The latest revision date of Appendix AA to the Empire Offshore Wind COP is July 2023. This appendix was not revised as part of the November 2023 submittal; therefore, the date on the Appendix AA cover sheet remains as July 2023.

# APPENDIX AA

## Visual Impact Assessment

Prepared for

equinor

TETRA TECH

JULY 2023

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ac | acre |
| ADLS | Aircraft Detection Lighting System |
| aMSL | above mean sea level |
| BLM | U.S. Bureau of Land Management |
| BOEM | U.S. Bureau of Ocean Energy Management |
| CMP | Coastal Management Program |
| CZMP | Coastal Zone Management Program |
| COP | Construction and Operations Plan |
| DEM | Digital Elevation Model |
| dSLR | digital single lens reflex |
| Empire | Empire Offshore Wind LLC |
| FAA | Federal Aviation Administration |
| FAA lights | obstruction marking lights installed to meet FAA guidelines |
| ft | foot |
| GIS | Geographic Information System |
| GPS | global positioning system |
| ha | hectare |
| HAT | Highest Astronomical Tide |
| IPS | Intermediate Peripheral Structure |
| km | kilometer |
| KOP | key observation point |
| Lease Area | designated Renewable Energy Lease Area OCS-A 0512 |
| m | meter |
| mi | statute mile |
| MHW | mean high water |
| MW | megawatt |
| nm | nautical mile |
| NHL | U.S. National Historic Landmark |
| NJDEP | New Jersey Department of Environmental Protection |
| NJ HPO | New Jersey State Historic Preservation Office |
| NPS | U.S. National Park Service |
| NRHP | U.S. National Register of Historic Places |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSERDA | New York State Energy Research and Development Authority |
| NY SHPO | New York State Historic Preservation Office |
| OCS | Outer Continental Shelf |
| PDE | Project Design Envelope |
| POI | Point of Interconnect |

| | |
|---|---|
| Project | The offshore wind project for OCS A-0512 proposed by Empire Offshore Wind LLC consisting of Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2). |
| Project Area | The area associated with the build out of the Lease Area, submarine export cable routes, interarray cables, and all onshore Project facilities. |
| SASS | Scenic Areas of Statewide Significance |
| SBMT | South Brooklyn Marine Terminal |
| SPS | Significant Peripheral Structure |
| TP | transition piece |
| USCG | U.S. Coast Guard |
| VIA | Visual Impact Assessment |
| VRM | Visual Resource Management |
| Visual Offshore Study Area | 44-mi (70.8-km) study area around the Lease Area |
| WRP | Waterfront Revitalization Program |

# AA.1 INTRODUCTION

Tetra Tech, Inc. was contracted by Empire Offshore Wind LLC[1] (Empire) to prepare a Visual Impact Assessment (VIA) in support of the development of the Empire Wind Project (Project) Construction and Operations Plan (COP). The Project consists of an offshore wind farm to be located in the designated U.S. Bureau of Ocean Energy Management (BOEM) Renewable Energy Lease Area Outer Continental Shelf (OCS)-A 0512 (Lease Area), as well as submarine export cables and onshore ancillary facilities required to convey power produced by the wind farm to the regional electric transmission system. The Lease Area is approximately 14 statute miles (mi; 12 nautical miles [nm], 23 kilometers [km])[2] south of Long Island, New York and 19.5 mi (16.9 nm, 31.4 km) east of Long Branch, New Jersey (**Figure AA-1,** Project Overview Map). The purpose of this VIA is to assess the potential visual effects resulting from the construction and operations of the Project.

Project components include offshore wind turbines, offshore substations, offshore foundations, submarine export cables, interarray cables, onshore export and interconnection cables, onshore substations, and an O&M Base. The focus of this report is on the above water offshore and aboveground onshore Project components including the wind turbines, offshore substations, onshore substations, cable bridge, and an O&M Base. The offshore submarine export cables and interarray cables, and the onshore export and interconnection cables will be entirely submerged under water or buried underground, with the exception of the portion of EW 2 Route IP-F and the portion of EW 2 Route IP-G, which may cross Barnums Channel via a cable bridge. Therefore, submerged/underground Project components were not discussed in detail in this VIA.

The VIA contained herein includes a detailed description of the Project components that were evaluated (Section AA.2); a summary of the regulatory requirements and drivers behind the analysis conducted (Section AA.3); a detailed discussion of the methods used to identify the Project Study Area and inventory visual resources potentially affected by the construction and operations of the Project (Section AA.4); a detailed discussion of the methods used to evaluate impacts and a summary of potential effects (Section AA.5); and an evaluation of potential mitigation measures applicable to the Project (Section AA.7).

The scope and approach to this VIA were supported through engagement with BOEM, U.S. National Park Service (NPS), the New York State Historic Preservation Office (NY SHPO), the New Jersey State Historic Preservation Office (NJ HPO), New Jersey Department of Environmental Protection (NJDEP), and New York State Department of Environmental Conservation (NYSDEC).

For the purposes of this VIA, the Project Area refers to the Lease Area (offshore; where the wind turbines and offshore substations will be located) and the onshore substations and O&M Base sites (onshore) as discussed in Section AA.2.1 and shown on **Figure AA-1**.

Although some historic resources are included as representative viewpoints and assessed as part of the VIA, a full evaluation of the potential impacts on historic resources are included in **Appendix Z Analysis of Visual Effects to Historic and Architectural Properties**.

[1] Empire is a direct, wholly owned subsidiary of Empire Offshore Wind Holdings LLC ("Empire HoldCo"). Empire HoldCo is jointly owned by (1) an indirect, wholly owned subsidiary of Equinor ASA (collectively, "Equinor"); and (2) an indirect, wholly owned subsidiary of BP Wind Energy North America In. ("BP"). BP acquired ownership interest in Empire HoldCo in a transaction that closed on January 29, 2021.
[2] Distances throughout the VIA are provided as statute miles (mi) or nautical miles (nm) as appropriate, with kilometers in parentheses. For reference, 1 mi equals approximately 0.87 nm or 1.6 km.

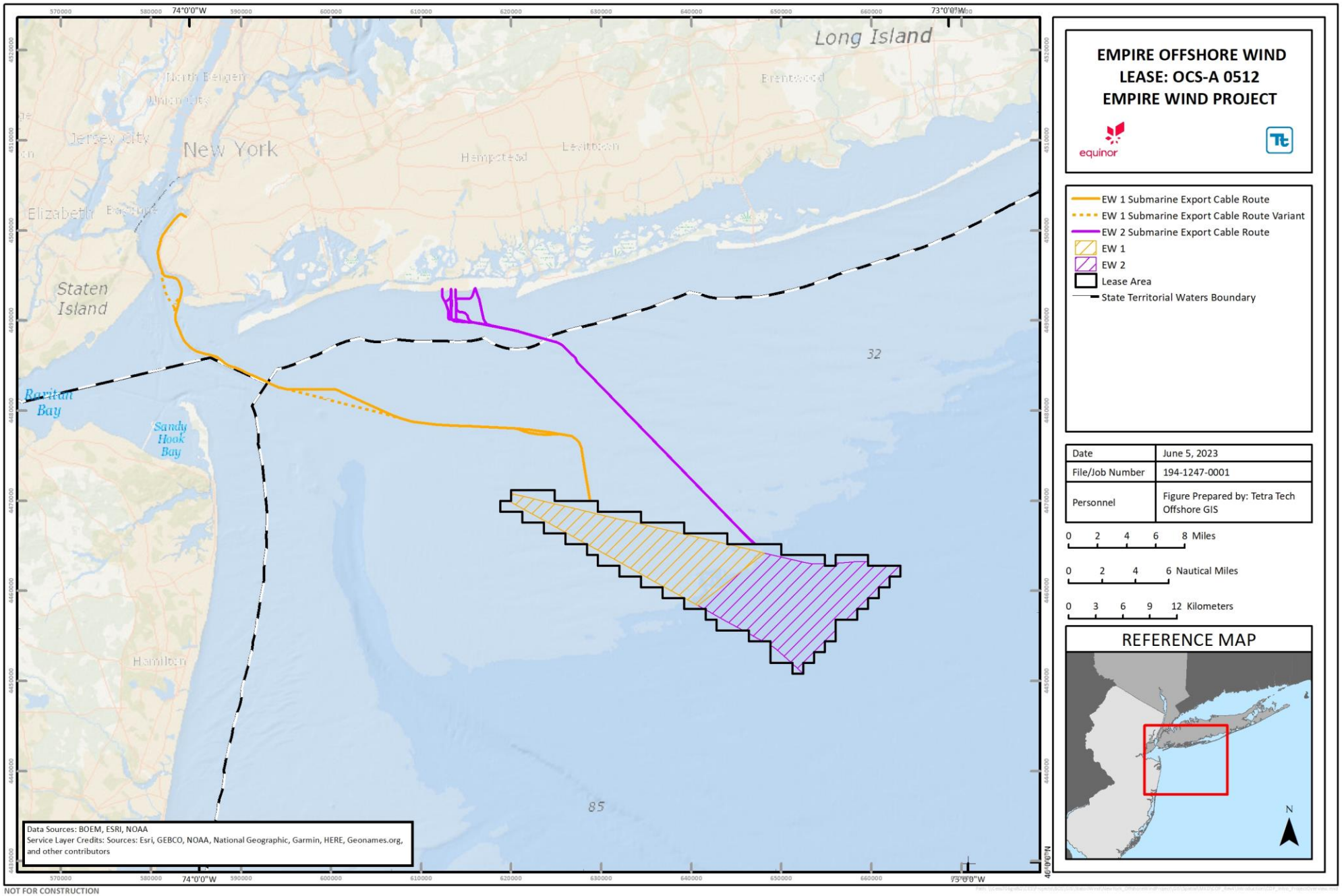



**Figure AA-1 Project Overview Map**

## AA.2 PROJECT DESCRIPTION

This section describes the location and infrastructure currently under consideration within the Project Design Envelope (PDE) which has been reviewed for potential visual effects.

### AA.2.1 Offshore Facilities

The Project includes the construction of up to 147 wind turbines at up to 176 locations (total number across both EW 1 and EW 2), two offshore substations, and foundations for the wind turbines and offshore substations within the Lease Area. The wind turbines will be connected via interarray cables to the offshore substations. The offshore substations will collect the power generated by the wind turbines and transport it to the Project's onshore substation via submarine export cables. The onshore substations will transform the energy generated to a higher and/or lower voltage for connection into the Points of Interconnection (POIs) identified in New York[3]. An overview of the offshore Project facility locations is provided in **Figure AA-1**. The interarray cables and submarine export cables will be entirely submerged under water, and therefore will not be visible components of the Project and are not evaluated in detail as part of this assessment.

Empire is proposing to develop the entire Lease Area, consisting of EW 1 and EW 2. However, EW 1 and EW 2 will each be an electrically isolated facility, each with its own dedicated submarine export cables and POI.

For the purposes of the COP, this assessment includes both EW 1 and EW 2, as required by Federal regulations (see Section AA.3).

#### AA.2.1.1 Wind Turbines

The wind turbines installed for the Project will be three-bladed, horizontal-axis machines. The rotor will be attached to a nacelle containing the electrical generator and other equipment. The nacelle will sit on top of a tubular support tower. Wind energy causes the blades on a wind turbine to rotate, which turns a generator in order to transform the kinetic energy of the air into electricity.

The make, model, and generating capacity of the wind turbines will be selected during the procurement process; the Project is expected to employ the most technologically advanced and efficient model available at the time the Project is constructed. **Table AA-1** provides a summary of the parameters for the proposed representative wind turbines.

**Table AA-1 Summary of the Parameters for the Representative Wind Turbines**

| Parameter | EW 1 | EW 2 |
|---|---|---|
| Total Number a/ b/ | 57 | 90 |
| Hub Height above HAT | 525 ft (160 m) | |
| Upper Blade Tip above HAT | 951 ft (290 m) | |
| Lower Blade Tip above HAT | 85 ft (26 m) c/ | |
| Rotor Diameter | 853 ft (260 m) | |

Notes:

a/ The number of wind turbines proposed allows for overplanting.

b/ Up to 147 wind turbines will be installed at any of 174 locations. The remaining two locations will be used for offshore substations.

c/ For this parameter, the minimum value represents the maximum PDE value to be used for assessing impacts.

[3] The PDE proposes the construction and installation of two onshore substations to support the Project. The onshore substations will be used to connect the export cables to the POIs in New York.

The wind turbines selected for this Project will consist of the following components:

- **Tower:** Steel tubular section which supports the rotor and nacelle, in addition to providing the height required to efficiently capture wind energy. The tower is the piece connected to the foundation and typically holds some control and electrical components within or at the base while also providing access to the nacelle for servicing.
- **Nacelle:** Box-like structure at the top of the tower which houses the electro-mechanical components of the wind turbine. The nacelle may also contain other equipment, such as transformers, yaw systems, and gearboxes.
- **Rotor:** Consists of the three blades and the hub (where the blades connect into). The rotor is responsible for the extraction of wind energy which is then converted into electricity by the generator. Rotors can range in length depending on wind turbine size and can be pitched to control thrust force and rotor speed.

**Figure AA-2** shows the representative wind turbine for the Project.

### AA.2.1.2 Foundations

Foundations are required to secure the wind turbines and offshore substations vertically while withstanding loads from wind and the marine environment. Foundations also provide a means of safe access for maintenance activities.

Similar to the wind turbines, the Project requires flexibility, with foundation selection dependent on multiple factors including the size of the wind turbines selected, soil/seabed conditions, metocean conditions (wind, wave, current and tidal regime), and procurement approach. The PDE includes options of up to two types of foundations; monopile foundations to support the wind turbine generators and the piled jacket foundation to support the offshore substations. Descriptions of the foundation types proposed are below.

- **Monopile**: a single vertical, broadly cylindrical steel pile driven into the seabed. A steel TP will be connected to the monopile.
- **Piled Jacket**: a vertical steel lattice structure consisting of four or six legs, from which piles are inserted, connected through cross bracing.

**Figure AA-3** shows a conceptual rendering of the monopile wind turbine foundation type (see **Figure AA-7** for a conceptual rendering of the piled jacket foundation proposed to support the offshore substation). Given the viewing distances evaluated in the assessment, however, the foundation type will not have an identifiable influence on the level of visual contrast created by the Project.

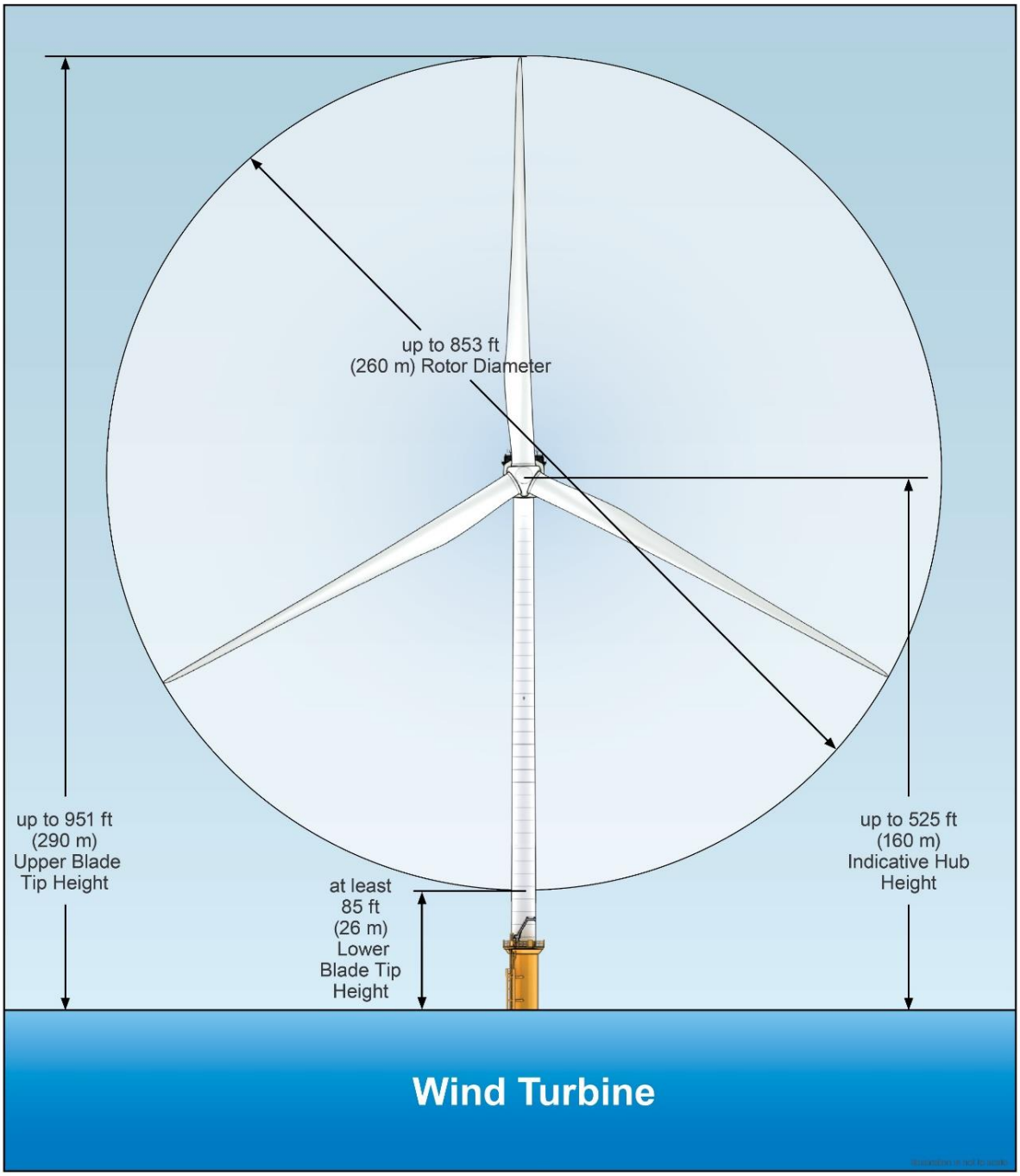



**Figure AA-2 Representative Wind Turbine**

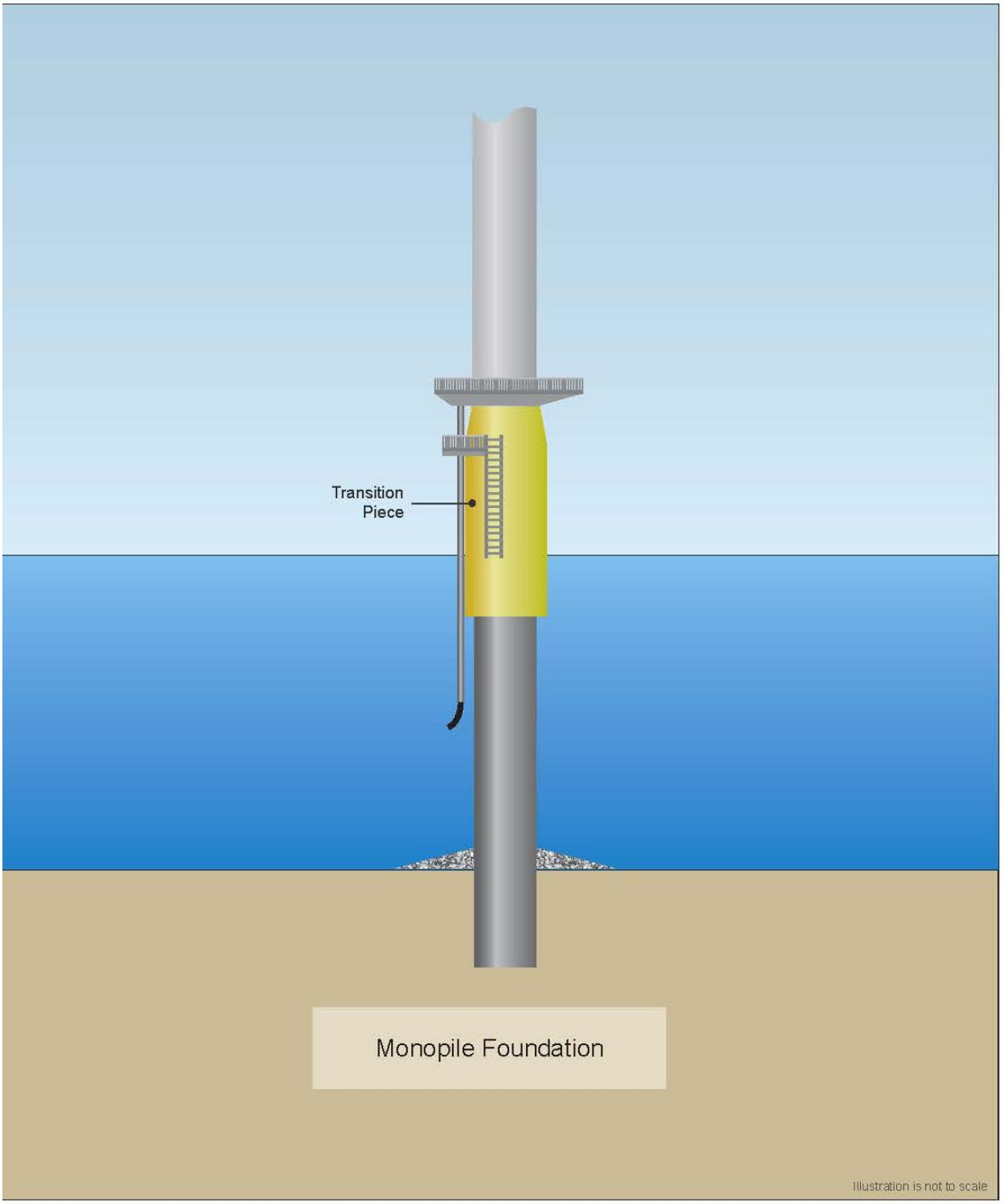



**Figure AA-3 Wind Turbine Foundation Type – Monopile**

### AA.2.1.3 Lighting

The wind turbines will be lit and marked in accordance with Federal Aviation Administration (FAA) and United States Coast Guard (USCG) requirements for aviation and navigation obstruction lighting, respectively (see Section 3.5.3 of the COP). In addition to adhering to FAA filing requirements for the wind turbines, Empire will light and mark all wind turbines in accordance with FAA Advisory Circular 70/7460-1L, BOEM's Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development (2021), *International Association of Marine Aids to Navigation and Lighthouse Authorities* (IALA) *Recommendation O-139 on The Marking of Man-Made Offshore Structures* (IALA 2013), and USCG Local Notice to Mariners Entry 44-20 (2020), as detailed below:

- All foundation structures will be painted yellow RAL 1023 from the level of Highest Astronomical Tide (HAT) up to 50 feet (ft; 15.3 meter [m]) and utilize retro reflective material.
- Wind turbine towers will have alphanumeric marking (or labels) in black, approximately 10 ft (3 m) high and will be visible in all directions in both daytime and nighttime. Empire is actively engaged with USCG to identify a unique alphanumeric marking scheme which will be aligned with other offshore wind projects within the same USCG District, as applicable. Letters shall be easily visible by using either illumination or retro-reflecting material.
- Wind turbines above the yellow demarcation line for navigational aids will be painted no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey.
- All wind turbines in excess of 699 ft (213 m) above ground level (AGL) will require two synchronized flashing red lights (with medium intensity L-864 and LED color between 800 and 900 nanometers) placed on the back of the nacelle on opposite sides.
- Additionally, mid-level lighting (model L-810) will be required at a half-way point on the tower between the top of the nacelle and ground level. Mid-level lighting should be flashing red lights configured to flash unison with the nacelle lighting and should contain a minimum of three of the L-810 lights.

