

Empire Offshore Wind LLC
and
EW Offshore Wind Transport Corporation

Empire Wind 2 Project
Article VII Application

Exhibit E-5
Effect on Communications

August 2023

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ACRONYMS AND ABBREVIATIONS

BOEM	Bureau of Ocean Energy Management
EM&CP	Environmental Management and Construction Plan
Empire or the Applicant	Equinor Offshore Wind LLC and EW Offshore Wind Transport Corporation
EW 2 Project	Empire Wind 2 Project
FCC	Federal Communications Commission
FM	Frequency modulation
HVAC	high-voltage alternating-current
km	kilometer
kV	kilovolt
Lease Area	BOEM-designated Renewable Energy Lease Area OCS-A 0512
LIPA	Long Island Power Authority
LIRR	Long Island Rail Road
mi	mile
nm	nautical mile
NYISO	New York Independent System Operator, Inc.
NY Project	EW 2 Project transmission facilities in New York
NYSPSC or Commission	New York State Public Service Commission
POI	Point of interconnection at the Hampton Road substation
PSEG-LI	PSEG Long Island
PSL	New York Public Service Law
TV	television

EXHIBIT E-5: EFFECT ON COMMUNICATIONS

E-5.1 Introduction

Empire Offshore Wind LLC and EW Offshore Wind Transport Corporation (collectively, Empire or the Applicant) proposes to construct and operate the Empire Wind 2 (EW 2) Project as one of two separate offshore wind projects to be located within the Bureau of Ocean Energy Management (BOEM) designated Renewable Energy Lease Area OCS-A 0512 (Lease Area). The EW 2 Project will require an electric transmission system to connect the offshore wind farm to the point of interconnection (POI) to the New York State Transmission System. An electric transmission line with a design capacity of 125-kilovolt (kV) or more, extending a distance of one mile or more, is subject to review and approval by the New York State Public Service Commission (Commission or NYSPSC) as a major electric transmission facility pursuant to Article VII of the New York Public Service Law (PSL). The EW 2 Project transmission system will extend a total of approximately 12.2 miles (mi) (19.6 kilometers [km]) within the State of New York and includes two 345-kV cable circuits.

The POI will be located on a parcel located along Hampton Road in Oceanside, within the Town of Hempstead, New York. The POI facilities (referred to herein collectively as the Hampton Road substation) will include both 345-kV and 138-kV substation facilities. The Applicant is proposing to permit all of these facilities, as well as the 138-kV “loop-in / loop-out” lines that will connect the substation facilities to two existing 138-kV cable circuits located under Lawson Boulevard owned by the Long Island Power Authority (LIPA) and operated by PSEG Long Island (PSEG-LI). LIPA will own and PSEG-LI will operate these loop-in / loop-out lines and the 138-kV facilities at the Hampton Road substation site. The ownership and/or operation of the 345-kV facilities at the Hampton Road substation will be determined through a mutually acceptable Interconnection Agreement between the Applicant and LIPA, as developed through the New York Independent System Operator, Inc. (NYISO) interconnection process.

This application is being submitted to the Commission pursuant to Article VII of the PSL for the portions of the EW 2 Project transmission system that are located within the State of New York (the NY Project). The onshore portion of the NY Project will be located entirely within Nassau County, New York.

The NY Project includes:

- Two three-core 345-kV high-voltage alternating-current (HVAC) submarine export cables located within an approximately 7.7-nautical mile (nm, 14.2-km)-long submarine export cable corridor from the boundary of New York State waters 3 nm (5.6 km) offshore to the cable landfall;
- A cable landfall in the City of Long Beach, New York;
- Two 345-kV onshore export cable circuits, each with three single-core HVAC onshore export cables within an approximately 1.6-mi (2.5-km)-long onshore export cable corridor from the cable landfall to the onshore substation;
- An onshore substation in the Village of Island Park, within the Town of Hempstead, New York, which will house major control components for the electrical system and perform functions such as voltage regulation, reactive power compensation, and harmonic filtering;

- Two 345-kV interconnection cable circuits, each with three single-core HVAC interconnection cables within an approximately 1.7-mi (2.8-km)-long interconnection cable corridor from the onshore substation to the Hampton Road substation;
- The new Hampton Road substation in Oceanside in the Town in Hempstead, New York, which will include substation facilities that will provide the necessary breaker arrays and 345-kV/138-kV transformers; and
- Four 138-kV loop-in / loop-out lines cable circuits, located within an approximately 0.1-mi (0.2-km) long cable corridor from the Hampton Road substation to existing LIPA transmission lines located under Lawson Boulevard in Oceanside, New York.

