components and relevant communication system constraints (e.g., Fresnel zones, radio station exclusion zones, etc.) is provided in Figure 26-1. The Facility has been designed to avoid impacts to communication systems to the extent practicable.

(e) Post-construction Activities to Identify and Mitigate Adverse Effects on Communication Systems

The Applicant takes seriously any complaints that it receives from members of the public. The Applicant has developed a Complaint Resolution Plan through which residents can issue a formal complaint should any issues, such as degraded television service, arise as a result of construction or operation of the Facility. This plan is attached as Appendix T. Complaints will be able to be made in person at the Facility's O&M building, via phone, or by writing, and the Applicant will contact the individual within 48 hours of receipt of the complaint. The Applicant will implement a five-point complaint response for all registered complaints, which will include community engagement, gathering information, response to the complaint, a follow up after the response has been issued, and further action if the complainant believes that the issue continues to exist. If it is determined that Facility operation has resulted in impacts to existing off-air television coverage, the Applicant will address each individual problem by offering cable television hookups (in areas where cable service is available) or, in areas where cable service is not available/not practical, direct broadcast satellite reception systems, as well as investigating methods of improving the television reception system. It is important to note that both cable service and direct broadcast satellite service will be unaffected by the presence of the Facility (see Appendix AAA).

In their comments on the PSS, DPS asked the Applicant to describe de-tuning a communications tower as a mitigation option for diminished reception as a result of the Facility. The Applicant consulted with Comsearch about the feasibility of detuning a television or radio tower as a mitigation option that could be pursued should reception be diminished as a result of the Facility. Comsearch indicated that de-tuning is a mitigation technique used for AM broadcast stations only. Because no impacts to AM stations are anticipated as a result of the Facility based on Comsearch's analysis, de-tuning towers is not a necessary mitigation measure for the Facility and is not being considered at this time.

(f) Potential Interference with Radar

As described above, the Applicant sent a written notification of the proposed Facility to the NTIA on February 23, 2015. Upon receipt of notification, the NTIA provided plans for the proposed Facility to the federal agencies represented in the IRAC, which include the Federal Aviation Administration, National Oceanic and Atmospheric Administration, Department of Defense, Department of Homeland Security, National Aeronautics and Space Administration, and National Science Foundation. The NTIA has reviewed the proposed Facility layout, and provided a response outlining the single concern that was raised among these participating agencies (see Appendix YY). The Radar Operations Center (a unit of the National Weather Service) identified a concern regarding interference with the Buffalo WSR-88D radar, located approximately 76.1 kilometers from the nearest wind turbine. The potential effect of the Facility on this radar and Radar Operations Center's recommendations are fully described above in 1001.26(a)(9). The Radar Operation Center indicated that due to the distance and terrain drop-off from the radar, impacts to radar data should be low and confined to the area where the Facility would be located. Consequently, the agency deemed that no mitigation measures were necessary. Per the Radar Operations Center's request, the Applicant will consult with this agency should there be any significant changes to the proposed Facility.

The concern raised by the Radar Operations Center was the only issue identified by the federal agencies that comprise the IRAC in the response letter from NTIA. Therefore, the Facility is not anticipated to result in other adverse impacts to federal communications systems.

## REFERENCES:

- AirNav.com. 2016. *Buffalo Niagara International Airport*. Last updated February 4, 2016. Available at <http://www.airnav.com/airport/KBUF>. (Accessed March, 2016).
- American Radio Relay League (ARRL). 2015. *FCC License Data Search*. Available at: <http://www.arrl.org/advanced-call-sign-search>. (Accessed July 14, 2015).
- Data.gov. 2015. *Military Bases (National)*. GIS Dataset maintained by Department of Transportation. Dataset available at <https://catalog.data.gov/dataset/military-bases-national>. (Accessed March, 2016).
- Lewis, E.L. 2015. *RadioQTH Call Sign Lookup*. Available at: <http://www.radioqth.net/lookup>. (Accessed July 14, 2015).
- National Coordination Office for Space-Based Positioning, Navigation, and Timing. 2015. Official U.S. Government Information about the Global Positioning System (GPS) and Related Topics. Available at: <http://www.gps.gov/> (Accessed July 2015; last updated July 2015).
- National Weather Service, NOAA. 2011. *National Weather Service Enhanced Radar Image*. Page last modified June 3, 2011. Available at: <http://radar.weather.gov/ridge/radar.php?rid=buf&product=NOR&overlay=11101111&loop=no>. (Accessed February 29, 2016).
- Vogt, R. J., T.D. Crum, W. Greenwood, E.J. Ciardi, and R.G. Guenther. 2011. *New Criteria for Evaluating Wind Turbine Impacts on NEXRAD Radars*. WINDPOWER 2011, American Wind Energy Association Conference and Exhibition, Anaheim, CA.
- Norin, L. and G. Haase. 2012. *Doppler Weather Radars and Wind Turbines*. In: *Doppler Radar Observations – Weather Radar, Wind Profiler, Ionospheric Radar, and Other Advanced Applications*, edited by J. Bech and J.L. Chau. InTech, April 2012.