In accordance with IALA 0-139 and USCG Local Notice to Mariners Entry 44-20, the following also apply:

- Each turbine should be lit as an offshore structure in accordance with 33 Code of Federal Regulations § 67 and USCG First District Local Notice to Mariners entry 44-20.
- Lighting will be located on all turbine structures and visible throughout a 360-degree arc from the water's surface.
- Corner Towers/Significant Peripheral Structures will have quick flashing yellow lights energized at a 5 nm (9.3 km) range.
- Outer Boundary Towers will have yellow 2.5 second lights (FL Y 2.5s) energized at a 3 nm (5.6 km) range.
- Interior Towers will have yellow 6 second or yellow 10 second lights (FL Y 6/FL Y 10) energized at a 2 nm (3.7 km) range and all lights should be synchronized by their structure location within the field of structures.
- Also noting that all temporary base, tower and construction components preceding the final structure completion must be marked with quick yellow obstruction lights visible throughout 360 degrees at a distance of 5 nm (9.3 km). These will not require permits, only USCG notification for appropriate marine notices and broadcasts until the final structure marking is established.
- The aids to navigation on each turbine will be mounted below the lowest point of the arc of the rotor blades and will exhibit at a height above highest astronomical tide of no less than 20 ft (6 m) and no more than 50 ft (15 m).

- Sound signals will be located on all structures located at corners/Significant Peripheral Structures (SPSs) and will sound every 30 seconds (4 second blast, 26 seconds off), will be set to project at a range of 2 nm (3.7 km), should not exceed 3 nm (5.6 km) spacing between perimeter structures, and will be Mariner Radio Activated Sound Signal activated by keying VHF Radio frequency 83A five times within ten seconds.
- Sound signals will be timed to energize for 45 minutes from last VHF activation.
- Aeronautical obstruction lights, which when fitted to the tops of turbines are not visible below their horizontal plane.
- Aeronautical obstruction lights will be night vision imaging system compliant.

Wind turbine navigational lighting is shown on **Figure AA-4**. In addition, Empire proposes to include an ADLS (or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, as a base case, pending commercial availability, technical feasibility, safety/reliability, and agency review and approval.

### AA.2.1.4 Offshore Substation

To support the Project's design capacity, Empire will require the installation of two offshore substations. Each offshore substation will consist of a platform containing the electrical components necessary to collect the electricity generated by the wind turbines (via interarray cables) for delivery transmission and transport to the Project's onshore electricity infrastructure (via export cables). The offshore substations will include transformers, switchgears to control the power flow, and reactors to optimize the power capture from the interarray cables and flow over the export cable. The topside also will include auxiliary equipment and uninterruptible power supplies, power quality measuring units, supervisory control, data acquisition equipment, telecommunication systems, numerous monitoring systems, together with facilities, safety, and rescue equipment for personnel. The offshore substations will have a maximum width of 230 ft (70 m) and length of 230 ft (70 m). The height of the offshore substation topsides will be 92 ft (28 m), with a maximum height of 295 ft (90 m) measured to the top of the lightning protection and ancillary structures. The offshore substation topside will be situated 72 ft (22 m) above mean sea level.

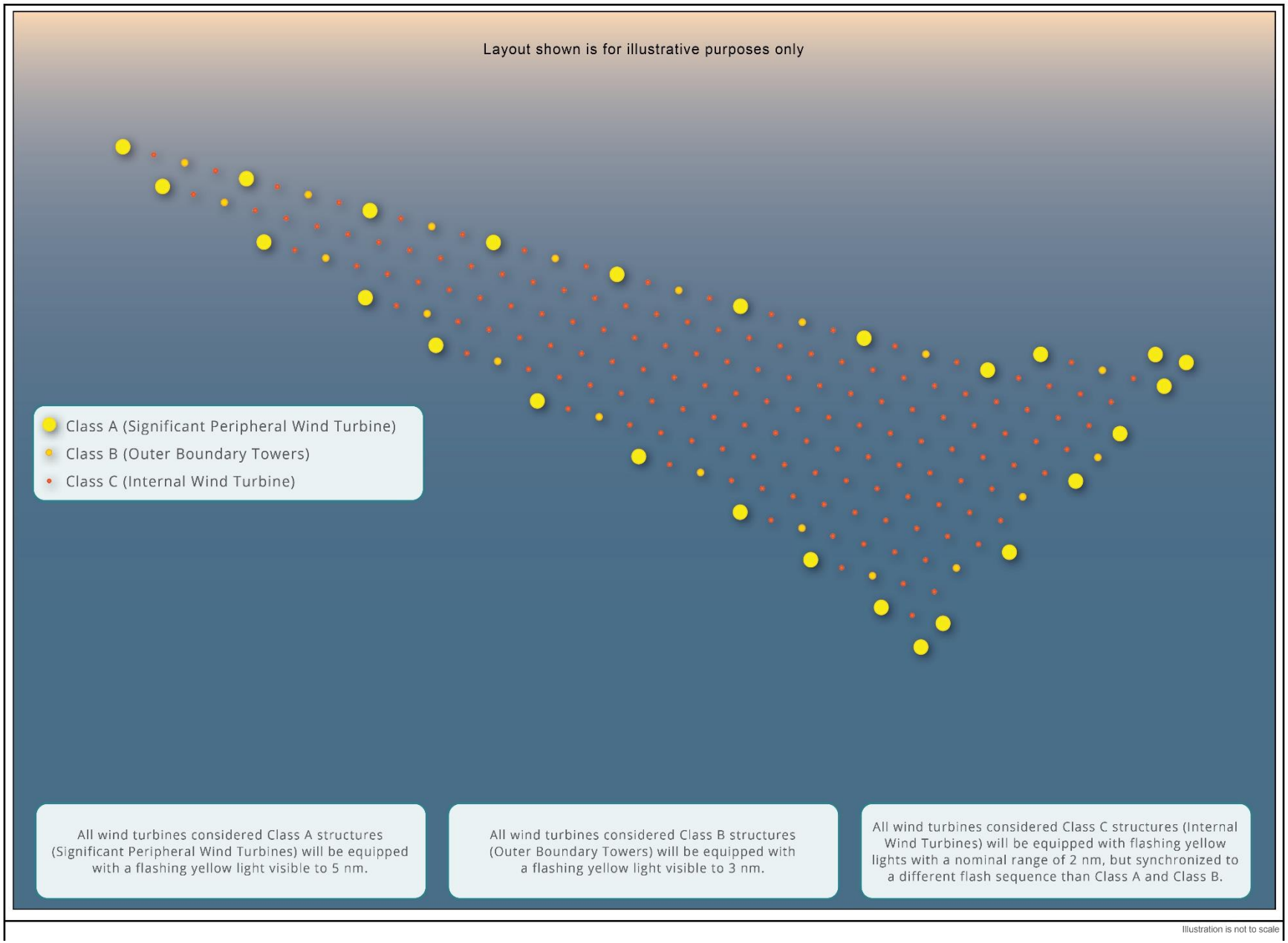



**Figure AA-4 Navigation Lighting Requirements for Wind Turbines**

The offshore substations will consist of multiple deck levels, which will include the cables, equipment, and utilities. The offshore substations will also be compatible with a gangway system and will feature boat landings. While the offshore substation will normally be unstaffed, the design will also incorporate space for emergency sheltering situations. **Figure AA-5** shows an example of an offshore substation.


**Figure AA-5 Example of an Offshore Substation on a Suction Bucket Jacket Foundation (Equinor-Operated Dudgeon Offshore Wind Farm)**

The offshore substation will be lit and marked in accordance with USCG and FAA requirements, as applicable, and include lights around the perimeter of each deck level for safety. Piled jacket foundations are being evaluated for the offshore substation, as described for the wind turbines. **Figure AA-6** provides a schematic of the offshore substation foundation.

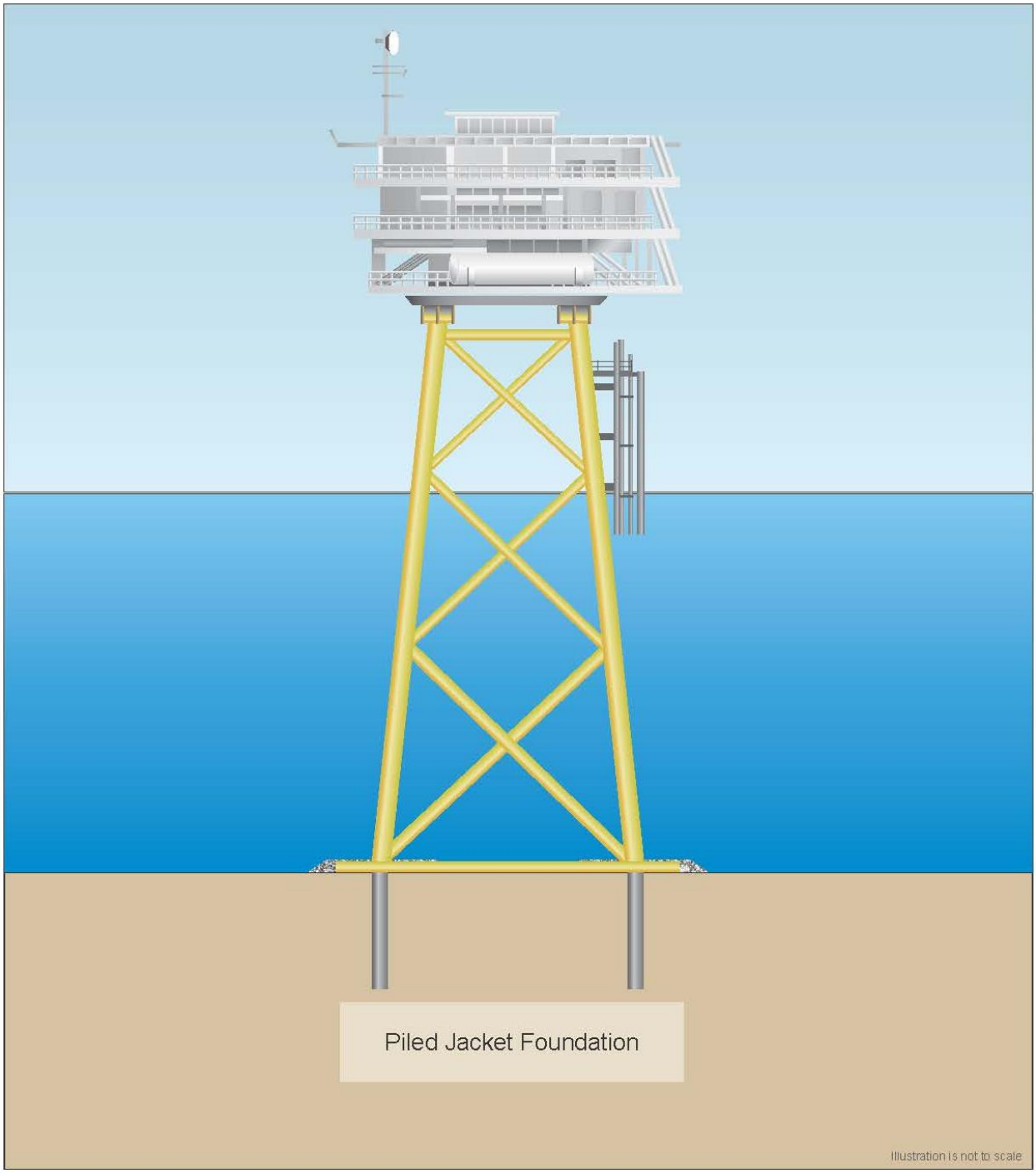



**Figure AA-6 Offshore Substation Foundation Type – Piled Jacket**

### AA.2.2 Onshore Facilities

The Project proposes to interconnect at two onshore locations in New York, where the renewable electricity generated will be transmitted to the electric grid. The transition from submarine export cables to onshore export cables will occur at the export cable landfall location. Four onshore substation locations were being considered at the time this VIA was prepared[4]; therefore, all four locations were evaluated in the VIA and include:

- EW 1 onshore substation site in Brooklyn, New York; and
- EW 2 Onshore Substation A site in Oceanside, New York; or
- EW 2 Onshore Substation C site in Island Park, New York.

At each of these locations, the onshore export cables will originate at the export cable landfall site and terminate at a new onshore substation. The onshore interconnection cables will originate at the new onshore substation and terminate at the existing POI. These onshore export and interconnection cables will be located underground, except when crossing Barnum Channel where a cable bridge would be installed parallel to the Long Island Railroad (LIRR) crossing, and will not be significantly noticeable once installed. Unless paving of the entire roadway occurs, contrast in color (new vs. old paving) may be noticeable. In addition, an O&M Base is proposed to be located in Brooklyn, New York, adjacent to the EW 1 onshore substation, as described in Section AA.2.4. Section AA.5.2.1 gives an overview of potential ground surface impacts during construction. The onshore substation facilities will be located at the EW 1 onshore substation site and either the EW 2 Onshore Substation A, or EW 2 Onshore Substation C site as described in Section AA.2.3.

Locations for the onshore facilities are shown on **Figure AA-7** and **Figure AA-8.**

### AA.2.3 Onshore Substations

#### AA.2.3.1 Conceptual Substation Layout

The onshore substations will be designed to comply with applicable state and federal building codes, electrical standards, and environmental conditions to the extent practicable.[5] For the purposes of this VIA, conceptual onshore substation layouts and designs were developed. Empire is considering a substation design based on gas-insulated switchgear technology, which allows electrical substation equipment to be contained within buildings. The designs of the onshore substations that are evaluated in this VIA are based on conservative assumptions.

The onshore substations will generally contain enclosed buildings and/or walled structures that will contain various equipment such as switchgears, control equipment, batteries, reactive compensation equipment and harmonic filters, and/or a designated outside area to house outdoor equipment. The onshore substation simulations depict equipment in enclosures around the site. However, open-air equipment may be used, which would reduce the number of enclosures on site.

[4] EW 1 and either the EW 2 Onshore Substation Aor EW 2 Onshore Substation C will be selected as the onshore substation location, based on Empire's ability to execute access agreements.

[5] In the event that certain standards cannot be met, variances will be sought through the appropriate regulatory mechanisms.

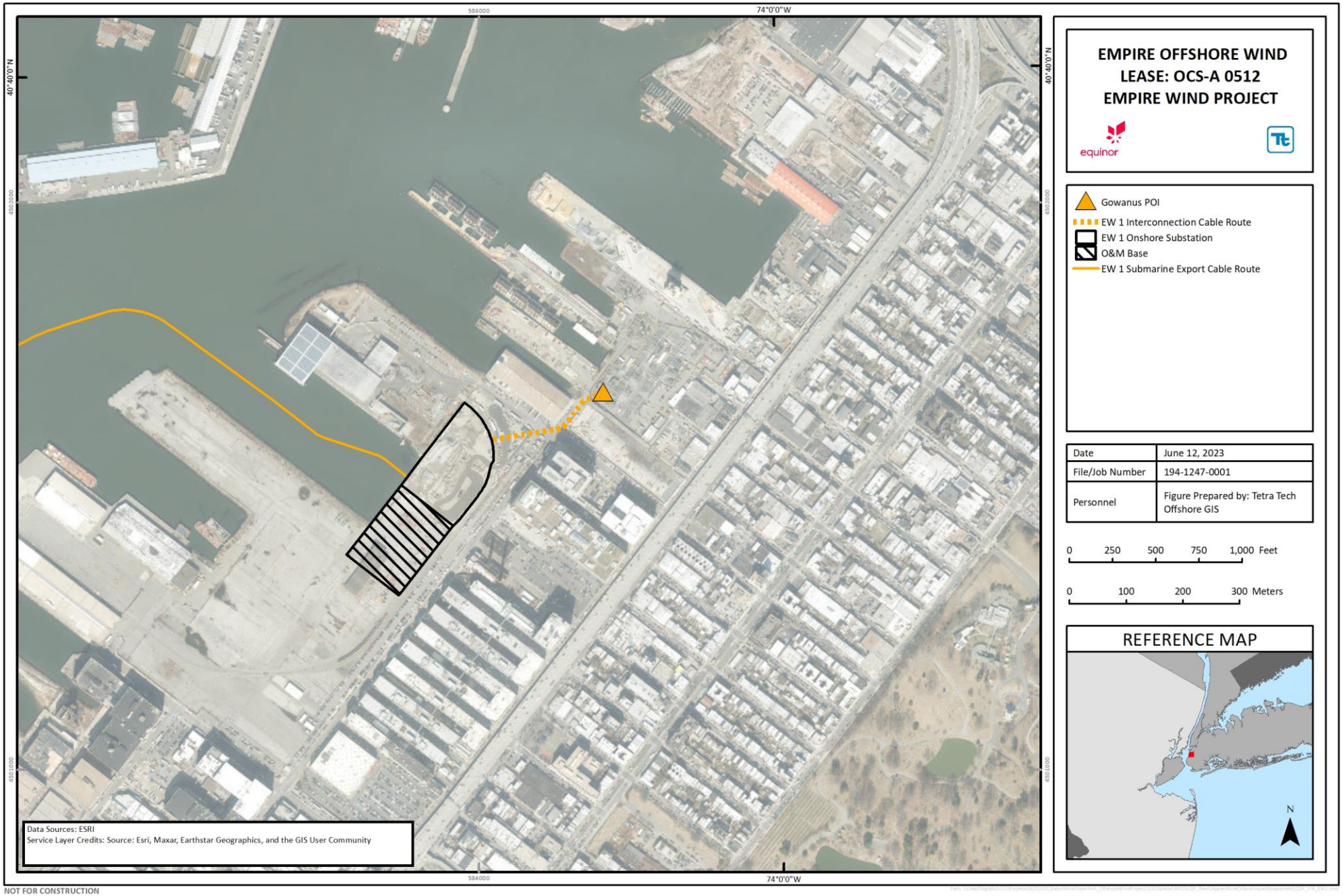



**Figure AA-7 EW 1 Onshore Substation Site, Interconnection Cable Route, and O&M Base**

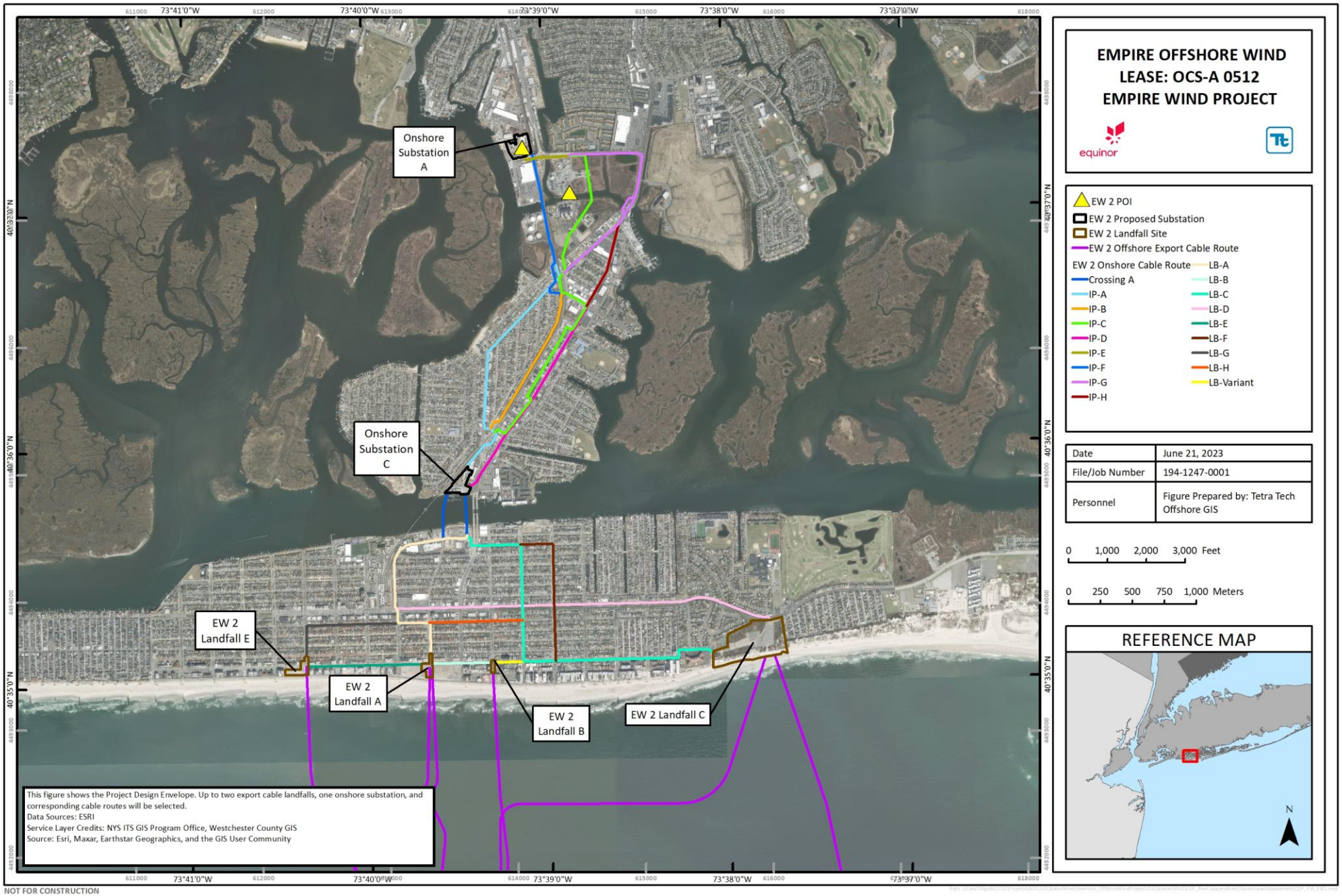



**Figure AA-8 EW 2 Onshore Substation Sites and Onshore Export and Interconnection Cable Routes**

- The onshore substation for EW 1 will be constructed within an approximately 4.8 ac (1.9 ha) portion of the property, with a maximum main building height of 49 ft (15 m); and
- The onshore substation for EW 2 will be constructed within an approximately 6.4 ac (2.6 ha) portion of the EW 2 Onshore Substation A site, with a maximum main building/equipment height of 60 ft (18 m); or
- The onshore substation for EW 2 will be constructed within an approximately 5.2 ac (2.1 ha) portion of the EW 2 Onshore Substation C site, with a maximum main building/equipment height of 60 ft (18 m).