This Exhibit addresses the requirements of 16 New York Codes, Rules and Regulations § 88.5 by describing the anticipated effects of the NY Project on television (TV), radio and other communications systems.

E-5.2 Effects on Communications

This Exhibit provides information on existing communication systems located in the vicinity of the NY Project, as well as potential impacts resulting from the construction, operation, and maintenance of the NY Project.

Federal Communications Commission (FCC) databases of frequency modulation (FM) transmission, microwave service, cellular, paging and land mobile towers, TV transmitters, and antenna structures, indicate that there are 50 FCC-registered commercial towers located within 1 mi (1.6 km) of the NY Project (FCC 2018a-2018j), as depicted in

Figure E-5.2-1. Additional details on the entities' names, locations and FCC identification numbers are provided in **Table E-5.2-1**. Commercial towers include FM transmission towers, microwave service towers, cellular towers, paging transmission towers, private land to mobile transmission towers, commercial land to mobile transmission towers, broadcast land to mobile transmission towers, analog TV station transmitters, digital TV station transmitters, and antenna structures. Given the density of development and structures in the area of Long Island, New York, the 1-mi (1.6-km) radius search was determined to be a reasonable distance for identification of those commercial towers closest to the NY Project.

The onshore export cables, interconnection cables, and loop-in / loop-out line cables (together, onshore cables) are a source of minor electric and magnetic fields due to the voltage applied to the conductors located within the cables. The onshore cables will be installed underground. As an expected minor source of electric and magnetic fields (see Section 4.13 of **Exhibit 4: Environmental Impact**), the NY Project cables are anticipated to have negligible impacts on communication systems.

Given the New York Bight's long history as a hub of trans-Atlantic and regional telecommunications activity, there are numerous charted cables crossing the submarine export cable route. The current status of many of these charted cables is poorly documented in the public domain, including the National Oceanic and Atmospheric Administration charts, with many of the charted cables dating back to telegraph systems installed up to 135 years ago. As shown in **Exhibit 2: Location of Facilities** and described in **Exhibit E-6: Effect on Transportation**, the NY Project will cross the FLAG Atlantic Telecommunications Cable near where it makes landfall on Long Island. Additional crossings of third-party submarine cables identified for the NY Project are associated with electric transmission cables, out-of-service, or planned (not yet built) communications cables. The Applicant continues to consult with asset owners to confirm the locations of submarine cable assets, including any active communication cables. All existing underground utilities along the onshore export and

interconnection cable routes and loop-in / loop-out lines will be identified through surveys and coordination prior to the submission of the Environmental Management and Construction Plan (EM&CP).

As part of the onshore export and interconnection cable routing design, the Applicant conducted aerial surveys and field verification of existing utilities and submitted records requests to utility companies operating in the vicinity of the NY Project, including those operating potential telecommunications lines.