Other outside structures will generally include:

- Outside electrical equipment including shunt reactors and transformers;
- Static masts;
- A 10 ft (3 m) high perimeter chain link security fence with a 2 ft (0.6 m) tall barbed wire extension for a total height of 12 ft (3.7 m), although other types of fencing materials are being discussed and may include, but are not limited to, mesh security fencing and/or anti-scalable vertical rail fencing;
- A gravel maintenance road encircling the facility just inside the perimeter security fence; and
- A minimum of one drive-through gate and one walk-through gate providing access to each site.

The size and configuration of the buildings and location of outside electrical equipment for each onshore substation will depend on the environmental conditions, electrical constraints, and parcel size on which the onshore substation is located. Conceptual onshore substation layouts for EW 1 Onshore Substation, EW 2 Onshore Substation A, and EW 2 Onshore Substation C are shown on **Figure AA-9**, **Figure AA-10**, and **Figure AA-11**, respectively.

**EW 1 Onshore Substation**

The EW 1 landfall is proposed to be located at the north end of the South Brooklyn Marine Terminal (SBMT), in the Sunset Park Neighborhood in Brooklyn, New York, adjacent to 1st Ave/2nd Avenue. SBMT is located on the east side of Upper Bay within New York Harbor. While there are several existing buildings located within the terminal, including a recycling center and warehouses, there are no buildings on the portion of the site where the onshore substation would be located. The site is bisected at the northern end by an existing railroad track that turns and runs along the southeastern boundary of the site. Beyond the railroad track to the southeast are parking lots; to the south is a warehouse and parking lot; and to the west is a recycling center and Gowanus Bay. Structures housing equipment and walls surrounding other open air equipment will have a maximum main building height of 49 ft (15 m).[6]

The EW 1 onshore substation would be developed within an approximately 4.8-acre (ac, 1.9-hectare [ha]) parcel of land. The conceptual layout includes three buildings. Outside electrical equipment will be situated in the central portion of the site.

[6] Subsequent to initial efforts, Empire continues to refine the design of the onshore substation. This is informed by analysis including visual simulations, acoustic modeling, and other field surveys, as well as engagement with municipalities and other stakeholders.

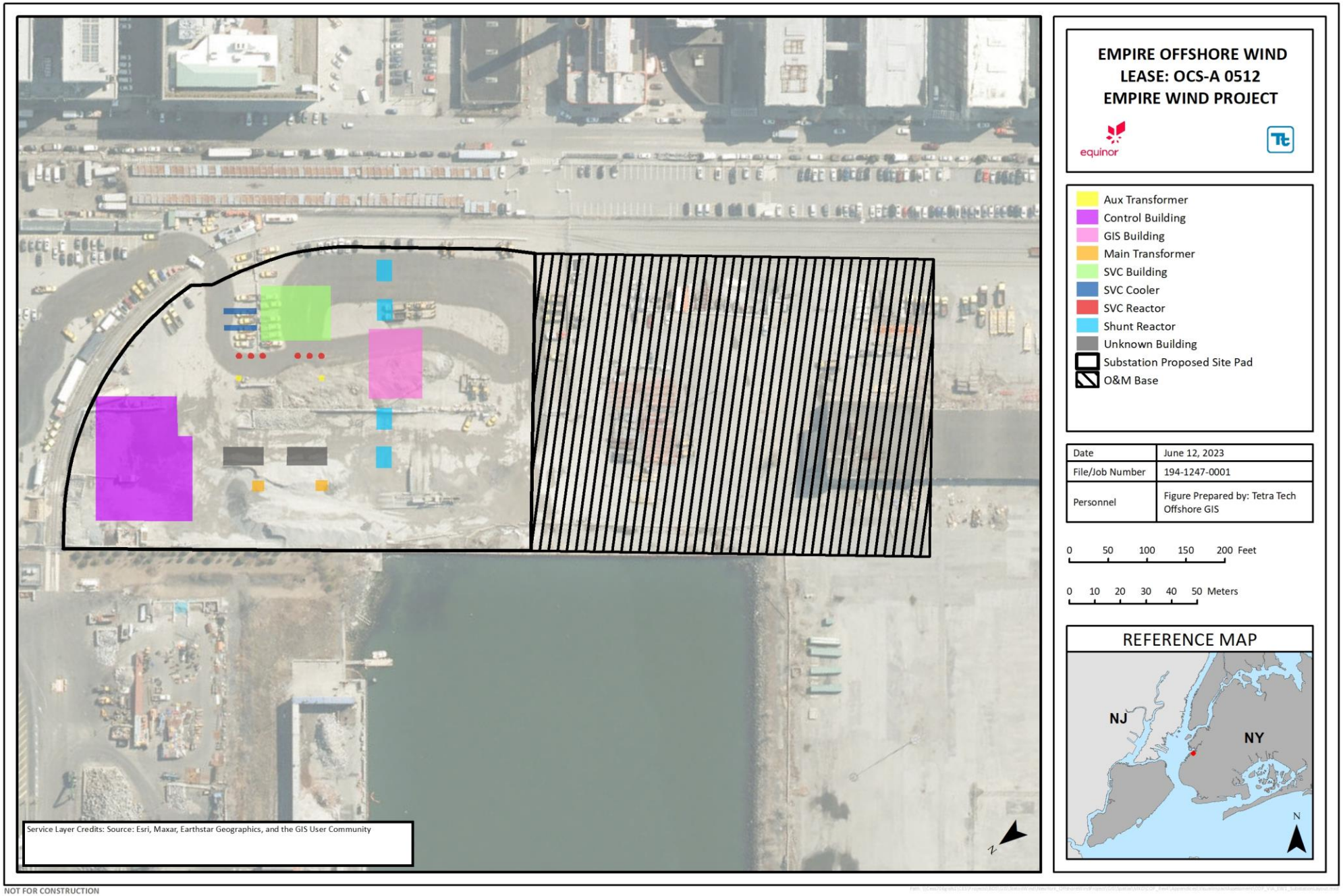



**Figure AA-9 EW 1 Onshore Substation – Conceptual Layout**

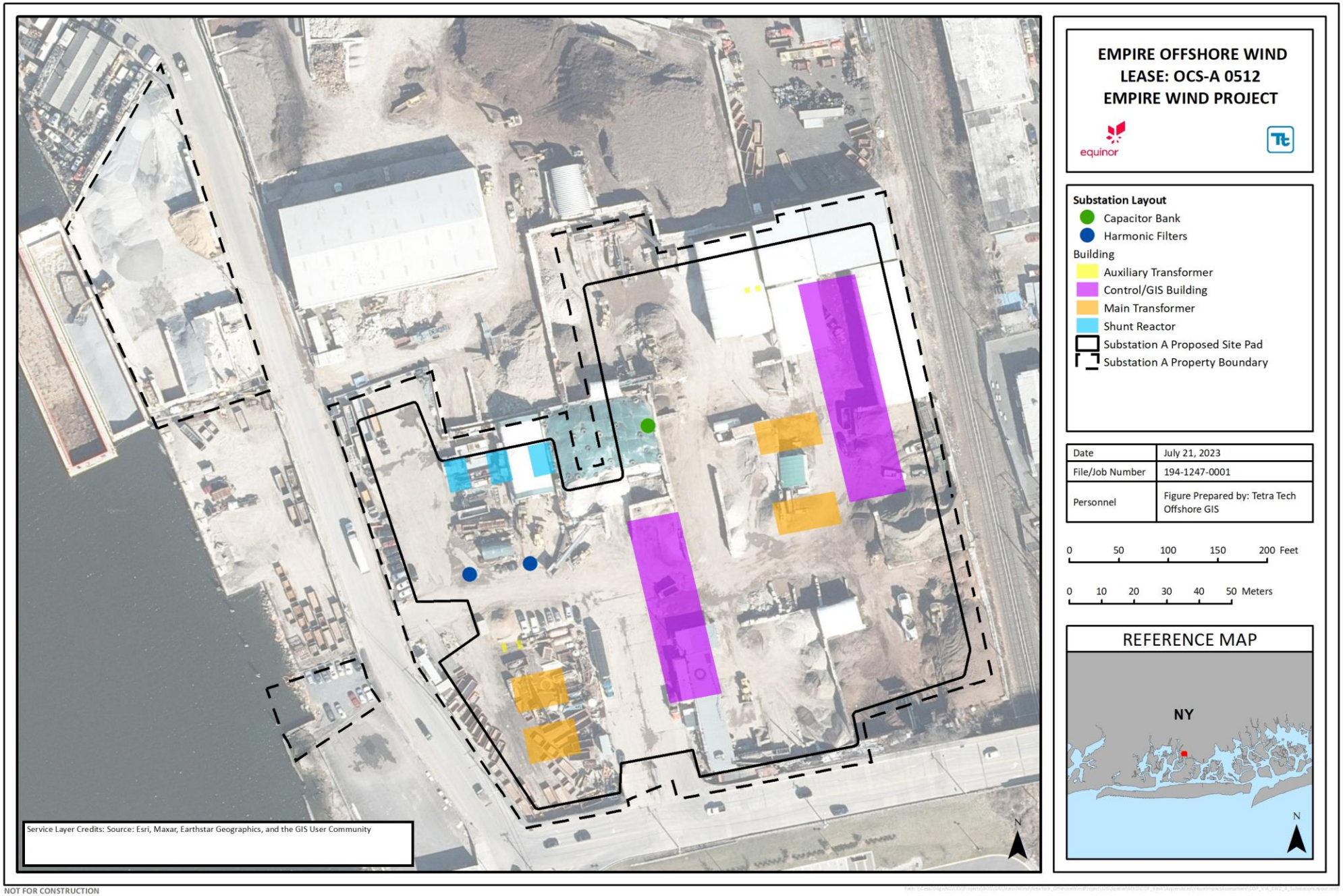



**Figure AA-10 EW 2 Onshore Substation A + Hampton Road Substation – Conceptual Layout**

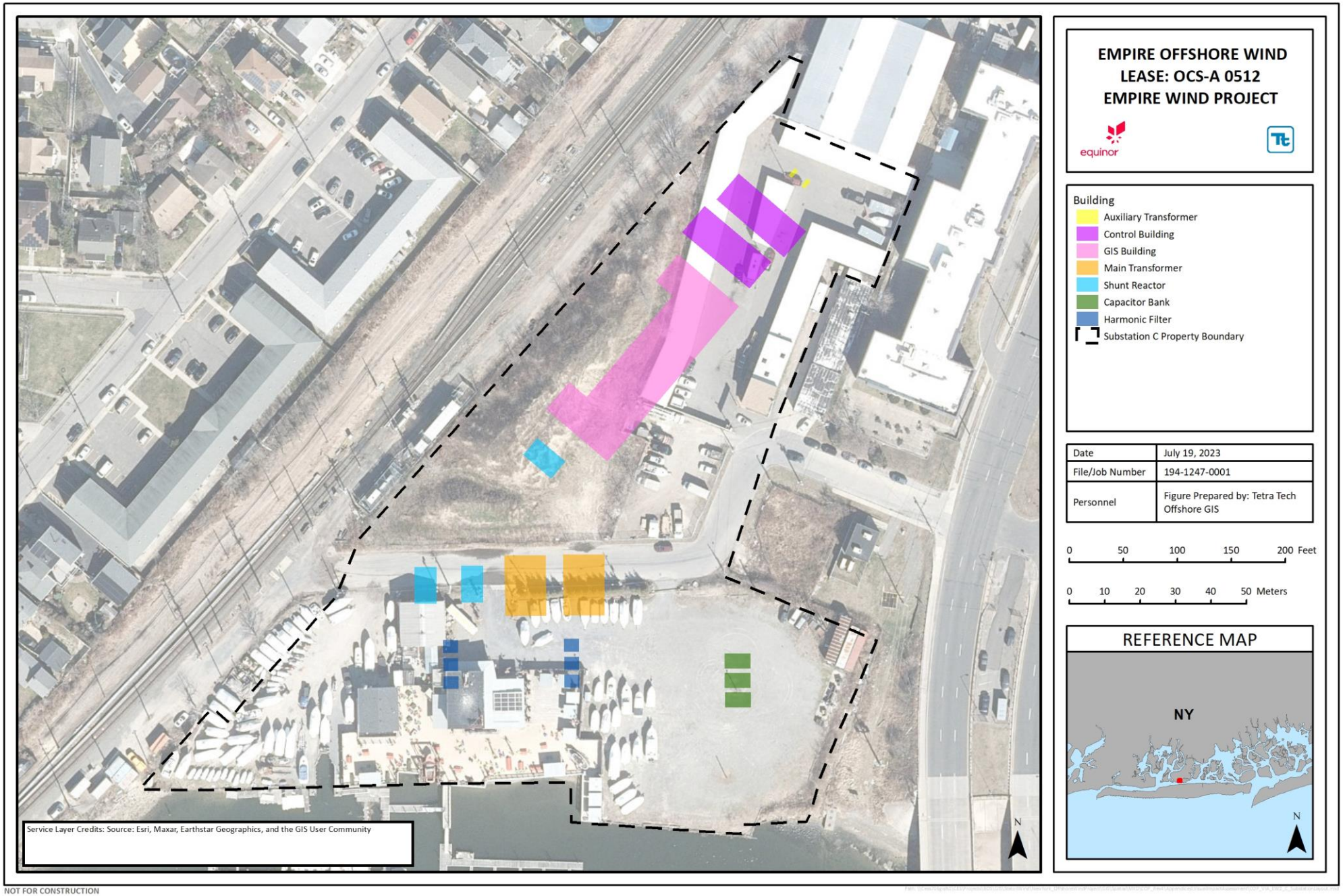



**Figure AA-11 EW 2 Onshore Substation C – Conceptual Layout**

**EW 2 Onshore Substation A**

The EW 2 Onshore Substation A site is located on Long Island in the unincorporated Hamlet of Oceanside, in Nassau County, New York. The site currently supports industrial uses including a recycling center which recycles concrete, wood, and construction and demolition materials. No vegetation is present on the site. The site is bounded by Patriot Recycling and other industrial uses to the north, a railroad and commercial development to the east, Daly Boulevard to the south, and Hampton Road to the west. The Oceanside POI, also owned by National Grid and operated by PSEG Long Island, is located approximately 0.1 mi (0.2 km) southeast of the EW 2 Onshore Substation A.

The EW 2 Onshore Substation A would be developed within an approximately 6.4-ac (2.6-ha) portion of the property with a maximum main building/equipment height of 75 ft (22.9 m).[6]

Engagement with the POI operator has indicated a potential expansion of the Oceanside POI into this property; this location may therefore contain the POI and associated equipment to which the Project will connect into the grid. This expansion of the POI is referred to as the Hampton Road Substation. Electrical equipment to support the Hampton Road Substation, if constructed, will be similar to what is proposed to be used for the onshore substation and will be installed in an orientation consistent with the conceptual layout analyzed in this document. If plans develop for the Oceanside POI to expand onto this parcel, the co-location of the EW 2 onshore substation may not be possible due to space constraints. Whether this parcel is used for EW 2 Onshore Substation A or the Hampton Road Substation, the visual conditions are substantially similar.

**EW 2 Onshore Substation C**

The EW 2 Onshore Substation C site is located on Long Island in the incorporated Village of Island Park, in Nassau County, New York. The parcels that comprise the site are privately owned and contain existing commercial uses. The site would require the demolition and removal of existing structures for the construction of the onshore substation. The site also includes some vegetation consisting of primarily grasses, shrubs, and patches of trees. The site is bounded by Long Beach Road to the east, Reynolds Channel to the south, and the LIRR to the north and west.

The EW 2 Onshore Substation C site would be developed within an approximately 5.2 ac (2.1 ha) portion of the property, with a maximum main building/equipment height of 60 ft (18 m). EW 2 Onshore Substation C includes a 26-ft (8-m) high perimeter wall along southern boundary of the site to shield views from the south.

## AA.2.1 Cable Bridge Crossing

An above-water cable bridge may be utilized to support an inland waterway crossing between Island Park and Oceanside, New York, along a portion of EW 2 Route IP-F or along a portion of EW 2 Route IP-G. A representative cable bridge drawing is shown in **Figure AA-12**.

At the location adjacent to the LIRR railway bridge, the cable bridge would have a maximum height of approximately 30 ft (9 m) above MSL. The other potential location is adjacent to the Long Beach Road bridge, at which the cable bridge is anticipated to have a maximum height of 30 ft (9 m) above MSL.

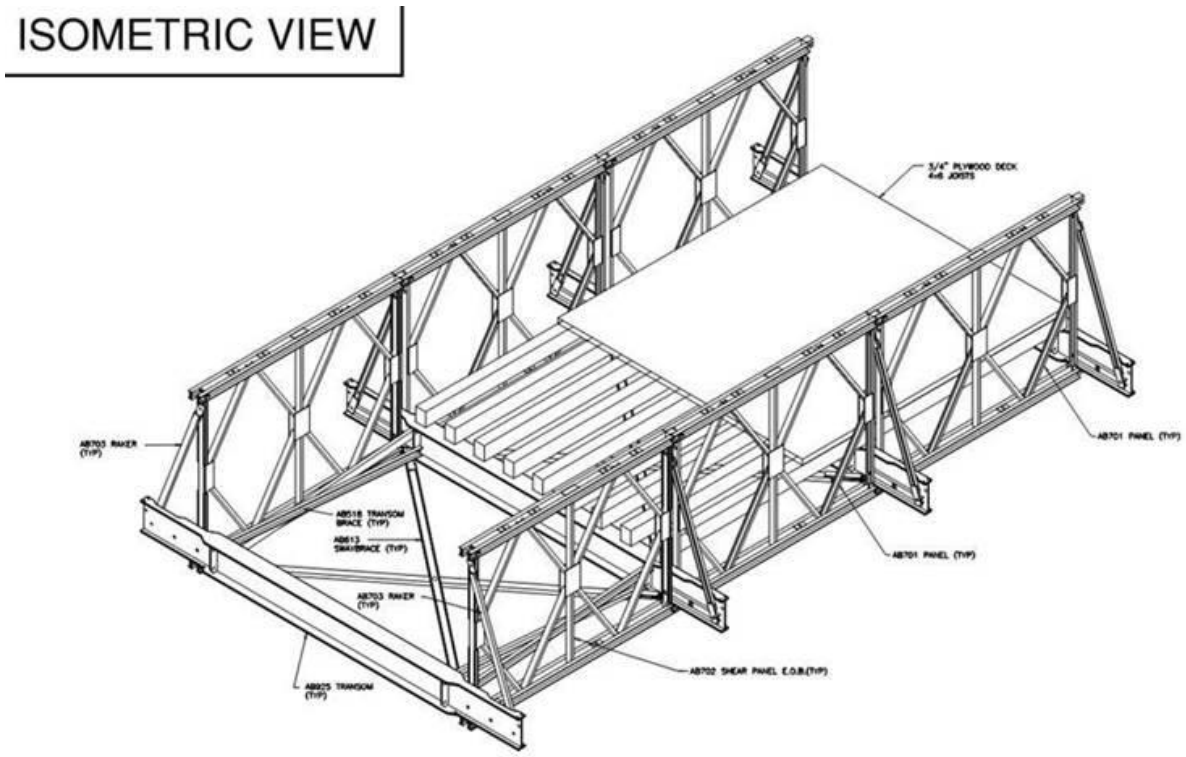



**Figure AA-12 Conceptual Diagram of Cable Bridge**

### AA.2.2 O&M Base

The O&M Base will be designed to comply with applicable state and federal building codes, electrical standards, and environmental conditions to the extent practicable.[7] For the purposes of this VIA, a conceptual layout and design was developed. Empire is considering the development of up to two enclosed buildings to support O&M operations, to be constructed within an approximately 4.5-ac (1.8-ha) portion of the property, with a maximum main building height of 49 ft (15 m). The design of the O&M Base evaluated in this VIA is based on conservative assumptions.

## AA.3 REGULATORY SETTING

Several federal, state, and local agencies have regulatory authority over the Project, based on the location of the different Project components. The wind turbines, interarray cables, and offshore substations will be located entirely within federal waters of the United States and within the OCS, and are under the jurisdiction of BOEM. The submarine export cables will be located in both federal waters and New York state waters. The onshore export and interconnection cables and onshore substations will be located in New York.

### AA.3.1 Federal and State

#### AA.3.1.1 BOEM's National Environmental Policy Act Review

Assessments of visual resources are required to support BOEM's National Environmental Policy Act review process for an offshore wind energy lease. BOEM's *Guidelines for Information Requirements for a Renewable Energy*

[7] In the event that certain standards cannot be met, variances will be sought through the appropriate regulatory mechanisms.

*Construction and Operations Plan* (BOEM 2016) indicate that the visual resource assessment should apply appropriate viewshed mapping, photographic simulations, and field inventory techniques to determine, with reasonable accuracy, the visibility of the proposed project to sensitive and scenic viewpoints.

In the COP Guidelines, BOEM provides recommended approaches for assessing visual and aesthetic resources during the permitting phase of offshore wind projects. Specific components of these guidelines include the following:

- The VIA must include an assessment of all currently proposed and future phases of development. This includes accurate and realistic photographic and virtual simulations, computer simulations, in addition to field inventory techniques and delineation of the onshore viewshed to determine the visibility of the Project. Simulations should illustrate sensitive and scenic viewpoints. Evaluate vantages from:
  - Variable heights at and above the beach and shoreline;
  - Variable heights at and above known protected areas (see 30 Code of Federal Regulations §§ 585.627(a)(5) and (6));
  - Variable heights at and above potential places or areas that are eligible for entry onto historic lists;
  - Land cover types or frequented locations along the coastal area that are not directly on the beach;
  - How seasonal sun angles, times of day, and meteorological conditions affect the above; and
  - Describe the potential visual impacts to any coastal prehistoric or historic resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places.
- The VIA should address key design elements, including:
  - Visual uniformity;
  - Use of tubular towers; and
  - Proportion and color of wind turbines.
- The applicant must address FAA and USCG-required lighting while minimizing visibility from shore, such as through the use of directional aviation lights.
- The applicant must seek public input in evaluating the visual site design elements of the proposed facility.

As demonstrated in **Figure AA-15**, the potentially affected areas fall within federal waters of the United States and New York state waters. Therefore, to support the VIA, Empire has coordinated with stakeholders that have an interest in visual resources, including BOEM, NPS, NY SHPO, NYSDEC, NJ HPO, and NJDEP (see **Appendix B Summary of Agency Engagement** for additional information). As part of this outreach, Empire provided background information on the Project, including the scope, as well as the methodology proposed to identify, inventory and evaluate visual resources within the Project Area. Stakeholder feedback was used to inform the Visual Study Areas, as well as confirm the methodology and baseline characterization, and to inform Empire's planning and mitigation measures.

### AA.3.1.2 Coastal Zone Management Program

The National Coastal Zone Management Program (CZMP) was established as part of the Coastal Zone Management Act which was enacted in 1972 to address issues associated with continued growth in coastal zones (NOAA 2019). The CZMP comprehensively addresses the nation's coastal issues through a voluntary partnership between the federal government and coastal and Great Lake states and territories and provides the basis for "protecting, restoring, and responsibly developing our nation's diverse coastal communities and resources" (NOAA 2019). Permitting systems are established to control activities that affect coastal resources. Jurisdictions that oversee these permitting systems vary state-by-state but generally fall within one of two categories: state-only jurisdiction or shared state and local jurisdiction (Rath 2018). New York shares permitting

jurisdiction with local governments while New Jersey is a state only jurisdiction. As the Lease Area is geographically located nearest the coast of New York and certain project elements occur within New York State waters, a consistency determination with the New York Coastal Management Program will be required. Empire also proposes to file a voluntary consistency determination with the State of New Jersey due to the geographic proximity of the Lease Area.

**New York State Coastal Management Program: Policy 24 and 25**

In 1982, the New York State Coastal Management Program (CMP) was created to establish the boundaries of the Coastal Area within which the CMP applies, describe the organizational structure to implement the CMP, and provide a set of statewide policies enforceable on all State and Federal agencies which manage resources and coordinate actions along the State's coastline (NYC 2019a). New York CMP Policy 24 aims to prevent the impairment of Scenic Areas of Statewide Significance (SASS) identified by the CMP (NYSDOS 2017). Policy 24 outlines evaluation methods to determine whether a project would impact these resources and provides guidelines to comply with this policy. In this case, impairments to scenic resources are defined as:

- The irreversible modification of geologic forms; the destruction or removal of vegetation; the modification, destruction, or removal of structures, whenever the geologic forms, vegetation or structures are significant to the scenic quality of an identified resource; and
- The addition of structures which because of siting or scale will reduce identified views or which because of scale, form, or materials will diminish the scenic quality of an identified resource.

There are no SASSs identified within the Visual Offshore Study Area (see Section AA.4.1.1). The closest SASS is located at the eastern end of Long Island, near Montauk (NYSDOS 2019).

Policy 25 aims to protect, restore, and enhance natural and human-made resources that contribute to the overall scenic quality of the coastal area (NYSDOS 2017). These resources are not identified as SASS, though the same compliance guidelines and evaluation methods in Policy 24 apply to this Policy.

The New York State CMP also encourages local communities to prepare and adopt local waterfront revitalization programs. These local programs provide a more detailed implementation of the State's program through local planning, zoning and review processes. Local waterfront revitalization programs were identified within the Visual Onshore Study Areas (see Section AA.4.1.2) and are discussed in Section AA.3.2.

**New Jersey Coastal Management Program**

The New Jersey CMP applies to a coastal area that includes the lands and waters within the seaward limit of the state's territorial sea, the waters of the Hudson and Delaware rivers, and tidal portions of tributaries to these seas and rivers (Rath 2018). The New Jersey CMP is administered by the NJDEP through a permit system that applies to most coastal development. The New Jersey CMP and the CZM rules are founded on eight broad coastal goals and supplemented by related policies to obtain each goal. The five goals and policies associated with visual and scenic resources include:

**Goal 1: Healthy coastal ecosystems.**

i. Protect, enhance and restore coastal habitats and their living resources to promote biodiversity, water quality, aesthetics, recreation and healthy coastal ecosystems; and
ii. Manage coastal activities to protect natural resources and the environment.

**Goal 2: Effective management of ocean and estuarine resources.**

i. Administer the safe and environmentally sound use of coastal waters and beaches to protect natural, cultural and aesthetic resources, promote safe navigation, and provide recreational opportunities.

**Goal 3: Meaningful public access to and use of tidal waterways and their shore.**

i. Preserve and enhance views of the coastal landscape to enrich aesthetic and cultural values and vital communities.

**Goal 5: Coastal open space.**

i. Preserve, enhance and restore open space including natural, scenic, historic and ecologically important landscapes that: Protect valuable wildlife and plant habitats and ecosystem health, foster aesthetic and cultural values.

**Goal 6: Safe, healthy and well-planned coastal communities and regions.**

i. Manage coastal activities and foster well-planned communities and regions that: Preserve and restore significant historic and cultural resources and aesthetic coastal features.

### AA.3.2 Local Land Use Plans and Guidance

Development of the onshore facilities in the Project Area will be guided by applicable land use plans. Land use plans reviewed for relevant guidelines and policies include:

- *Vision 2020: New York City Comprehensive Waterfront Plan* (NYC 2011) – applicable to the EW 1 onshore substation site;
- *Waterfront Revitalization Program* (NYC 2016), *Nassau County Master Plan* (Nassau County 2010) – applicable to the EW 2 Onshore Substation A and Substation C sites; and
- *Long Island South Shore Estuary Reserve Comprehensive Plan 2021* (CMP 2001) – applicable to the EW 2 Onshore Substation A and EW 2 Onshore Substation C sites.

Additional plans reviewed as they pertain to various key observation point (KOP) locations include:

- *Monmouth County Master Plan* (Monmouth County 2016), and
- *Township of Neptune Comprehensive Master Plan* (Neptune Township 2011).

#### AA.3.2.1 Vision 2020: New York City Comprehensive Waterfront Plan

*The Vision 2020: New York City Comprehensive Waterfront Plan*, updated every ten years, provides guidance on expanding the use of New York City waterfront areas for parks, housing and economic development and opening up the waterways for transportation, recreation and natural habitat. The plan provides citywide policies and site-specific recommendations and is organized into eight overarching goals with strategies for achieving them. Goals associated with enhancing visual and scenic resources include:

- **Goal 1**: **Expand public access to the waterfront and waterways on public and private property for all New Yorkers and visitors alike.** Parks, piers, esplanades, beaches, and other kinds of publicly accessible spaces on the shoreline provide opportunities for recreation, relaxation, sightseeing, and waterfront events. The City has dramatically expanded publicly accessible waterfront space since 1992, and it plans to secure even more waterfront access, taking fuller advantage of New York's unique geography and allowing residents and visitors to experience our city as a waterfront metropolis. Not only do we want more places where people can reach the water's edge, we also seek additional spots where people can gain access to the water itself.

- **Goal 6: Enhance the public experience of the waterways that surround New York – Our Blue Network.** Our waterways are a great resource, and Vision 2020 proposes to better connect people with them—physically, visually, and culturally. Increasing waterborne transportation, promoting water recreation, and creating the waterfront infrastructure needed for events, cultural activities, and educational programs will allow residents and visitors to engage more fully with the Blue Network and help New York realize its potential as a great waterfront city.

The plan also includes several neighborhood reach[8] strategies. The reach strategies include specific projects that will enhance public access, maritime industry, water recreation, the natural environment, new development, and other activities (NYC 2011). The EW 1 onshore substation site is located within Sunset Park which falls within Reach 14 south (Brooklyn Upper Bay South). Neighborhood strategies for Sunset Park are primarily focused on providing access to the waterfront where feasible and enhancing the marine and industrial use within the area.

### AA.3.2.2 Waterfront Revitalization Program

The New York City Waterfront Revitalization Program (WRP) establishes the City's policies for waterfront planning, preservation and development projects to ensure consistency over the long term. The goal of the WRP is to maximize the benefits derived from economic development, environmental conservation and public use of the waterfront, while minimizing any potential conflicts among these objectives (NYC 2019b). The WRP includes policies that are intended to protect and enhance scenic resources:

- **Policy Nine: Protect scenic resources that contribute to the visual quality of the New York City coastal area.**
  9.1 Protect and improve visual quality associated with New York City's urban context and the historic and working waterfront.
  - Ensure that new buildings and other structures are compatible with and add interest to existing scenic elements, such as landmarks, maritime industry, recreational boating facilities, natural features, topography, landforms, and the botanic environment. Among the measures that may be considered are grouping or orienting structures to preserve open space and maximize views to and from the coast and incorporating sound existing structures into development where harmonious with their surroundings.
  - Where feasible and practicable, provide views of visually interesting elements of water dependent uses.
  - New development should be compatible with the scenic elements defining the character of the area. The New York City Zoning Resolution provides standards for waterfront landscaping.
  - Preserve existing vegetation or establish new vegetation where necessary to enhance scenic quality.
  - Minimize introduction of uses that would be discordant with existing scenic elements, and screen unattractive aspects of uses that detract from the visual quality of nearby public parks and waterfront open spaces.
  - Provide public viewing at and interpretive signage of industrial uses where compatible and appropriate.

[8] The *Comprehensive Waterfront Plan* of 1992 divided the city's waterfront into 22 segments or reaches (a nautical term for a continuous expanse of water). The Vision 2020 plan includes strategies for enhancing public access, maritime industry, water recreation and other activities.

### AA.3.2.3 Long Island South Shore Estuary Reserve Comprehensive Plan 2021 (CMP 2001)

Originally implemented in 2001, The Long Island South Shore Estuary Reserve Comprehensive Management Plan is the result of The Long Island South Shore Estuary Reserve Act passed in 1993 creating the Long Island South Shore Estuary Reserve (Reserve). The Act also implemented the Long Island South Shore Estuary Reserve Act Council (Council) whose task was to design a Comprehensive Management Plan (CMP 2001) to protect the reserve and its inhabitants. This CMP emphasizes the importance of the Long Island South Shore Estuary Ecosystem and outlines actions necessary to preserve, protect, and enhance the natural, recreational, economic, aesthetic, and educational resources that the reserve provides. The Plan discusses various components such as:

- **Action 2.3.8: Reduce negative environmental consequences of duck sludge and other legacy pollutants through removal and/or restoration.** The restoration of former duck farms represents an important opportunity to…improve aesthetic and environmental conditions for nearby neighborhoods and provide County residents with the opportunity to access these waterways for recreational and educational purposes.
- **Action 4.3.4: Increase end-of-street parks and parking access to the shoreline.** Implement projects that create parks at the end of streets and in vacant lots, provide public parking access, and provide benefits such as improved aesthetics and public access. Parks that utilize green infrastructure best management practices can also contribute to water quality improvement.

### AA.3.2.4 Nassau County (NY) Master Plan

*The Nassau County Master Plan* (2010) is a centers-oriented plan with the idea that the county should spur economic development by strengthening downtowns, revitalizing underutilized commercial properties, and redeveloping brownfields to preserve the quality of life for residents by protecting environmental, scenic, and historic resources.

Within the Master Plan it notes that Nassau County supports sustainable development through integrated energy, environment, housing, economic development, and transportation programs. Comprehensive planning will manage patterns of development to benefit residents of the County. Sustainable growth should balance development while protecting the environment, encouraging social and economic equity, and conserving energy and water resources. As Nassau County explores and manages the development of renewable energy resources, careful analysis and planning should be undertaken first to identify the most beneficial projects with the greatest chance of success. Considerations should be given for including visual impacts (Nassau County 2010).

### AA.3.2.5 Monmouth County (NJ) Master Plan

*The Monmouth County Master Plan* (2016) is a tool to help guide efforts and actions that contribute to a strong, stable, and sustainable prosperity for the community. The 2016 plan continues to build on previous master plan documents and focuses on redevelopment, revitalization, and rediscovery of communities through the county.

**Goal: Promote the protection and conservation of natural and cultural resources to help guarantee our long-term sustainability.**

**Objectives:**

- Encourage county and municipal actions to identify, promote, and protect natural resources and significant natural features, unique areas, critical habitats, and the potential or known habitats of resident and migratory populations of rare, endangered, and threatened species, particularly those that have municipal, county, or statewide significance.

- Protect, conserve, and enhance the county's significant, diverse, natural, and scenic resources utilizing sound ecological protection and restoration measures.
- Protect habitat and ecological diversity by encouraging the preservation of large, contiguous tracts of land.
- Encourage the sustainable use of public lands in concert with natural resource protection.

**Goal: Promote beneficial development and redevelopment that continues to support Monmouth County as a highly desirable placed to live, work, play and stay.**

**Objectives:**

- Support efforts that increase sustainable infrastructure capacity to accommodate population change, replace aging systems, and encourage investments that provide for safe, sound, resilient, and reliable utility service.

### AA.3.2.6 Township of Neptune (NJ) Comprehensive Master Plan

*The Township of Neptune Comprehensive Master Plan* (2011) was developed to provide planning goals of a more general and qualitative nature, providing a framework for development and preservation of the township throughout its scenic, historic, and natural areas. The Township of Neptune Comprehensive Master Plan provides goals and recommendations for future development while preserving natural and historic resources:

- Promote aesthetic and site improvements in the Township's major commercial and industrial areas.
- Guide the redevelopment and development of the remaining large parcels and scattered vacant sites within neighborhoods to ensure proposed uses support existing uses without adverse impact in terms of land use compatibility, traffic, economic, and aesthetic impacts.
- Promote an attractive visual environment in Neptune Township through appropriate standards within the land development ordinances.
- Encourage the underground installation of above-ground utilities, wherever possible.
- Promote an attractive visual environment in Neptune though the identification of appropriate locations for future utility installations as well as ensuring appropriate screening for above-ground utilities.
- Protect the visual quality of scenic corridors throughout the Township.
- Evaluate the corridors depicted (Fletcher Lake, Wesley Lake) for potential designation as scenic corridors, and consider adopting appropriate design standards and guidelines for development along designated corridors.

## AA.4 RESOURCE INVENTORY

BOEM methodology and guidelines were not available at the time this VIA was prepared; therefore, a standard inventory and assessment approach that applied certain elements of the U.S. Bureau of Land Management (BLM) Visual Resource Management (VRM) system was used for this VIA (BLM 2018). As noted in Section AA.3, the inventory and assessment approach used for this VIA was supported through engagement with BOEM, NPS, NY SHPO, NYSDEC, NJ HPO, and NJDEP. The BLM VRM system is widely used for a variety of projects and, with some modifications, has been applied successfully to projects that do not occur on lands under the jurisdiction of the BLM.

Key steps in the methodology include establishing a study area, inventorying visual resources in the study area, identifying sensitive viewing locations and KOPs,[9] conducting fieldwork to assess the existing visual character of the landscape, and to inventory KOPs, creating visual simulations, and assessing impacts and mitigation.

## AA.4.1 Visual Study Area

The visual study area was identified based on locations from which offshore Project components are potentially visible and noticeable to the casual observer. The "casual observer" is considered to be an observer who is not actively looking or searching for the Project facilities but is engaged in activities at locations with potential views of the Project, such as hiking, driving on a scenic road, or relaxing on a beach.

The proposed visual study area for the offshore Project components was discussed with and accepted by federal and state agencies prior to commencing the visual inventory and assessment.

The following sections describe how the offshore and onshore visual study areas were identified.

### AA.4.1.1 Visual Offshore Study Area

At the time this assessment was originally developed, visual assessments conducted for proposed offshore wind farms in the United States had applied study areas that ranged from approximately 25 to 30 mi (40 to 48 km), depending on the size of the proposed wind turbine, the wind turbine layout, and the surrounding landscape (Sullivan et al. 2013, Deepwater Wind 2012, and BOEM 2015). A study prepared for BOEM also found that small to moderately sized wind facilities (wind farms with wind turbine hub [nacelle] heights ranging from approximately 219 to 295 ft (67 to 90 m) above mean sea level (aMSL) "were noticeable to casual observers at distances of almost 18 mi (29 km); and were visible with extended or concentrated viewing at distances beyond 25 mi (40 km)" (Sullivan et al. 2013). The findings of this study were based on observations of operational wind farms in Europe with wind turbines that were smaller than those proposed for the Project; therefore, consideration of a larger study area is appropriate for this VIA.

The theoretical limit of visibility of the representative wind turbines was used to establish the Visual Offshore Study Area and was determined by the distance between the viewer and the structure, the height of the structure, the elevation of the viewer, and the curvature of the earth.[10] **Figure AA-13** shows a scaled graphic demonstrating how the representative wind turbines will disappear below the horizon, accounting for curvature of the earth, based on viewer distance, from the perspective of a viewer at sea level (on the beach).[11] The nacelle (hub), full rotor blades and the tower are shown as visible above the horizon at 17 mi (27.4 km) for the representative wind turbines. At this distance, the foundation and the lower portion of the tower would fall below the horizon line. The nacelle (hub) is shown as visible just above the horizon line at 32 mi (51.5 km) for the representative wind turbine. Therefore, the lights on the nacelle are also located just above the horizon line and are potentially visible. At 35 mi (56 km), only the top portion of a blade of the representative wind turbine in the upright position is above the horizon line. At 44 mi (70.8 km), it is anticipated that most turbines will be unnoticeable from this distance.

[9] Key observation points are discussed in Section AA.4.3.3.
[10] Curvature of the Earth is discussed in Section AA.5.1.2.
[11] **Figure AA-13 and Figure AA-14** do not account for atmospheric refraction.