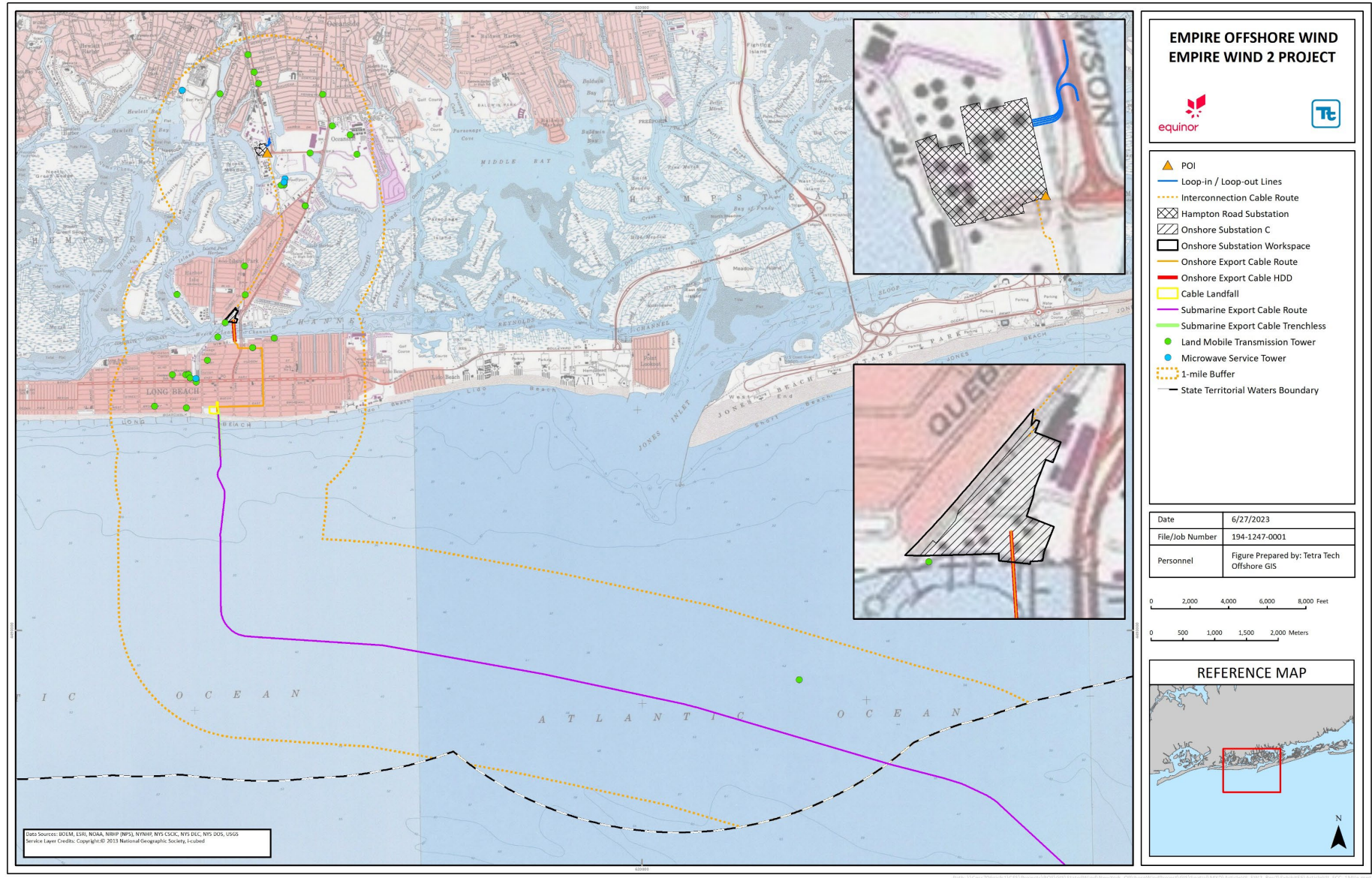


Figure E-5.2-1 FCC Registered Commercial Towers Located within 1 mile of the NY Project

Table E-5.2-1 FCC Registered Commercial Towers Located within 1 mile of the NY Project