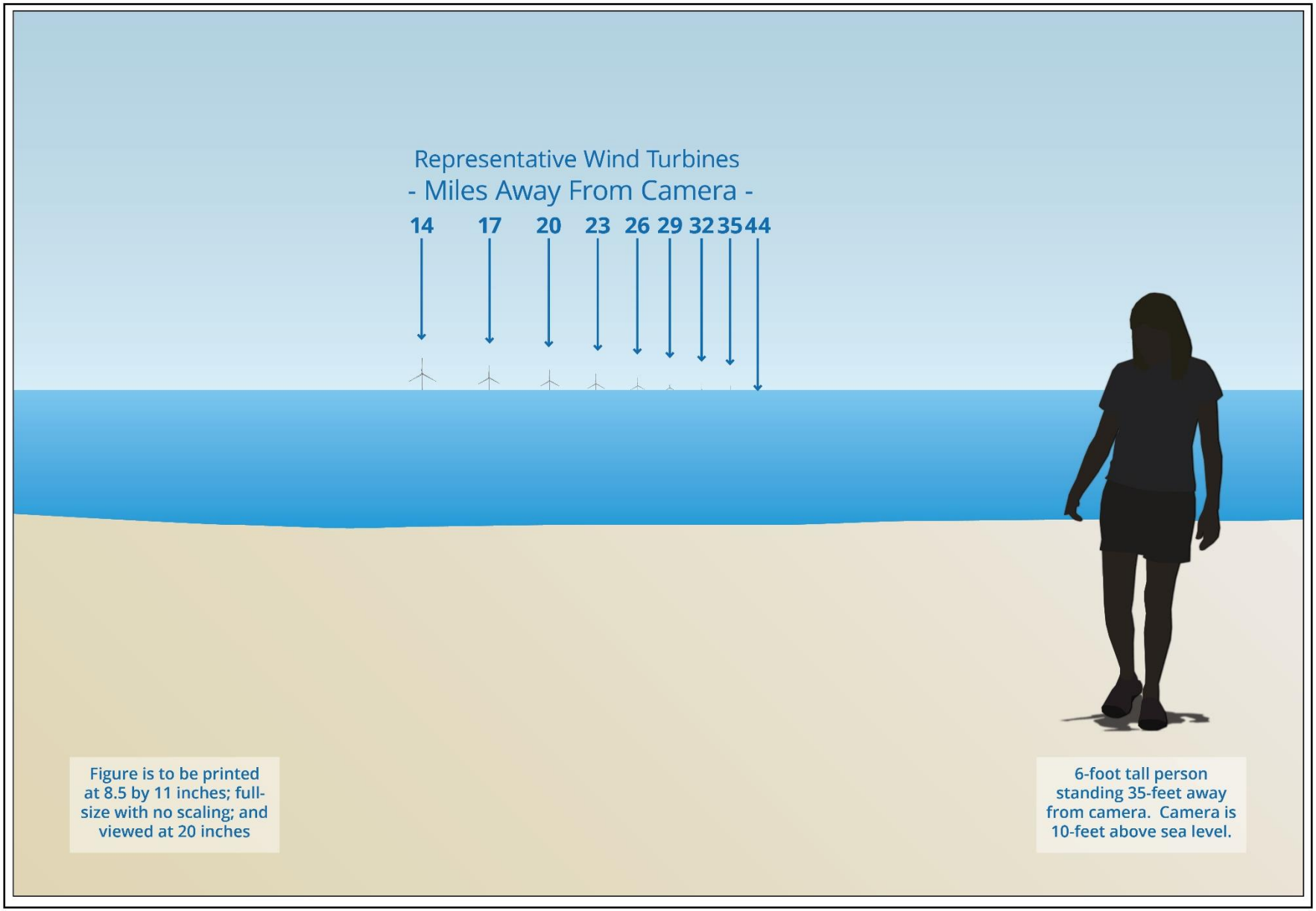



**Figure AA-13 Turbine Visibility at Varying Distances**

**Figure AA-14** is a similar scaled graphic, showing the wind turbines at varying distances based on a photograph from a coastal beach location.[12] Although it is anticipated that the thin form of the rotor blades of the representative wind turbines will not be noticeable or perceived by the casual observer, the use of the 44-mi (70.8-km) Visual Offshore Study Area around the Lease Area was used as a conservative estimate, as the proposed wind turbine generators will be mostly unnoticeable from this distance. This Visual Offshore Study Area consists of western Long Island including all of Kings, Queens, Bronx, Richmond, and Nassau counties and the western half of Suffolk County, , and the southern portion of Westchester County. In New Jersey, the Study Area encompasses all of Hudson County, most of Monmouth County, northeastern Ocean County, and portions of Bergen, Passaic, Essex, Union, and Middlesex counties. The location and extent of the Visual Offshore Study Area is illustrated in **Figure AA-15**.

Conditions that may vary with seasonality and/or time of day, such as atmospheric conditions and lighting angle that may reduce potential visibility, were not considered in establishing the Visual Offshore Study Area in order to be conservative. However, they were considered when evaluating visual impacts. Other factors affecting Project visibility are discussed in Section AA.5.1.2.

**Offshore Viewshed Analysis**

The locations from which the wind turbines will be potentially visible based on a topographic (**Figure AA-16**) and vegetated (**Figure AA-17**) viewshed analysis conducted using the representative wind turbines. It is important to note that **Figure AA-13** and **Figure AA-14** are based on the perspective of a viewer at sea level. Angle of observation refers to the angle between the viewer's line of sight and an object's location. Angles of observation are typically described as inferior (in which viewers are situated at a lower elevation than the object), level (in which viewers are at the same elevation as the object), and superior (in which viewers are situated at a higher elevation than the object). While **Figure AA-13** and **Figure AA-14** are helpful to inform views from the beaches, land masses within the 44-mi (70.8-km) Visual Offshore Study Area, including Fire Island, Manhattan Island, and the southern coast of Long Island, New York and New Jersey, have varying topography and structures with some superior views toward the Project from potentially sensitive viewpoints. When distance from the wind turbines is consistent, viewers at higher elevations (superior views) will see larger portions of the wind turbines when compared to viewing conditions at beach level. Therefore, a viewshed analysis was performed to inform how topography, as well as vegetation and development will influence potential views of the wind turbines.

[12] **Figure AA-13 and Figure AA-14** are meant to be printed at a specific size and viewed at a specific distance as noted on the graphics.


**Figure AA-14 Perspective Simulation**

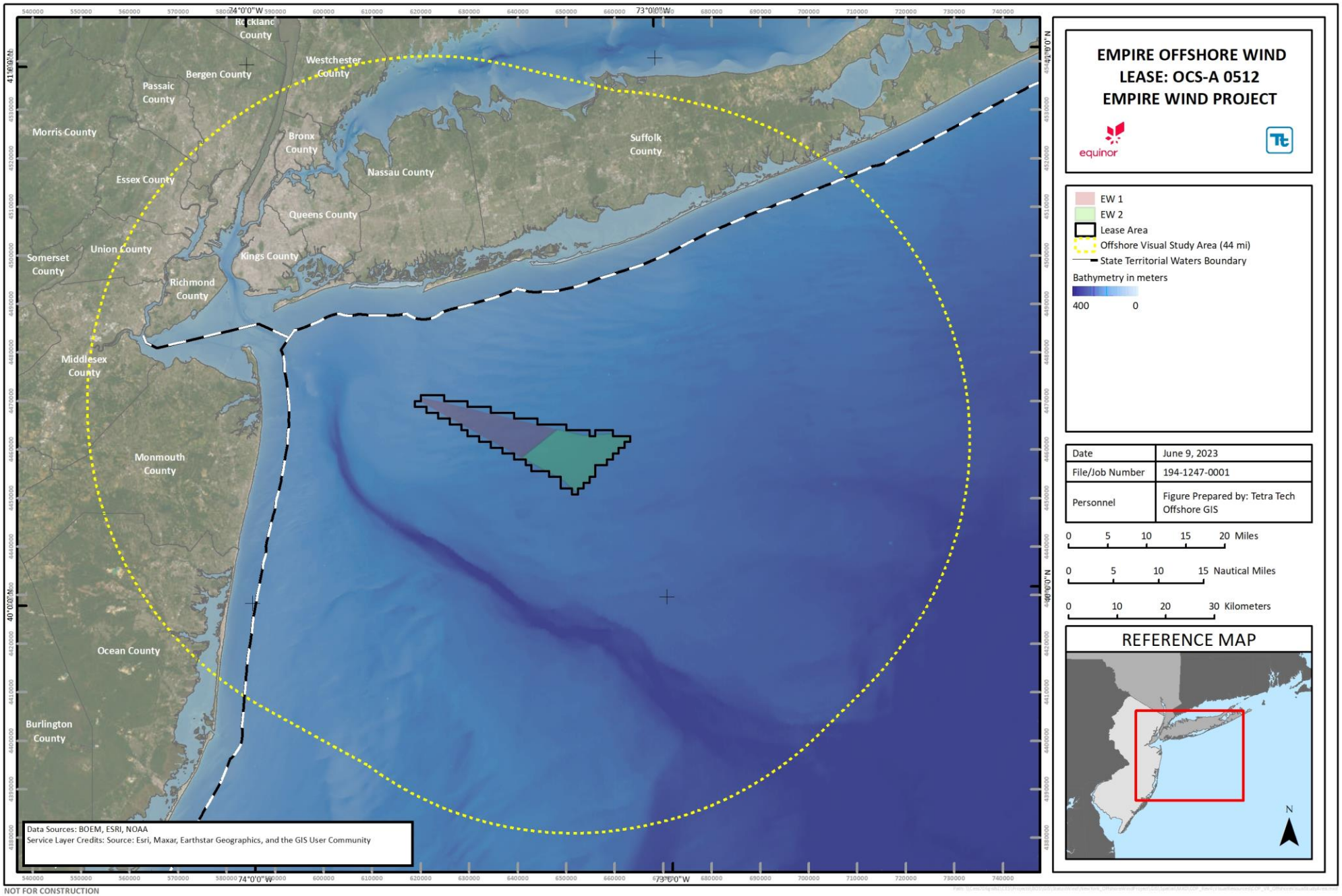



**Figure AA-15 Visual Offshore Study Area**

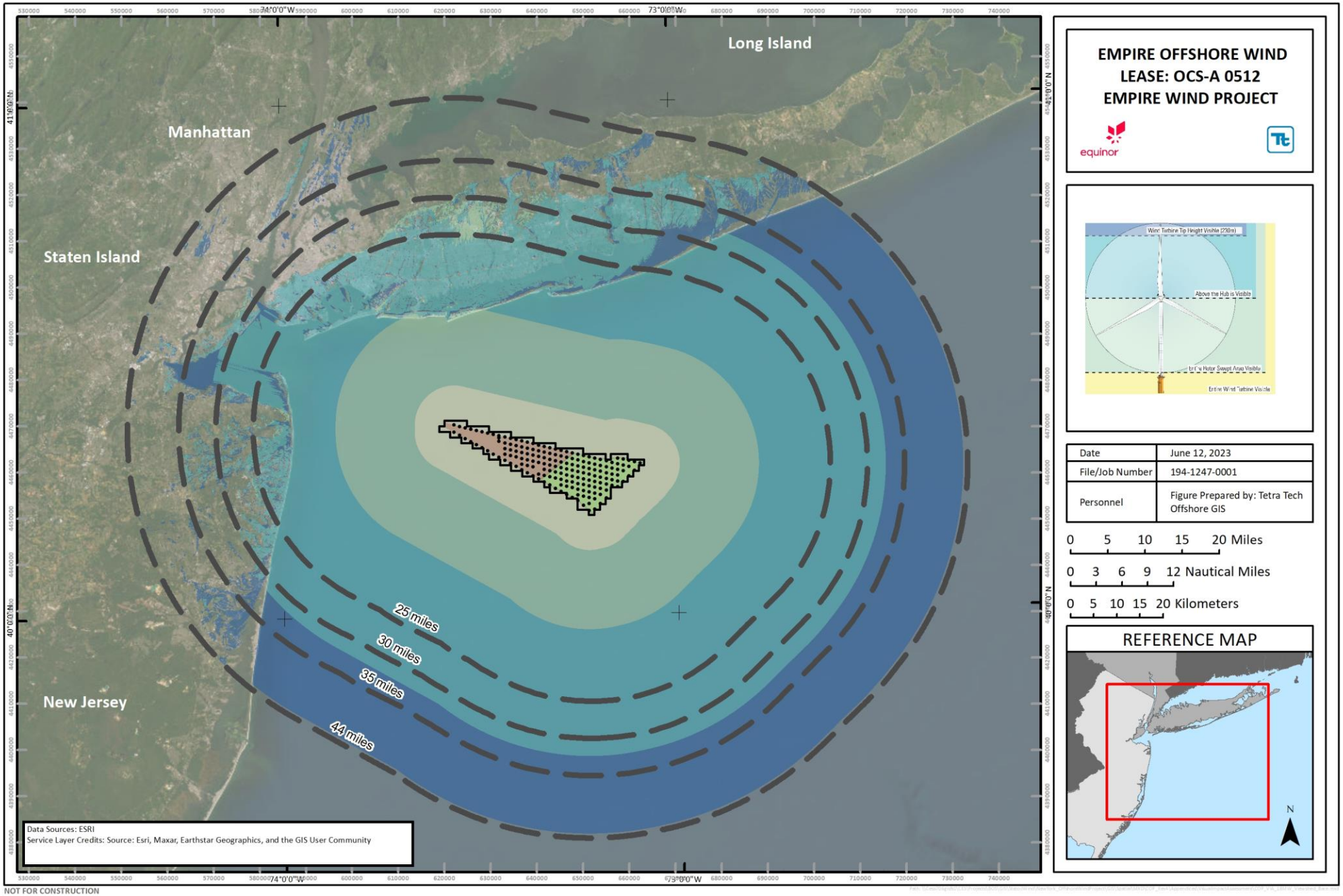



**Figure AA-16 Representative Wind Turbine Layout Topographic Viewshed Analysis**

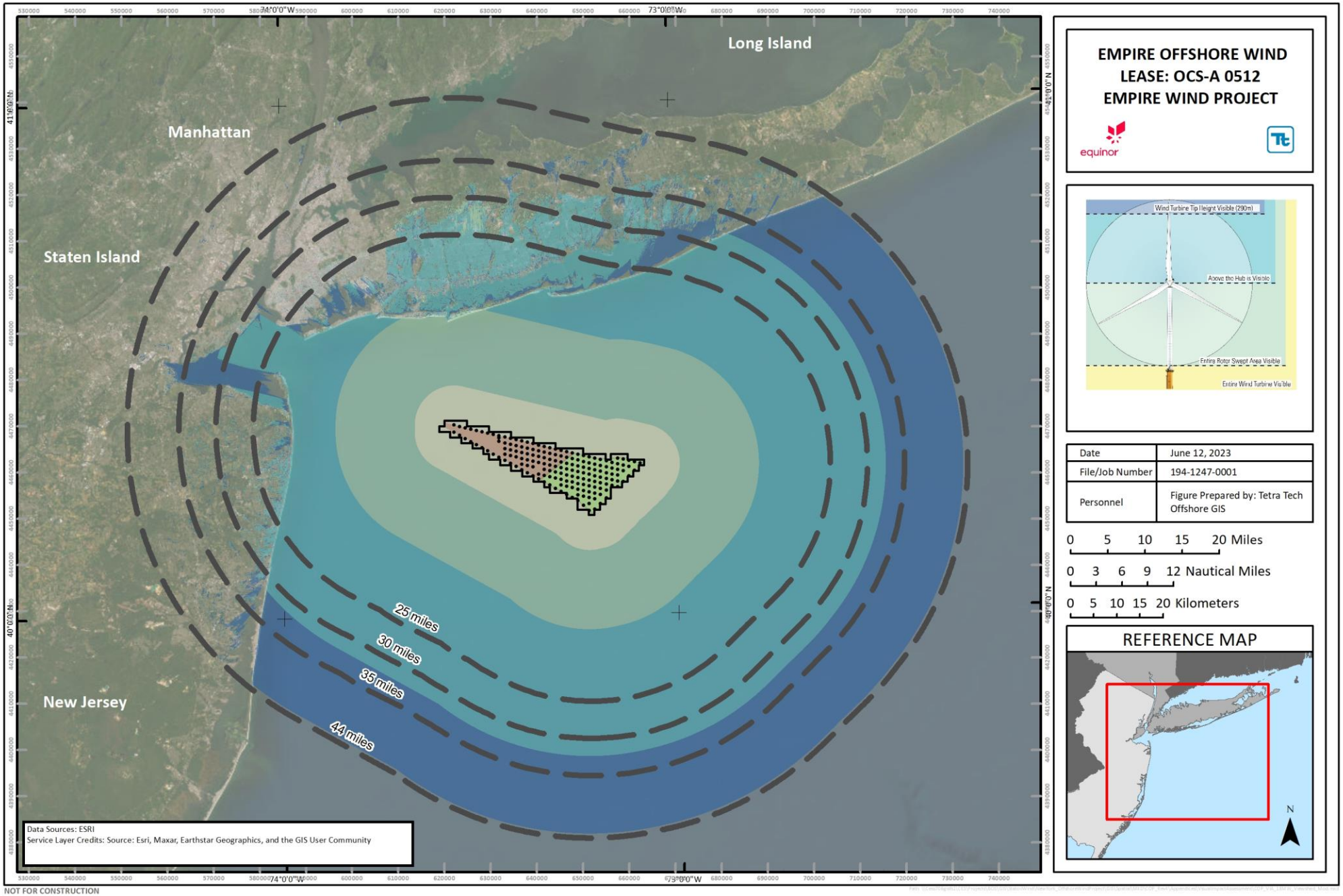



**Figure AA-17 Representative Wind Turbine Layout Refined Viewshed Analysis**

**Figure AA-16** shows the topographic viewshed analysis for the representative wind turbine. This analysis was conducted using ESRI ArcGIS Pro 2.2.0 software with the Spatial Analyst extension to process 10 m Digital Elevation Models (DEM) based on the National Elevation Dataset and height zones of visible components of the wind turbines (foundation, entire rotor swept area, hub, and maximum blade tip). The topographic viewsheds represent "bare earth" conditions and were developed from wind turbine locations looking out to determine areas with potential visibility. The viewsheds accounted for both curvature of the earth and refraction, using the default values identified in the software. **Figure AA-16** shows potential visibility zones for the offshore wind turbines based on distance and topography only. The bare-earth modeling approach used in the viewshed analysis, based only on the effects of terrain on visibility, results in a conservative assessment of potential visibility. Locations at sea within approximately 5.5 mi (8.9 km) of the representative wind turbines potentially have unobstructed views of the entire wind turbine from water level to the tip of the blade (including base and hub lighting). It is anticipated that most wind turbines will not be visible from land masses outside of the 44-mi (70.8-km) Visual Offshore Study Area. In the areas shown in green, the entire rotor swept area will potentially be visible plus some portion of the tower. In the areas shown in light blue, only the nacelle (where nighttime lights will be also located) and the upper blades will be potentially visible. In the areas shown in dark blue, only the tips of the blades will be potentially visible. It is important to note that these zones indicate potential visibility based on topography only and do not account for vegetation or development. **Figure AA-17** accounts for the screening effects of vegetation and development. The computer generated viewshed analysis is a conservative representation of visibility and may not always match actual conditions on the ground. Many of these locations will be fully or partially obscured by vegetation and/or development such as buildings and infrastructure when visited in the field.

To supplement the topographic viewshed analysis, a viewshed accounting for vegetation and building heights was also developed to identify areas within the Visual Offshore Study Area where potential screening may be provided by buildings. This viewshed helped to focus inventory and field visit efforts based on existing conditions (i.e., without-Project) within the landscape. The viewshed accounting for vegetation and building heights was derived using a similar process as the topographic viewsheds described above. However, for this viewshed, LANDFIRE vegetation data and building footprints for New York City, Suffolk County, Nassau County in New York, and Monmouth County in New Jersey were incorporated into the DEM model to represent surface elevations. The building footprint information obtained for New York City contained building heights. Other data sources obtained[13] did not contain building height information. For data sets that did not contain building heights, an assumed height of 17 ft (5.2 m) was used to represent a conservative height of an approximately one-story building across the building footprints. Visibility results based on the viewshed analysis accounting for building heights that was conducted using the representative wind turbines is shown in **Figure AA-17**.

### AA.4.1.2 Visual Onshore Study Area

A 4-mi (6.4-km) Visual Onshore Study Area was used to review potential visibility of each of the onshore substations, onshore export and interconnection cables, and O&M Base. For onshore substations in a relatively flat area that is heavily developed and/or wooded, such as the ones proposed for the Project, a smaller visual study area would typically be used to assess potential visibility. The use of a 4-mi (6.4-km) Visual Onshore Study Area for this Project was determined by the location of the EW 1 onshore substation site and O&M Base, as well as the EW 2 Onshore Substation C site, being adjacent to open water (i.e., Upper Bay, Reynolds Channel).[14]

[13] Data sources used to develop the viewsheds are noted in Section AA.8.

[14] While the O&M Base will serve both EW 1 and EW 2, the base will be located at the South Brooklyn Marine Terminal, adjacent to the EW 1 onshore substation, and will therefore be included within the EW 1 Onshore Study Area for the purposes of this analysis.

The use of a larger visual study area captures the western shore of the bay, where visual receptors may have unobstructed views toward the Project across open water. The 4-mi (6.4-km) Visual Onshore Study Area for each onshore substation was maintained across all onshore substation sites for consistency. The focus of the visual analysis was modified for each onshore substation site based on the results of the viewshed analysis and field reconnaissance.

The onshore export and interconnection cables associated with each of the proposed onshore substation sites will be entirely underground, with the exception of the cable bridge crossing, and installed under existing roadways. During construction, short-term impacts will occur. Unless paving of the entire roadway occurs, contrast in color (new vs. old paving) may be noticeable. A 150-ft (46-m) right-of-way would be maintained along this interconnection cable route. Construction areas associated with underground cable installation will be restored to a condition similar to that before construction and no significant long term visual impacts are anticipated.

**Onshore Viewshed Analysis**

The viewsheds for the onshore substation sites and O&M Base were derived using a similar process as the viewsheds noted in Section AA.4.1.1 and were conducted using ESRI ArcGIS Pro 2.2.0 software with the Spatial Analyst extension to process 10 m Digital Elevation Models based on the National Elevation Dataset. Viewsheds for the onshore substations and O&M Base were developed from the perimeter of each site looking out using the tallest proposed building/equipment height: 49 ft (15 m) for the EW 1 onshore substation and O&M Base and 60 ft (18 m) for both the EW 2 Onshore Substation Aand EW 2 Onshore Substation C sites[15] to determine areas with potential visibility. The site perimeter and height were used as a worst case, as the conceptual onshore substation layouts and O&M Base will most likely change (become more refined) during final design. Viewsheds run from the site perimeter provides the most conservative indication of potential visibility and was therefore used in the onshore viewshed analysis.

Similar to the offshore viewshed analysis, the onshore viewsheds used vegetation and building footprints of New York City, Suffolk County, and Nassau County in New York, and Monmouth County in New Jersey to identify areas within the Visual Onshore Study Areas where potential screening may be provided by buildings. Furthermore, viewsheds for the EW 2 Onshore Substation A and EW 2 Onshore Substation C sites used the same building/equipment footprints and accounted for vegetation.[16] Potential visibility results based on the viewshed analyses that were conducted for the EW 1 onshore substation and O&M Base and both the EW 2 Onshore Substation A and EW 2 Onshore Substation C sites are shown in **Figure AA-18**, **Figure AA-19**, and **Figure AA-20**, respectively.

## AA.4.2 Inventory Components

The inventory of visual resources considered the existing landscape and scenery, and the viewers and KOPs within the Visual Offshore and Onshore Study Areas. These visual components are described below.

[15] The use of 49 ft (15 m) and 60 ft (18 m) building heights for EW 1 and EW 2, respectively, was based on the tallest proposed building used for each of the conceptual substation layouts.
[16] Buildings were accounted for within the viewshed, using building footprints from Microsoft JSON data for Suffolk and Nassau counties. Suffolk and Nassau counties used an assumed height of 17 ft (average residential home height).

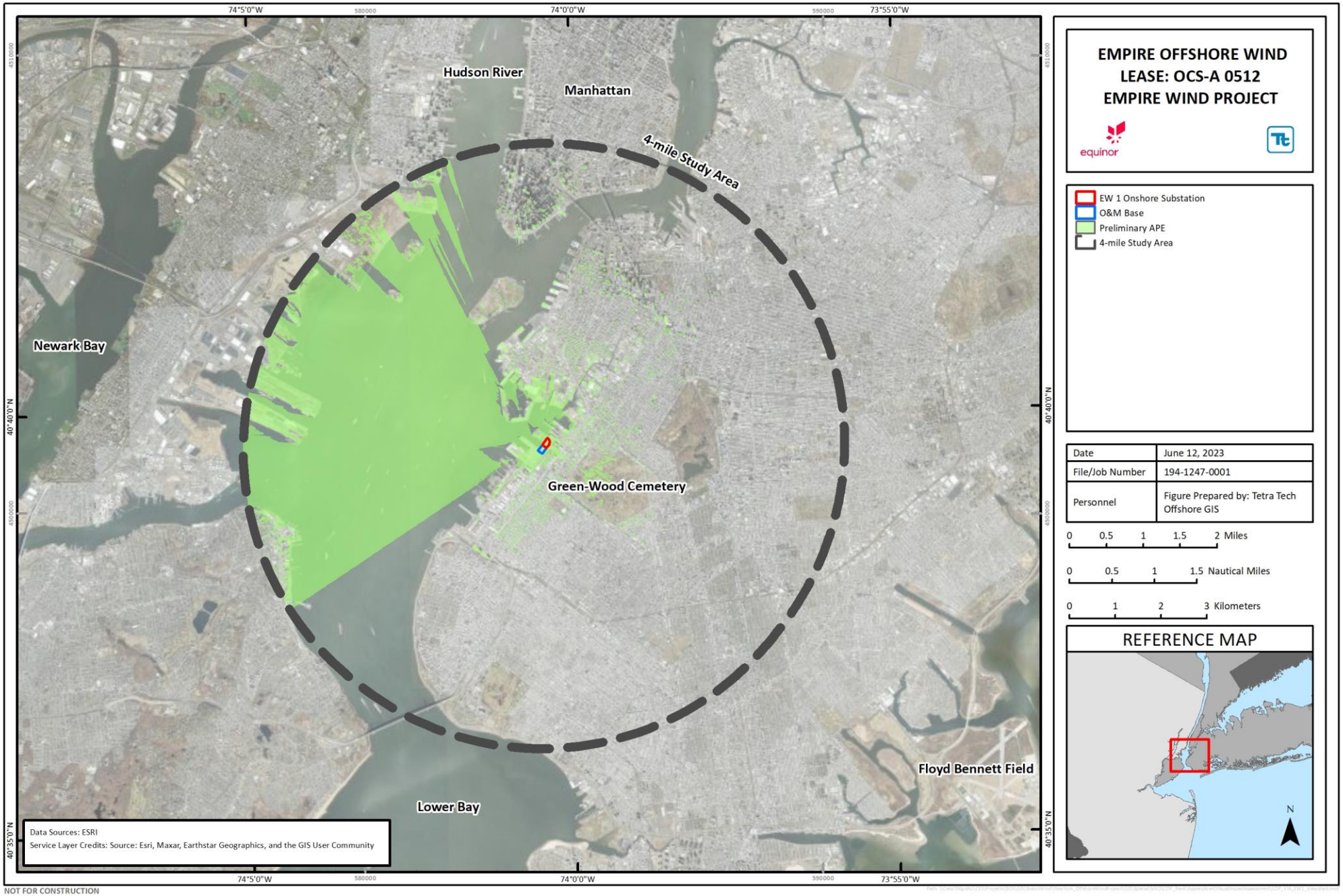



**Figure AA-18 EW 1 Onshore Substation and O&M Base Conceptual Layout Refined Viewshed Analysis**

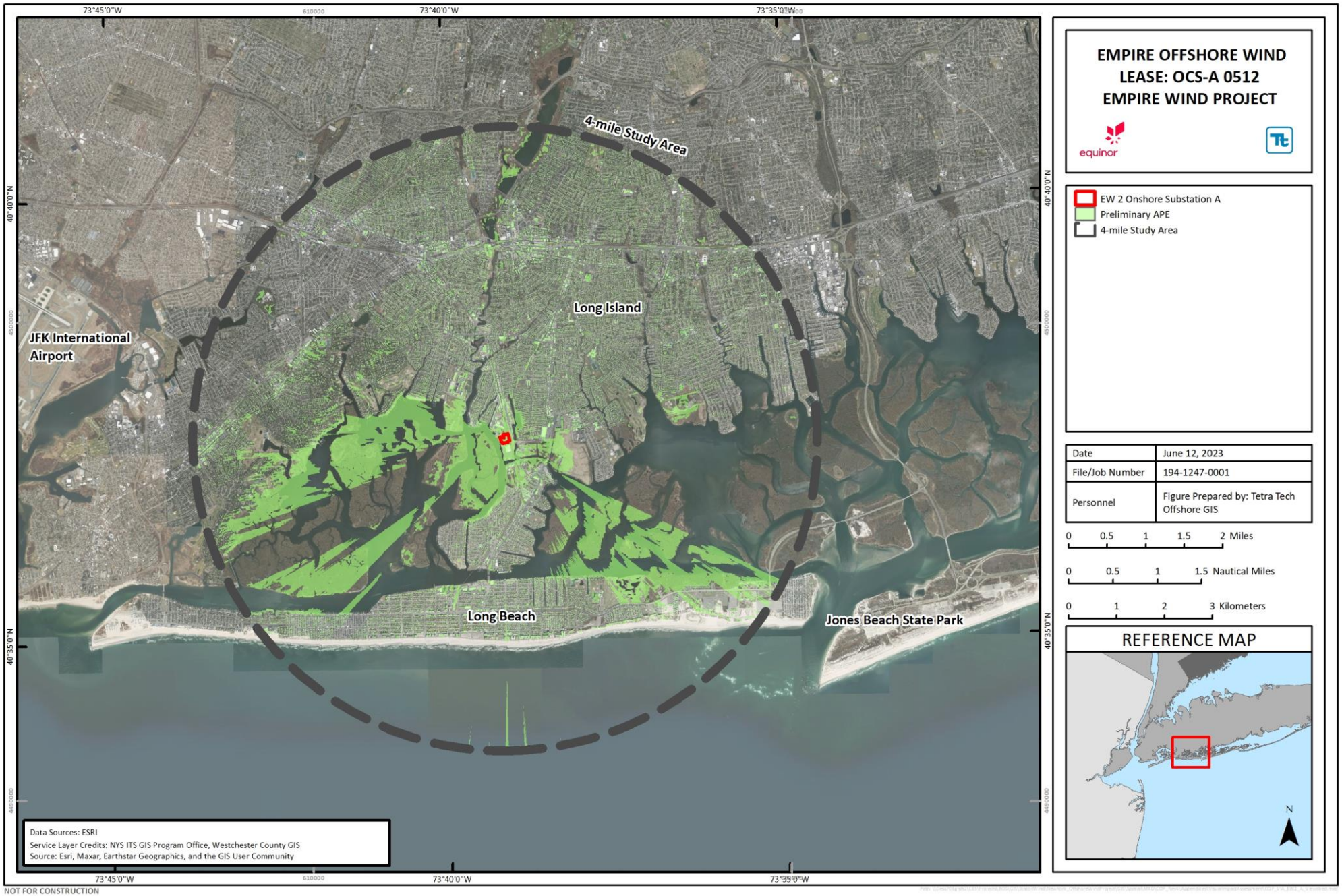



**Figure AA-19 EW 2 Onshore Substation A + Hampton Road Substation Conceptual Layout Refined Viewshed Analysis**

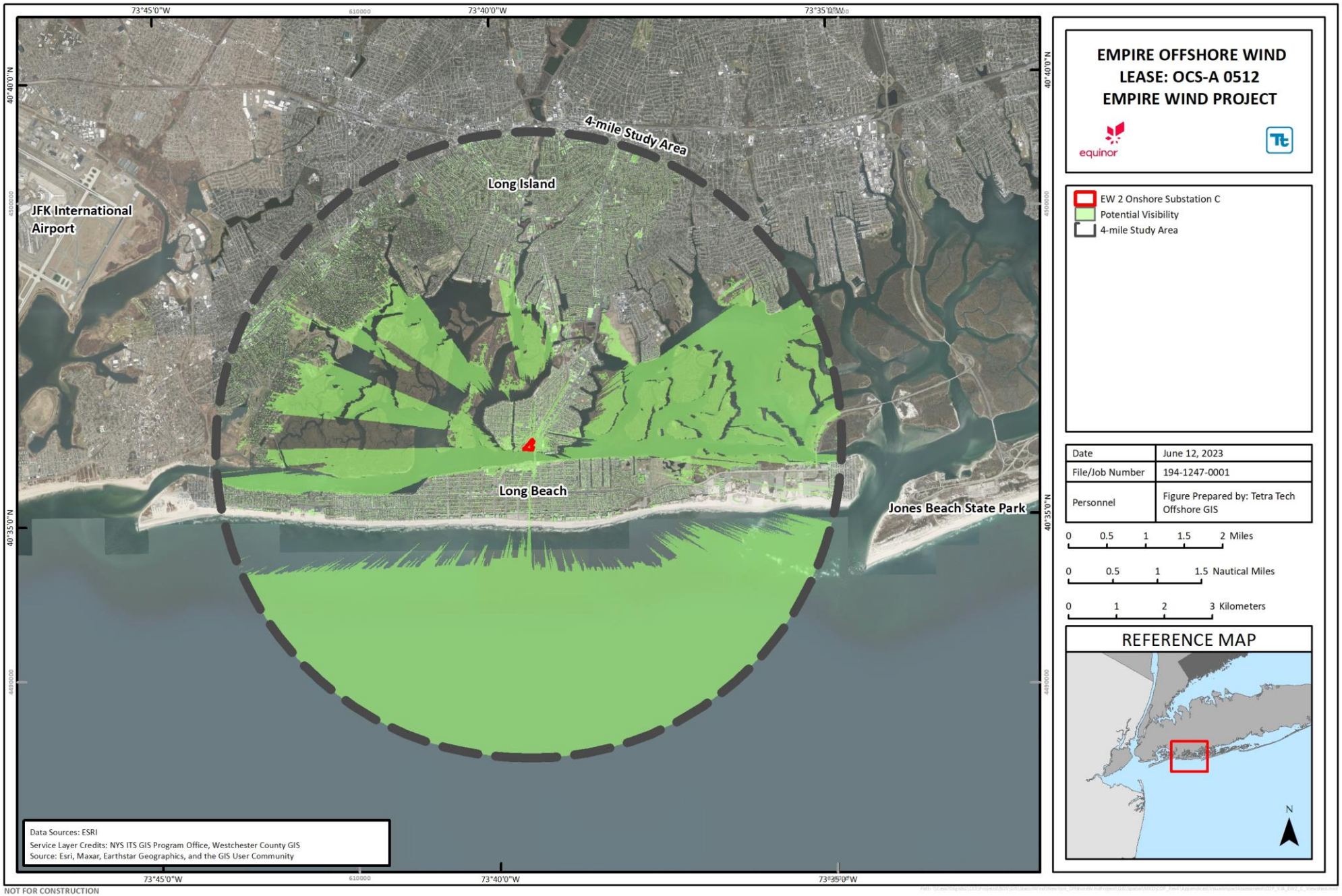



**Figure AA-20 EW 2 Onshore Substation C Conceptual Layout Refined Viewshed Analysis**

### AA.4.2.1 Landscape and Scenery

Scenery is the aggregate of features that give character to the landscape (BLM 1984). Typically, every landscape is comprised of varying characteristics of landform, vegetation, existence of water, color, scarcity, adjacent scenery, and cultural modifications; all of which combine to exhibit landscape character (BLM 1986a). Existing conditions in the Visual Study Areas were evaluated by means of aerial photography and field reconnaissance to determine where and to what extent cultural modifications have affected natural settings. Existing conditions observed during the inventory processes are described in Section AA.4.3.

### AA.4.2.2 Sensitive Viewers/Key Observation Points

The term "sensitive viewers" refers to specific user groups associated with various land uses that have a sensitivity to landscape change, and therefore could be adversely affected by the construction and operations of the Project. In this regard, viewing locations are typically associated with key travel routes, recreation areas, and residential areas. Key observation points represent critical or typical viewpoints within, or along, an identified viewing location and are used to assess the visual effect of a proposed project. The sensitivity of viewers at each KOP is based on the type of use and expected concern for aesthetics. Identifying groups of individuals that will likely be sensitive to visual changes is an important part of the visual assessment process and helps to define specific locations from which to assess changes to the visual character of the landscape. The inventory considered: 1) the most critical viewpoints (i.e., views from communities, residential areas, and recreational areas); 2) views from scenic areas specifically identified in local planning documents; and 3) views that best represent the general area or landscape setting.

### AA.4.2.3 Field Visits

Field visits to the Visual Study Areas were conducted to properly assess the existing visual character of the landscape and to inventory current conditions at a set of sensitive viewing locations. The field inventory included three components: 1) identification and photo-documentation of sensitive viewing locations; 2) classification of visual sensitivity at the locations visited; and 3) description of expected Project visibility from locations visited. Following the field inventory, a subset of the sensitive viewing locations was selected as representative KOPs for use in the impact evaluation. An initial field visit to the Visual Offshore Study Area was conducted between November 4 and November 13, 2018. Additional field visits were conducted between June 3 and June 6, 2019 to complete the visual resource inventory for offshore components by visiting and photo-documenting locations identified through agency and stakeholder outreach, and to capture nighttime photography and video documentation for the 24-hour time lapse video simulations (discussed in Section AA.5.1.3). Field visits to the EW 1 Visual Onshore Study Area occurred on September 18, 2019. Additional field visits occurred to the EW 2 Onshore Substation A Visual Onshore Study Area on February 5, 2021 and to the EW 2 Onshore Substation C Visual Onshore Study Area on September 2, 2021.

A panorama (overlapping series of photos) was captured at each location visited in the field. **Attachment AA-1, Table AA-1-1**, and **Table AA-1-2** provide the locational details for photographs taken during the field visit and a description of the existing views for the locations initially identified as potentially sensitive within the Visual Study Areas, as follows:

- Visual Offshore Study Area – 40 locations total:
  - 30 locations in New York; and
  - 10 locations in New Jersey; and

- Visual Onshore Study Areas – 30 locations total:
  - 9 locations within the study area for the EW 1 onshore substation site and O&M Base;

- 10 locations within the study area for the EW 2 Onshore Substation A site; and
- 11 locations within the study area for the EW 2 Onshore Substation C site.

## AA.4.3 Summary of Inventory Results

The following sections describe the existing environment in the Visual Offshore and Onshore Study Areas. Existing conditions were evaluated by means of aerial photography and field reconnaissance to determine where modifications have affected natural settings.

### AA.4.3.1 Landscape Character/Existing Conditions

#### Regional Landscape Character

The existing landscape character provides the context for assessing the effects of changes to the landscape. Landscape character is identified and described by the combination of the scenic attributes that make each landscape identifiable or unique. A region's landscape character creates a sense of place and describes the visual image of an area. To assess impacts to the landscape's visual character and quality, it is important to establish the context for the visual environment at both a regional level and at a project-specific level.

U.S. Environmental Protection Agency Level IV ecoregions of New York and New Jersey were used to develop a description of the existing landscape character within the Visual Study Areas. Ecoregions provide a convenient foundation for describing visual character at the regional level because they are defined based on multiple elements similar to those used in the BLM's VRM for inventorying and assessing scenic quality (BLM 1986a). These factors include physiographic elements of landform, vegetation, and water, and cultural modifications, defined as human/man-made modifications to the landscape. Level IV ecoregions of New York and New Jersey that cross the Visual Offshore Study Area include: Cape Cod/Long Island, Pine Barrens, Barrier Islands/Coastal Marshes, Inner Coastal Plain, New England Coastal Plains and Hills, Long Island Sound Coastal Lowlands, Glaciated Triassic Lowlands, and Hackensack Meadowlands. The Visual Onshore Study Areas include the Barrier Islands/Coastal Marshes, Southern New England Coastal Plains and Hills, Glaciated Triassic Lowlands, and Long Island Sound Coastal Lowland ecoregion. Landscape conditions within these Level IV ecoregions are discussed below.

*Cape Cod/Long Island*

This ecoregion is characterized by level to rolling plains with some steeper slopes on moraines, islands, coastal bays and inlets, dunes, beaches, tidal flats, numerous small lakes and ponds, and low-gradient streams and rivers; most of the ecoregion has been modified by urbanization (Bryce et al. 2010). Elevation for most of this ecoregion is less than 115 ft (36.6 m) aMSL. Vegetation type consists of sandplain and dune woodlands, sandplain heathlands and grasslands, sand dune grasslands, swamps and bogs, and saltmarshes. Cultural modifications in this ecoregion include urban development and development associated with coastal tourism and sport and commercial fishing. The landscape character of the ecoregion is mixed but is dominated by residential coastal community character. Public lands within this ecoregion include Calverton Pine Barrens State Forest, Longwood State Forest, Rocky Point Pine Barrens Preserve, and Otis Pike Preserve, which are all located in New York.

Portions of the Visual Offshore Study Area that are within this ecoregion include the central and eastern portion of Long Island, New York.

*Atlantic Coastal Pine Barrens*

This ecoregion is characterized by gently undulating, low-elevation coastal plain and distinguished by sandy, droughty, infertile soils, and extensive pine-oak woodlands (Woods et al. 2007). Streams occur throughout this

ecoregion, which are fed by a large aquifer of fresh water supplied by precipitation. Vegetation type consists of pine-oak forests in upland areas and include pitch pines, shortleaf pines and various oak species. Low-lying areas support white cedar swamps, swamp hardwoods, pitch pine lowlands, and mineral-poor fens. Cultural modifications in this ecoregion include residential and commercial development and agriculture.

Portions of the Visual Study Areas that are within this ecoregion include inland northern New Jersey and Long Island, New York.

*Barrier Islands/Coastal Marshes*

This ecoregion is characterized by flat to gently sloping plains, coastal bays and inlets, islands, bluffs, dunes, beaches, tidal flats, and marshes (Bryce et al. 2010). Elevation for this ecoregion is less than 50 ft (15.2 m) aMSL. Vegetation type consists of coastal forests that include a variety of oaks, maple, pitch pine and American holly, dune grass along beaches, and salt marshes with saltmeadow, spike-grass, and saltmarsh rush. Cultural modifications include urban development and development associated with coastal tourism and sport and commercial fishing. The barrier islands also serve as important nesting sites for several endangered or threatened birds. Public lands within this ecoregion include Fire Island National Seashore, located in New York, Gateway National Recreation Area, located in New York and New Jersey and several state parks.

Portions of the Visual Study Areas that are within this ecoregion include the southern coast of Long Island, New York, and the eastern coast of New Jersey.

*Inner Coastal Plain*

This ecoregion is characterized by undulating plains dominated by agriculture, urban development, and transportation infrastructure (Woods et al. 2007). Vegetation type includes mixed oak and beech oak forests in upland areas, however, much of the natural vegetation has been cleared for development or converted to agriculture. Lowland areas include marshlands with cattails and wild rice. Cultural modifications include residential and agricultural uses, with the primary products including corn, wheat, soybeans, vegetables, dairy, and poultry.

Portions of the Visual Study Areas that are within this ecoregion include inland New Jersey.

*Southern New England Coastal Plains and Hills*

This ecoregion is characterized by irregular plains with some low hills. Ponds, small lakes, reservoirs, streams and wetlands are abundant throughout the ecoregion (Bryce et al. 2010). Elevation for this ecoregion ranges between 40 to 800 ft (12.2 to 243.8 m) aMSL. Vegetation type consists of Appalachian oak-pine forests and hardwoods, swamps, and vegetation associated with small river floodplains, including oak, sycamore and maples. Cultural modifications include urban, suburban, and rural residential land, and some crop lands.

Portions of the Visual Offshore Study Area that are within this ecoregion include Manhattan Island, New York.