Distance from Project (ft)	Entity Name	Tower Type	FCC Identification Number
26.79	ISLAND PARK, VILLAGE OF	1192426	Land Mobile Transmission Tower
26.79	ISLAND PARK, VILLAGE OF	2513751	Land Mobile Transmission Tower
117.85	TELMOBILE INC	1785245	Land Mobile Transmission Tower
336.05	KEYSPAN CORP DBA KEYSPAN ENERGY	2381444	Land Mobile Transmission Tower
425.72	MTA-LONG ISLAND RAILROAD	1916977	Land Mobile Transmission Tower
472.75	KEYSPAN CORP DBA KEYSPAN ENERGY	1887753	Land Mobile Transmission Tower
4782.75	KEYSPAN CORP DBA KEYSPAN ENERGY	1882235	Land Mobile Transmission Tower
472.75	KEYSPAN CORP DBA KEYSPAN ENERGY	1895551	Land Mobile Transmission Tower
472.75	KEYSPAN CORP DBA KEYSPAN ENERGY	1898218	Land Mobile Transmission Tower
520.39	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
520.39	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
520.39	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
520.39	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
520.39	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
520.39	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
520.39	Nassau County Police Department		Microwave Service Tower
596.31	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
596.31	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
833.57	LONG BEACH MEDICAL CENTER	2550134	Land Mobile Transmission Tower
845.53	NEW YORK, STATE OF	2772441	Land Mobile Transmission Tower
848.51	LONG BEACH, CITY OF	1289816	Land Mobile Transmission Tower
1339.22	ISLAND PARK U F S D	1279279	Land Mobile Transmission Tower
1339.22	ISLAND PARK U F S D	3186966	Land Mobile Transmission Tower
1339.22	ISLAND PARK U F S D	3186966	Land Mobile Transmission Tower
1591.60	CHARLES GREENTHAL	2646903	Land Mobile Transmission Tower
1688.85	LONG BEACH INDEPENDENT TAXI CORP	1921518	Land Mobile Transmission Tower

Distance from Project (ft)	Entity Name	Tower Type	FCC Identification Number
189.73	KUCIK, LARRY	3026816	Land Mobile Transmission Tower
1775.01	NEW YORK, STATE OF	2774770	Land Mobile Transmission Tower
1840.40	CITY OF LONG BEACH NY		Microwave Service Tower
2055.30	LONG BEACH, CITY OF	1176839	Land Mobile Transmission Tower
2055.30	LONG BEACH, CITY OF	1289816	Land Mobile Transmission Tower
2055.30	LONG BEACH, CITY OF	1295363	Land Mobile Transmission Tower
2055.30	LONG BEACH CITY TAXI ASSOCIATION	1921541	Land Mobile Transmission Tower
2106.86	OCEANSIDE COVE HOMEOWNERS ASSOCIATION INC	2877192	Land Mobile Transmission Tower
2246.79	LONG BEACH SCHOOL DISTRICT	1278630	Land Mobile Transmission Tower
2339.92	LONG BEACH, CITY OF	1177755	Land Mobile Transmission Tower
2851.65	ATLANTIC EXPRESS TRANSPORTATION CORP	1644664	Land Mobile Transmission Tower
2860.75	LONG BEACH, CITY OF	1267450	Land Mobile Transmission Tower
2867.45	NASSAU, COUNTY OF	1262231	Land Mobile Transmission Tower
3108.31	LONG BEACH, CITY OF	1249830	Land Mobile Transmission Tower
3232.54	TORAH HIGH SCHOOL	1646113	Land Mobile Transmission Tower
3317.25	NIKE FACTORY	3070480	Land Mobile Transmission Tower
3390.53	HEMPSTEAD, TOWN OF	1207700	Land Mobile Transmission Tower
3466.12	COURTESY BUS CO INC	1272647	Land Mobile Transmission Tower
3557.26	FRANKLIN PETROLEUM PRODS CO INC	1844935	Land Mobile Transmission Tower
4140.747	ROSEN, MARTIN DBA MARTYS TRUCKING CORP	1834850	Land Mobile Transmission Tower
4421.52	MTA-LONG ISLAND RAILROAD	1919247	Land Mobile Transmission Tower
4500.14	MLEB FAMILY PARTNERSHIP, LP	1945043	Land Mobile Transmission Tower
5117.55	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower
5117.55	NASSAU COUNTY POLICE DEPARTMENT		Microwave Service Tower

Cable crossings will typically require a physical separation between cables. For the submarine export cables, concrete mattresses or an exterior protection product will be installed between the cables. The NY Project will comply with applicable standards as they relate to power and communication cable spacing; therefore, the NY Project is not anticipated to impact communications systems due to proximity to existing submarine or underground telecommunications cables. Details on the specific crossings will be included in the EM&CP. The onshore substation and Hampton Road substation will be designed in accordance with industry standards to prevent communications interference.

The NY Project is anticipated to have negligible impacts on communication systems, as detailed in the following sections. While the NY Project's interference with radio, television, or other communication systems is anticipated to be negligible, the Applicant will work to resolve any suspected or identified interference in the event that complaints are received during construction or operations.

E-5.2.1 Radio and Television Interference

Based on the design of the cables and the proposed onshore substation and Hampton Road substation, the NY Project is not anticipated to be a source of radio or television interference. Radio and television interference is typically associated with overhead lines and corona-produced radio-noise. Corona interference occurs when the electrical field around a conductor, typically at high voltage, ionizes the air, resulting in a discharge of electricity. Raindrops, snow, fog, hoarfrost, and condensation accumulated on the conductor surface are also sources of surface irregularities that can increase corona. Radio-noise from a corona discharge is reduced with distance from the source. The submarine export and onshore cables will be installed underground or underwater, with the exception of the crossing of Barnums Channel, which will use an aboveground cable bridge. The cable construction will likewise block the electric field outside the cable. The NY Project will be designed to reduce the potential for corona discharge, including by incorporating cross-linked polyethylene insulation and shielding. As such, the NY Project facilities are not expected to be a material source of radio-noise or television interference.

E-5.2.2 Power Line Carrier Interference

Power line carrier is a communication system used in overhead transmission lines, which transmits by modulation on a carrier signal. Power line carrier interference can occur from electrical transmission lines in the form of noise, which can be a concern for radio services. Since the NY Project's communication and protection signaling will use fiber optic cables rather than power line carrier, and because the proposed cables will be installed predominantly underwater and/or underground, this type of interference is not anticipated.

E-5.2.3 Telephone Interference

The onshore export cables, interconnection cables, and loop-in / loop-out lines will be installed predominantly underground, with the exception of the crossing of Barnums Channel, which will use an aboveground cable bridge, so they are not anticipated to cause harmonic distortion sufficient to impact or interfere with existing telephone systems or mobile communications systems. The onshore substation and Hampton Road substation will be designed to minimize the potential for harmonic distortion. The onshore substation and Hampton Road substation design will incorporate measures to address potential telephone or mobile communication system interference and to ensure that local standards are maintained. Moreover, telephone cables are generally manufactured with shielded copper wire for the purpose of minimizing potential interference from transmission lines. Digital and fiber optic telephone communications are not known to be subject to transmission interference. As a result, the NY Project is not expected to cause any interference with telephone signals.

E-5.2.4 Railway Signaling Interference

Railway signaling interference can happen where there are railway communication facilities in the vicinity of proposed transmission lines. The proposed interconnection cable route will be installed predominantly along the Long Island Rail Road (LIRR) right-of-way between the onshore substation and Hampton Road substation, through the Village of Island Park. Additionally, the loop-in / loop-out lines will cross under the LIRR. The Applicant will coordinate with the LIRR such that the NY Project does not result in impacts to railway signaling. **Exhibit E-6** provides additional information on the NY Project's potential effects on transportation, including construction along the LIRR corridor.

E-5.2.5 Microwave Interference

Microwave communications use short wavelengths typically for line-of-sight point-to-point communications, as well as satellite communications, using directional antennas. As such, microwave interference typically would only occur if the interference source were located between two antennas. Because of the short wavelengths and high directionality, microwave communications are designed to be targeted and reduce the potential for interference from other microwave systems. Microwave communication systems or relays also tend to be built in elevated locations to preserve line-of-sight. There are 12 microwave service towers within 1 mile of the submarine and onshore export and interconnection cable routes; however, because the proposed transmission line will be located entirely subsea or belowground, with the exception of the crossing of Barnums Channel via an aboveground cable bridge, it is not expected to produce any microwave interference.

E-5.2.6 Proposed Mitigation

The NY Project is not expected to result in any significant interference with radio, television, cellular phone reception, railway signaling and communications, or microwave transmissions. The Applicant will comply with applicable provisions of the National Electrical Safety Code related to proposed transmission lines and communication facilities and has designed the transmission lines to minimize corona effects.

The Applicant will follow the Call Before You Dig protocol and contact potential third-party underground communication cable operators to confirm the locations of any underground communication facilities that would be within or crossed by the right-of-way. If underground communication facilities that have not been previously identified are found within the vicinity of the NY Project, the Applicant will ensure that appropriate clearances and interference protection are verified.

E-5.3 References

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