*Long Island Sound Coastal Lowland*

This ecoregion is characterized by flat to irregular plains, coastal beaches, bays, tidal flats, and low gradient streams (Bryce et al. 2010). Elevation is less than 250 ft (76.2 m) aMSL. Vegetation types consists of oak-hickory or oak-tulip forests in upland areas, and red maple, sweet gum and pin oak occur in wetter areas. Coastal bluffs consist of pitch pine, eastern red cedar, oaks and hickory. Low dunes consist of beach grass and goldenrod, and low marshes consist of cordgrass and spike grass. Cultural modifications include urban, dense suburban and some rural residential development. Coastal resorts and development associated with coastal tourism and sport and commercial fishing also occur in this ecoregion.

Portions of the Visual Study Areas that are within this ecoregion include the western portion of Long Island and a portion of the southern coast of New York.

*Glaciated Triassic Lowlands*

This ecoregion consists of flat to irregular plains, moist depressions, low hills, ridges and streams (Bryce et al. 2010). Vegetation type consist of fragmented woodlands transitional between Appalachian oak forest and hemlock-northern hardwood forests, serpentine barrens-grassland-savanna communities, and swamps with cottonwood and oaks. Cultural modifications include mostly urban areas in New York, with some agriculture and nursery crops. Public lands include Great Kills Park, located on Staten Island in New York.

Portions of the Visual Offshore Study Area that are within this ecoregion include the mid and eastern portion of Staten Island, New York.

*Hackensack Meadowlands*

This ecoregion consists of low-lying wetland, marshes, freshwater ponds, lagoons and tidal creeks (Bryce et al. 2010). Elevation within this ecoregion is primarily 10 ft (3.0 m) aMSL or less, with some area such as outcrops or landfills reaching up to 100 ft (30.5 m) aMSL. Vegetation includes cattail, phragmites, saltmarsh cordgrass, and goldenrod. Cultural modifications include industrial and commercial development, landfills, and wildlife habitats and fisheries.

Portions of the Visual Offshore Study Area that are within this ecoregion include the western portion of Staten Island, New York.

**Offshore Project Area**

The offshore Project Area is located entirely within the Atlantic Ocean. This area is characterized by broad expanses of open water. The surface of the water varies from smooth and relatively level during calmer weather to undulating and choppy during more turbulent weather conditions. Also varying with weather conditions is the color of the water's surface, which can range from blue to silver to dark gray. Existing human-made visual intrusions that are evident near offshore Project components include marine vessel traffic coming and going from New York harbor, including barges, container ships, cruise ships, commercial and recreational fishing, recreational boating, and ferry transportation. In addition, buoys, channel markers and warning lights are located within and around the offshore Project components.

**Onshore Project Area**

*EW 1 Onshore Substation*

The EW 1 onshore substation site is an approximately 4.8 ac (1.9 ha) parcel located at the north end of SBMT, which is located west of 2nd Avenue between 29th and 39th streets in Brooklyn, New York. The existing Gowanus POI, which will support the interconnection of the Project to the existing electrical grid, is located approximately 400 ft (122 m) to the northeast of EW 1 onshore substation. The topographic character of the Project Area is relatively flat and ranges from approximately 5.9 ft (1.8 m) aMSL to approximately 10.8 ft (3.3 m) aMSL elevation NAVD88. The parcel on which the EW 1 onshore substation is proposed to be located consists of paved parking lot and storage area. The onshore substation site is surrounded by a large warehouse to the north, a parking lot, 2nd Avenue and commercial and industrial buildings to the east, open asphalt area and warehouse to the south, and Upper Bay to the west. A railroad also runs along the eastern boundary of EW 1. Vegetation is limited and includes scattered short green grasses and bushy shrubs along the shore of the bay ranging from approximately 10 to 15 ft (3 to 5 m) in height and 3 to 8 ft (1 to 2 m) in width, and weeds that

have grown up through cracks in the pavement. The EW 1onshore substation is in a highly urbanized area that is characterized by several warehouses, commercial buildings, and industrial facilities.

*EW 2 Onshore Substation A*

The EW 2 Onshore Substation A site is an approximately 6.4-ac (2.6-ha) parcel located north of Daly Boulevard and situated mostly between Hampton Road to the west and Lawson Boulevard to the east. The existing National Grid POI, which will support the interconnection of the Project to the existing electrical grid, is southeast of the EW 2 Onshore Substation A site. The topographic character of the Project Area ranges from approximately 3.2 ft (1 m) aMSL to 31.9 ft (9.7 m) aMSL elevation NAVD88. The parcel on which the EW 2 Onshore Substation A site is proposed is currently within an industrial setting and is not vegetated. The EW 2 Onshore Substation A site is surrounded by Patriot Recycling to the north, a railroad and commercial development to the east, Daly Boulevard to the south, and Hampton Road to the west. The Oceanside POI, also owned by National Grid and operated by PSEG LI, is located approximately 0.1 mi (0.2 km) southeast. The EW 2 Onshore Substation A site is located in an urban area characterized by a mixture of industrial, commercial, and residential development.

*EW 2 Onshore Substation C*

The EW 2 Onshore Substation C site is an approximately 5.2 ac (2.1 ha) parcel located adjacent to Long Beach Road. The existing National Grid POI, which will support the interconnection of the Project to the existing electrical grid, is located to the north. The topographic character of the Project Area ranges from approximately 0 ft (0 m) aMSL to 11.1 ft (3.4 m) aMSL elevation NAVD88. The portion of the parcel on which the EW 2 Onshore Substation C site is proposed is currently developed with several commercial businesses. Areas that are undeveloped are vegetated primarily with low growing weeds, grasses and shrubs and scattered trees. The EW 2 Onshore Substation C site is surrounded by buildings to the north and is located in an urban area characterized by a mixture of industrial, commercial, and residential development.

*Cable Bridge*

The cable bridge crossing is proposed to be located at Barnum Channel adjacent to the LIRR rail bridge, between Long Beach Road and Daly Boulevard. The crossing is proposed to be located in an industrial and commercial area and is bordered to the east by the existing commuter LIRR, to the east and south by the E.F. Barrett Power Station, to the west by a body of water, and to the north by commercial development which includes a gas station and parking lot. An existing pedestrian bridge on the E.F. Barrett property crosses above the existing LIRR. Vegetation is limited to the banks on either side of Barnum Channel and includes scattered short grasses. The cable bridge is in a highly urbanized area that is characterized by commercial buildings and industrial facilities.

An alternative cable bridge crossing (Route IP-I) of Barnums Channel would be constructed adjacent to the west side of the Long Beach Road bridge. The crossing is proposed to be located in a commercial and industrial area and is bordered to the east by the existing Long Beach Road bridge, to the south by commercial development, to the west by a body of water, and to the north by industrial development. Vegetation is limited to the banks on either side of Barnum Channel and includes scattered short grasses. The cable bridge is in a highly urbanized area that is characterized by commercial buildings and industrial facilities.

*O&M Base*

The O&M Base is proposed to be located on an approximately 4.5-ac (1.8-ha) parcel located at the north end of SBMT, immediately adjacent to the EW 1 onshore substation, located west of 2nd Avenue and between 29th and 39th streets, in Brooklyn, New York. The topographic character of the Project Area is relatively flat and

ranges from approximately 5.9 ft (1.8 m) aMSL to approximately 10.8 ft (3.3 m) aMSL elevation NAVD88. The parcel on which the O&M Base is proposed to be located consists of a paved parking lot and storage area. The O&M Base site is surrounded by a large warehouse to the north; a parking lot, 2nd Avenue, and commercial and industrial buildings to the east; an open asphalt area and warehouse to the south; and Upper Bay to the west. A railroad also runs along the eastern boundary of the site. Vegetation is limited and includes scattered short green grasses and bushy shrubs along the shore of the bay ranging from approximately 10 to 15 ft (3 to 5 m) in height and 3 to 8 ft (1 to 2 m) in width, and weeds that have grown up through cracks in the pavement. The O&M Base is in a highly urbanized area that is characterized by several warehouses, commercial buildings, and industrial facilities.

### AA.4.3.2 Viewer Types and Characteristics

This section provides a general description of the key viewer groups in the Visual Study Areas who might experience the visual effects of the Project. Distinctions among user groups and their expected sensitivity to landscape changes, based on activity types and viewing characteristics, are standard components of a VIA.

Viewer concern can vary depending on the characteristics and preferences of the viewer group. For example, residential viewers are expected to have high concern for changes in views from their residences. Motorists' and commuters' concern generally depends on when and where travel occurs, and the type of travel involved (e.g., commuting vs. recreational travel).

Scenic views designated in land use plans adopted by federal, state, or local government entities typically formalize a widely recognized visual value of a resource and the public's desire to protect that value (e.g., a designated wilderness or scenic area). Where such official designated lands exist, the public expectation is that the view at the location or of the identified resource will be preserved, and the viewer concern is considered high.

In general, the types of viewers present within the Visual Study Areas are classified as local residents, travelers, and tourists and recreational users. The following discussion summarizes the composition of these groups and their characteristics that are relevant to the visual assessment.

#### Local Residents

The local residential viewer groups consist of people who live within the Visual Study Areas. Many local residents are present on a year-round basis, whereas some have permanent residences elsewhere and are seasonal residents. Generally, they view the landscape from their yards and homes, and often from places of employment while engaged in daily activities. Residents of primary interest for the analysis are located along or near the southeastern coast of Long Island and the barrier islands[17] of New York, and the eastern coast of New Jersey within the 44-mi (70.8-km) Visual Offshore Study Area. Onshore, residents of primary interest for the analysis are located in residential neighborhoods close to the onshore Project components.

Regardless of their residence location, local residents may have similar reactions to views of the Project facilities. Residents' sensitivity to visual quality can be variable and may be tempered by the visual character and setting of their neighborhoods. For example, residents with a view of existing commercial or industrial facilities may respond differently to landscape changes associated with Project facilities than those with a view of open ocean or forested areas. It is assumed, however, that local residents are generally familiar with the local landscape and may be more sensitive to changes in particular views that are important to them.

[17] Barrier islands include Long Beach, Jones Beach, and Fire Island.

**Travelers**

Travelers passing through an area typically view the landscape from motor vehicles on their way to work or other destinations. Travelers include daily commuters and people engaged in various types of business or personal travel.

Commuters traveling within the analysis area view the landscape from motor vehicles and LIRR on their way to work or other business destinations. Within the Visual Offshore Study Area, this viewer group is rather large because of the large population and major employment centers within the analysis area. Commuting activity occurs all throughout the Visual Study Areas since much of the area is developed and near New York City, a major metropolitan area. Commuters do not tend to stop along their travel routes, have a relatively narrow field of view because they are focused on road and traffic conditions, and are destination-oriented. Passengers in commuter vehicles would have greater opportunities for prolonged off-road views toward landscape features and, accordingly, may have greater perception of changes in the visual environment.

Through travelers are typically moving, have a relatively narrow field of view, and are destination-oriented. They would be concentrated on the major roads that traverse the analysis area, including Interstates 95, 287, 295, 468, 495, and Route 144 (Garden State Parkway in New Jersey), as well as LIRR between Island Park and Oceangrove. Generally, drivers in this group are focused on driving and on the road and traffic conditions but have the opportunity to observe roadside scenery from time to time. Both drivers and passengers may have greater opportunities for prolonged views toward landscape features and may take more notice of changes in the visual environment. Within the Visual Offshore Study Area, major arterial roads are typically set back from the shorelines and have limited significant or extended views of the water.

**Tourists and Recreational Users**

This viewer group includes local and seasonal residents engaged in recreational activities, and tourists and recreational users visiting from out of the local area. These users can be involved in outdoor recreational activities at beaches, parks and other developed recreational facilities or in undeveloped natural settings such as forests or preserves. Tourists and recreational users come to the area for the purpose of experiencing its cultural, scenic, and/or recreational resources. They may view the landscape while traveling to these destinations on local roads or ferries, or from the sites themselves.

The recreational user group includes those involved in active recreation (e.g., bicyclists, hikers, walkers, joggers, swimmers, recreational boaters) and those involved in more passive recreational activities (e.g., lounging at the beach, picnicking, sightseeing, and wildlife observation). For some of these viewers, scenery is a very important part of their recreational experience, and recreational users often have continuous views of landscape features over relatively long periods of time. Other types of tourists and recreationist within the Visual Offshore Study Area include passengers on local ferries that are traveling from the mainland New York to the barrier islands not accessible by roads, such as portions of Fire Island, passengers on cruise ships and recreational and fishing boats. Passengers on these types of vessels have the opportunity for prolonged views (i.e., one hour or more) toward the Project offshore. Some of these vessels may pass adjacent to or within the Lease Area. Passengers on vessels that are not within New York Harbor would have unobstructed views toward the offshore components of the Project at varying distances. However, most recreational viewers will only view the surrounding landscape from ground-level or water-level vantage points. Recreational users' sensitivity to visual quality and landscape character will be variable, depending on their reason for visiting the area. However, recreators are generally considered to have relatively high sensitivity to scenic quality and landscape character.

Within the Visual Offshore Study Area, likely locations for this group to be concentrated include beaches along the southern coast and coastal barrier islands of New York, the eastern coastline of New Jersey, lighthouses

along the coastal mainland and islands, and trails and overlooks scattered throughout the Visual Offshore Study Area.

### AA.4.3.3 Key Observation Points

Based on the results of the field visits (see Section AA.4.2.3), a total of 15 KOPs within the Visual Offshore Study Area (ten in New York and five in New Jersey) and 11 KOPs within the Visual Onshore Study Areas (four for the EW 1 onshore substation and O&M Base, three for EW 2 Onshore Substation A, and four for the EW 2 Onshore Substation C in New York) were selected for detailed study. Criteria used to select KOPs for offshore and onshore Project components included:

**Offshore Project Components**

- Locations representing the most critical viewpoints (i.e., views from communities, residential areas, or recreational areas, scenic areas specifically identified in planning documents);
- Geographic distribution representing locations closest to the Lease Area and at various distances within the Visual Offshore Study Area (i.e., less than 25 mi [40.2 km), 25 to 30 mi [40.2 to 48.3 km], 30 to 35 mi [48.3 to 56.3 km], and 35 to 44 mi [56.3 to 70.8 km]);
- Locations representing level and elevated viewing conditions along the coast and inland within the Visual Offshore Study Area; and
- Representative views looking at the broad boundary (i.e., northern) and the narrow side (i.e., western corner) of the Lease Area.

**Onshore Project Components**

- Locations representing the most critical viewpoints (i.e., views from communities, residential areas, or recreational areas, scenic areas specifically identified in planning documents); and
- Geographic distribution representing locations closest to the onshore substations and at various distances within the Visual Onshore Study Areas.

**Table AA-2** includes a list of KOPs within the Visual Offshore Study Area, and portions of the wind turbines potentially visible based on the results of the offshore viewsheds (see Section AA.4.1.1). KOPs within the Visual Offshore Study Area are shown in **Figure AA-21**. **Table AA-3** includes a list of KOPs within each of the Visual Onshore Study Areas and potential visibility of the Project based on the results of the onshore viewsheds (see Section AA.4.1.2). KOPs within the Visual Onshore Study Area for the EW 1 onshore substation and O&M Base and EW 2 onshore substation sites are shown in **Figure AA-22**, **Figure AA-23**, and **Figure AA-24**, respectively. Photographic simulations were created for a select number of KOPs. The selection of locations to be simulated are discussed in Section AA.5.1.3.

**Table AA-2 List of Key Observation Points within the Visual Offshore Study Area**

| Map ID Number a/ | Name | Location | Resource Type | Distance to Nearest Project Component (mi [km]) | Viewshed Visibility Results b/, c/ |
|---|---|---|---|---|---|
| **New York** | | | | | |
| 1 | Empire State Building | Manhattan | Tourist Destination, Historic (NRHP, NHL, NYC Landmark) | 34.2 (55) | Entire Turbine |
| 2 | Floyd Bennett Field | Brooklyn | Tourist Destination, Public Recreation Historic (NHRP) | 22.1 (35.6) | Hub Up |
| 3 | Fire Island Lighthouse | Suffolk | Tourist Destination, Public Recreation, Historic (NRHP) | 21.7 (34.9) | Hub Up |
| 4 | Great Kills Park | Staten Island | Tourist Destination, Public Recreation | 32 (51.5) | Hub Up |
| 5 | Heckscher State Park | Suffolk | Tourist Destination, Public Recreation | 26.9 (43.3) | Hub Up |
| 6 | Jacob Riis Park | Queens | Tourist Destination, Public Recreation, Historic (NHL) | 21 (33.8) | Hub Up |
| 7 | Jones Beach State Park | Nassau | Tourist Destination, Public Recreation, Historic (NRHP) | 14.2 (22.9) | Rotor Swept Area |
| 8 | Norman J Levy Park and Preserve | Merrick | Public Recreation | 18.8 (30.3) | Rotor Swept Area |
| 9 | Otis Pike Fire Island High Dune Wilderness | Suffolk | Tourist Destination, Public Recreation, Historic (NRHP) | 32.0 (51.5) | Hub Up |
| 10 | Sunken Forest | Suffolk | Tourist, Public Recreation | 34.1 (54.9) | Hub Up |

**Table AA-2 List of Key Observation Points within the Visual Offshore Study Area (continued)**

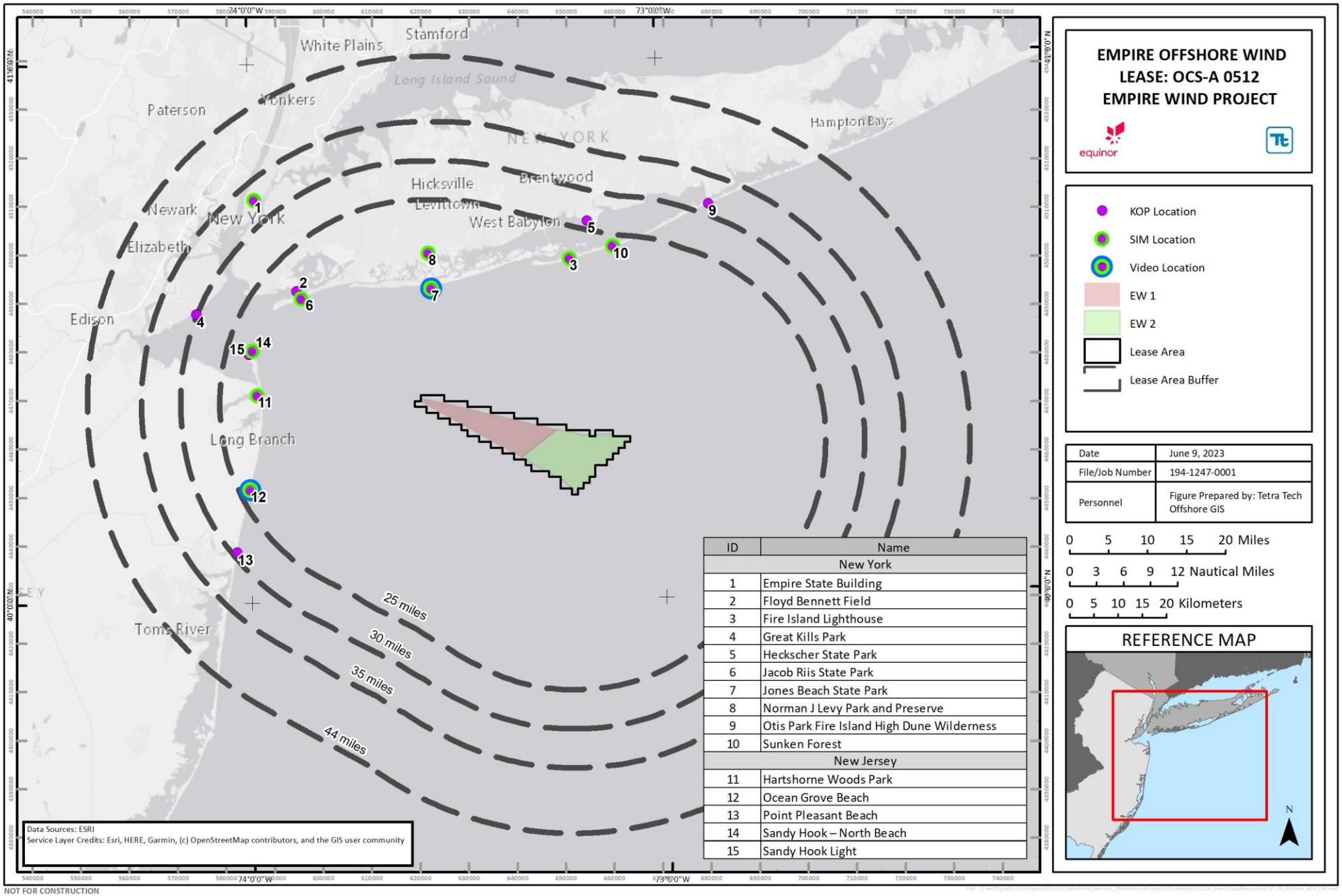
| Map ID Number a/ | Name | Location | Resource Type | Distance to Nearest Project Component (mi [km]) | Viewshed Visibility Results b/, c/ |
|---|---|---|---|---|---|
| **New Jersey** | | | | | |
| 11 | Hartshorne Woods Park | Monmouth | Public Recreation, Historic (NRHP, Historic District) | 22.3 (35.9) | Rotor Swept Area |
| 12 | Ocean Grove Beach | Monmouth | Tourist Destination, Public Recreation, Historic (Historic District) | 25.4 (40.9) | Hub Up |
| 13 | Point Pleasant Beach | Ocean County | Tourist Destination, Public Recreation | 31 (49.9) | Hub Up |
| 14 | Sandy Hook – North Beach | Monmouth | Tourist Destination, Public Recreation | 23.7 (38.1) | Rotor Swept Area |
| 15 | Sandy Hook Light | Monmouth | Tourist Destination Public Recreation, Historic (NRHP, NHL, NJRHP) | 24 (38.6) | Rotor Swept Area visible from the elevated deck; no visibility from ground level |

Notes:
a/ Map ID numbers correspond to the map shown in **Figure AA-21**.
b/ Portion of the wind turbine visible is based on the viewsheds described in Section AA.4.1.1. Analyses were conducted using ESRI ArcGIS Pro 2.2.0 software with the Spatial Analyst extension to process 10-meter Digital Elevation Models (DEM) based on the National Elevation Dataset and height zones of visible components of the wind turbines (foundation, entire rotor swept area, hub, and maximum blade tip). The viewshed analysis took in account the effects of terrain, vegetation and/or development on visibility.
c/ The viewshed is a desktop-based computer-generated model; actual conditions were field-verified and potential visibility is depicted in the simulations (**Attachment AA-3**).

**Table AA-3 List of Key Observation Points within the Visual Onshore Study Areas**

| Map ID Number a/ | Name | Location | Resource Type | Distance to Project Site (mi [km]) | Project Visibility |
|---|---|---|---|---|---|
| **EW 1** | | | | | |
| 1 | 2nd Avenue | Brooklyn | Travel Way | 100 ft (30.5 m) | Visible |
| 2 | Columbia Street Esplanade | Brooklyn | Public Recreation | 0.4 (0.6) | Partially Visible |
| 3 | Hudson River Waterfront Walkway | Hoboken, New Jersey | Public Recreation | 3.7 (6.0) | Visible |
| 4 | Statue of Liberty | New York City | Tourist Destination, Historic (National Monument, NRHP, NYC Landmark, NJRHP) | 2.8 (4.5) | Partially Visible |
| **EW 2 Onshore Substation A** | | | | | |
| 1 | Residential Neighborhood / Oceanlea Drive | Oceanside, NY | Residential and Travel Way | 0.2 (0.3) | Partially Visible |
| 2 | Woodmere Dock | Hewlett Neck, NY | Public Recreation and Residential | 2.5 (3.6) | Partially Visible |
| 3 | Masone Point Beach / Residential Neighborhood | Oceanside, NY | Public Recreation and Residential | 1 (1.6 m) | Partially Visible |
| **EW 2 Onshore Substation C** | | | | | |
| 1 | Quebec Road / Residential Neighborhood | Nassau County | Residential | 0.07 (0.11) | Screened |
| 2 | Long Beach Bridge | Nassau County | Travel Way | 0.09 (0.15) | Visible |
| 3 | Long Beach Skate Park | Nassau County | Public Recreation | 0.43 (0.69) | Partially Visible |
| 4 | Island Park Station | Nassau County | Travel Way/Residential | 0.19 (0.31) | Partially Visible |

Note:
a/ Map ID numbers for the EW 1 onshore substation and O&M Base and the EW 2 onshore substation sites correspond to the maps shown in **Figure AA-22**, **Figure AA-23**, and **Figure AA-24**, respectively.




| ID | Name |
|---|---|
| | New York |
| 1 | Empire State Building |
| 2 | Floyd Bennett Field |
| 3 | Fire Island Lighthouse |
| 4 | Great Kills Park |
| 5 | Heckscher State Park |
| 6 | Jacob Riis State Park |
| 7 | Jones Beach State Park |
| 8 | Norman J Levy Park and Preserve |
| 9 | Otis Park Fire Island High Dune Wilderness |
| 10 | Sunken Forest |
| | New Jersey |
| 11 | Hartshorne Woods Park |
| 12 | Ocean Grove Beach |
| 13 | Point Pleasant Beach |
| 14 | Sandy Hook – North Beach |
| 15 | Sandy Hook Light |

**Figure AA-21 Key Observation Points within the Visual Offshore Study Area**

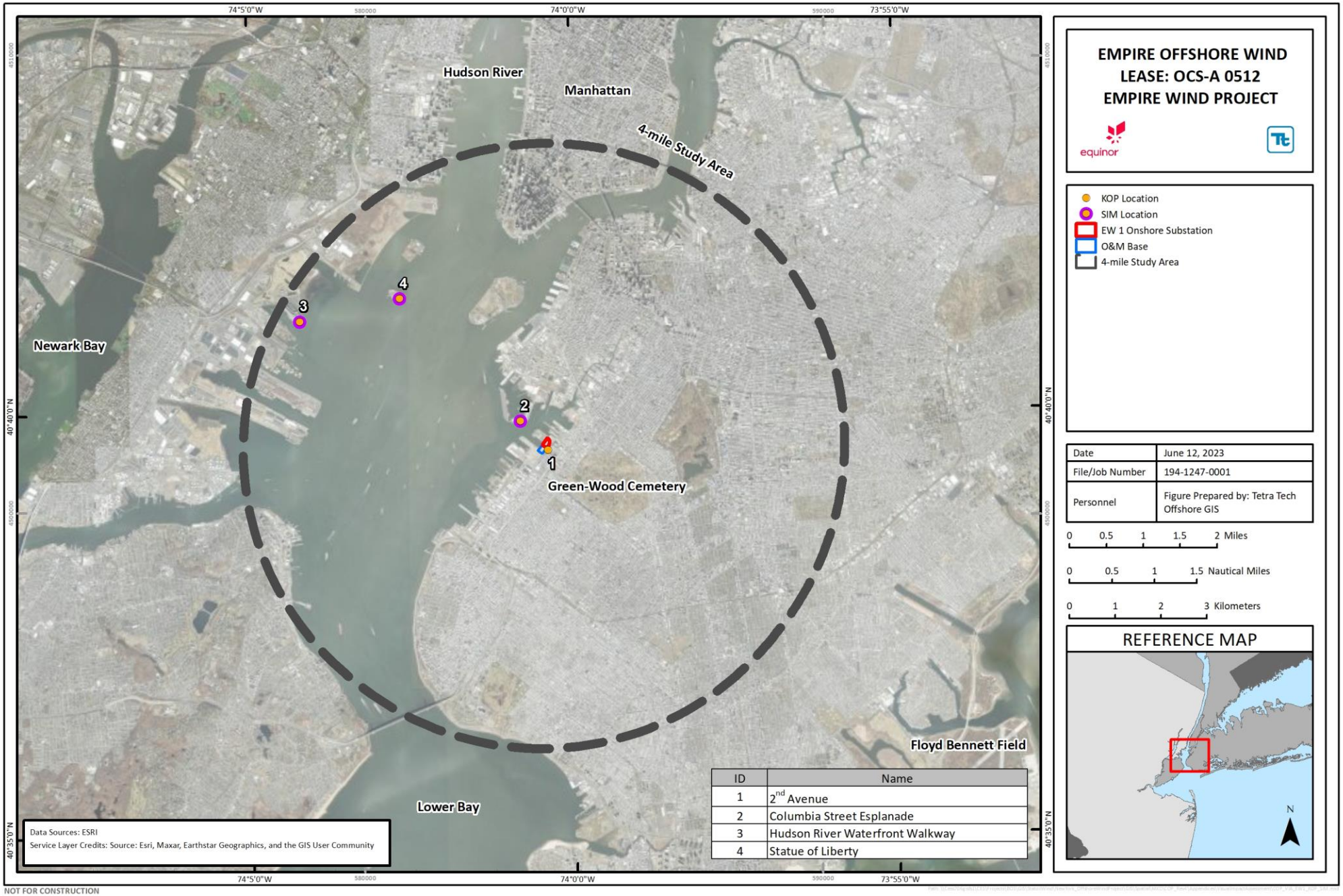



**Figure AA-22 Key Observation Points within the EW 1 and O&M Base Visual Onshore Study Area**

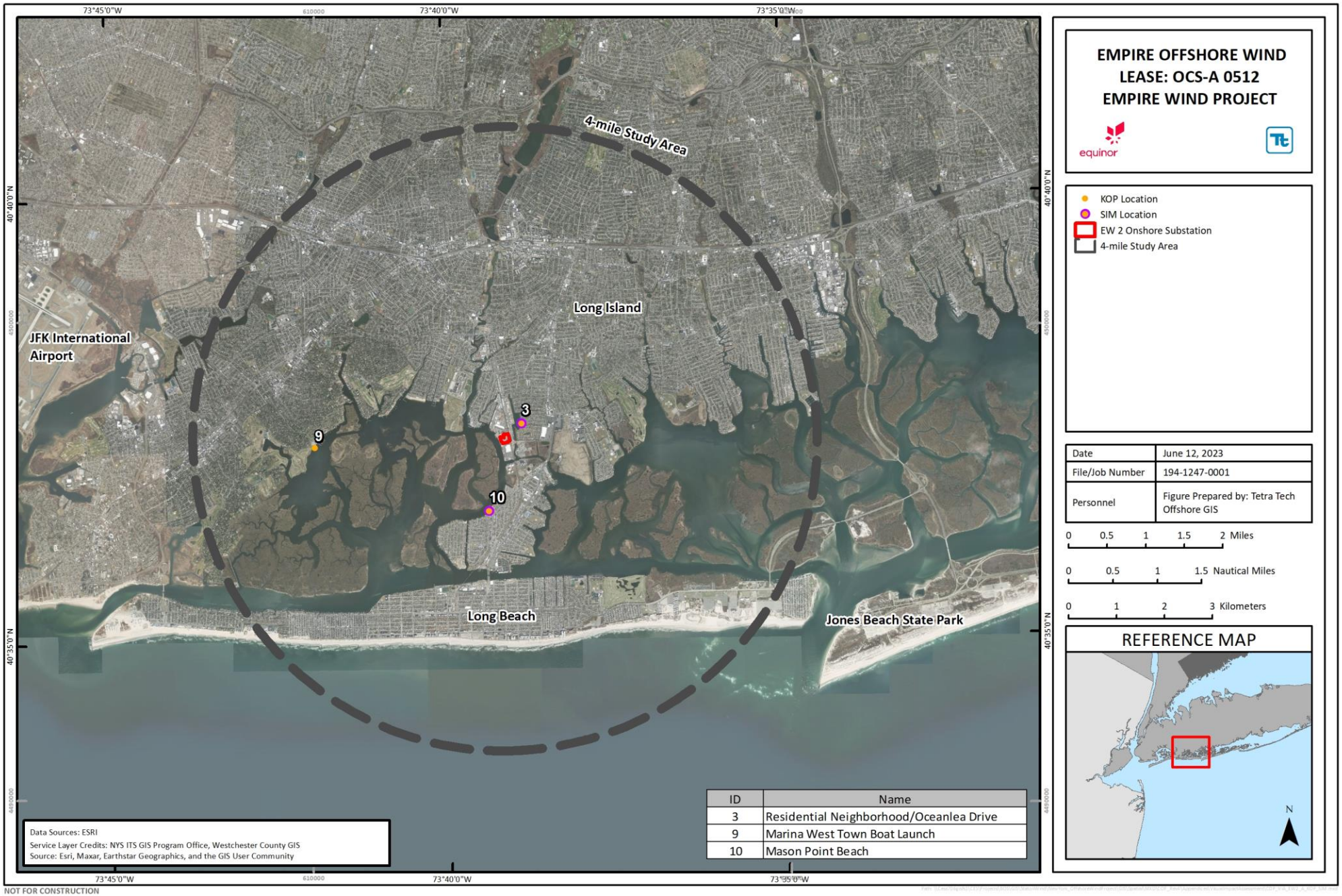



**Figure AA-23 Key Observation Points within the EW 2 Onshore Substation A Visual Onshore Study Area**

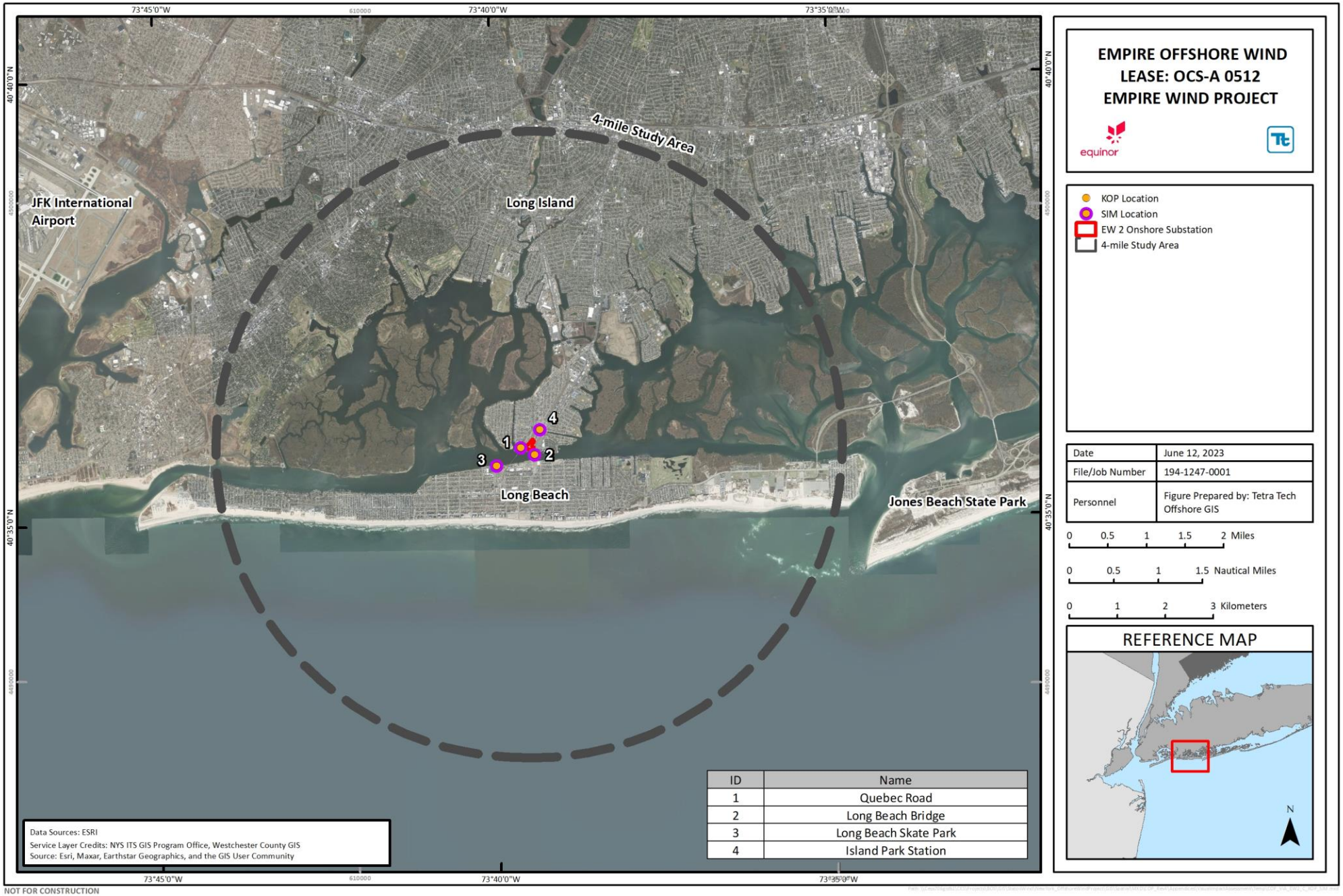



**Figure AA-24 Key Observation Points within the EW 2 Onshore Substation C Visual Onshore Study Area**

# AA.5 IMPACT ANALYSIS

## AA.5.1 Impact Analysis Methodology

Public enjoyment of a scenic resource is subjective and highly dependent on the viewer's perception of beauty and scenery. The addition of the Project facilities into a view may be detrimental to one viewer's enjoyment of a location but may have a negligible effect for a different viewer. Therefore, a process using the concept of "contrast" based on the BLM VRM system is often used to objectively measure potential changes to landscape features of inventoried sensitive resources (BLM 1986b, BLM 1984). Concepts from the BLM VRM system are widely used for a variety of projects and, with some modifications, have been applied successfully to projects that do not occur on lands under the jurisdiction of the BLM. In the BLM VRM system, potential visual effects are assessed by considering the level of contrast the Project facilities introduce to the existing landscape. The BLM's visual contrast rating process (Handbook 8431-1 Visual Resource Contrast Rating) was used as the basis for reviewing potential landscape changes resulting from the Project. A form adapted from the BLM's Visual Contrast Rating Worksheet (BLM Form 8400-4) was used to assess the degree of contrast the Project will introduce to the existing landscape.

### AA.5.1.1 Visual Contrast Rating

Assessing the degree of visual contrast is a means to evaluate the level of modification to the existing landscape features that would result from an action. In the context of the Project, existing landscape scenery is defined by the visual characteristics (form, line, color, and texture) associated with the landform (including water), vegetation, and existing facilities within and adjacent to the Project. Descriptions of each visual character element are listed below:

- Form—The shape and mass of landforms or structures;
- Line—The edge of shapes or masses, silhouettes, or bands;
- Color—The property of reflecting light of a particular intensity of wavelength that the eye can see; and
- Texture—The nature of the surface of landforms, vegetation, or structures.

The level of visual contrast introduced by an action can be measured by changes in form, line, color, and texture. The greater the difference between these character elements found within the landscape and the Project components, the level of visual contrast becomes more apparent, which typically increases perceived contrast.

The degree of contrast introduced to a particular viewpoint by Project facilities, in combination with the sensitivity of viewers at that viewpoint, will determine the level of visual effect. The following general criteria are used by the BLM when rating the degree of contrast, and are utilized here to describe the visibility/noticeability of the Project offshore and onshore components:

- None—The element contrast is not visible or perceived;
- Weak—The element contrast can be seen but does not attract attention;
- Moderate—The element contrast begins to attract attention and begins to dominate the characteristic landscape; and
- Strong—The element contrast demands attention, will not be overlooked, and is dominant in the landscape (BLM 1986b).

Contrast ratings were prepared for each of the KOPs (identified within the Visual Offshore Study Area and Visual Onshore Study Areas) using a form adapted from the BLM's Visual Contrast Rating Worksheet (Form 8400-4) and the results are included in **Attachment AA-2**.

### AA.5.1.2 Environmental Factors Affecting Project Visibility

The theoretical limit of visibility of an offshore structure is determined by the distance between the viewer and the structure, the height of the structure, the elevation of the viewer, and the curvature of the earth (BOEM 2007). Wind turbine generator heights and the effects of curvature of the earth (as discussed in Section AA.4.1.1) are illustrated in **Figure AA-13**, which shows a scaled graphic demonstrating how the representative wind turbines will disappear below the curvature of the earth based on viewer distance, from the perspective of a viewer at sea level (on the beach). The nacelle (hub) is visible just above the horizon line at 32 mi (51.5 km) for the representative wind turbine. However, the theoretical limit of visibility often exceeds the actual visibility or what is experienced in real life. In seascapes, atmospheric haze reduces the practical visibility, sometimes significantly. The presence of waves may also obscure objects low on the horizon. Limits to human visual acuity also reduce the ability to discern objects at great distances, suggesting that some wind turbine components, such as blades, will not be discernable, even though they are theoretically above the horizon. Other factors affecting the visibility include color and reflectivity of the object and the level of contrast with the visual background under varying lighting conditions (BOEM 2007).

#### Viewer Distance

Viewer distance from an area is a key factor in determining the level of visual effect, with perceived impact generally diminishing as distance between the viewer and the affected area increases (BOEM 2007). The BLM VRM categorizes views into foreground/middleground, background, and seldom seen distance zones. These distance zones provide a frame of reference for classifying the degree to which details of the viewed Project will affect visual resources. The "foreground/middleground" area, identified as occurring from 0 to 5 mi (8 km) from the Project, is considered to be the range from which Project element details will be visually clear (in the foreground) and where viewers still have the potential to distinguish individual forms, and texture and color are still identifiable but become muted and less detailed (middleground). In the "background," classified as the area from 5 mi to 15 mi (8 to 24 km), texture has disappeared and color has flattened, making objects appear "washed out"; however, landform ridgelines are still distinguishable. The "seldom seen" area includes lands visible beyond 15 mi (24 km) or lands hidden from view from key locations.

Offshore Project components will be within the background distance zone (5 mi to 15 mi [8 to 24 km]) or seldom seen distance zone (beyond 15 mi [24 km]) for viewers located along the coast of New York and New Jersey. It is anticipated for this Project that the seldom seen zone includes the portion of the open ocean that falls below the visible horizon line. Views of offshore Project components in the foreground/middleground distance zone (0 to 5 mi [8 km]) will be limited to marine or airborne traffic passing close to the Project Area.

For each of the three onshore sites, onshore Project components will be primarily within the foreground/middleground distance zone (0 to 5 mi [8 km]) for most viewers. Due to dense urban, residential development and/or vegetation surrounding the onshore sites, it is anticipated that there will be no views of the onshore Project components in the background and seldom seen distance zones (5 mi to 15 mi [8 to 24 km] and beyond 15 mi [24 km], respectively).

#### Curvature of the Earth and Atmospheric Refraction

In general, objects or features that are closer to a viewer's location will appear more detailed and more dominant. In the case of offshore wind projects in which wind turbines are often located miles offshore, objects viewed on the horizon are often not seen in their entirety because they begin to fall below the visible horizon due the curvature of the earth's surface. As the distance from the viewing location to the object increases, less of the object will be visible. In addition, our line of sight curves downward at large distances because of the refraction of light in the Earth's atmosphere. This effectively lessens the impact of the earth's curvature on the relative

height of an object. The effects of the curvature of the Earth and atmospheric refraction on the apparent height of objects is illustrated in **Figure AA-25.**

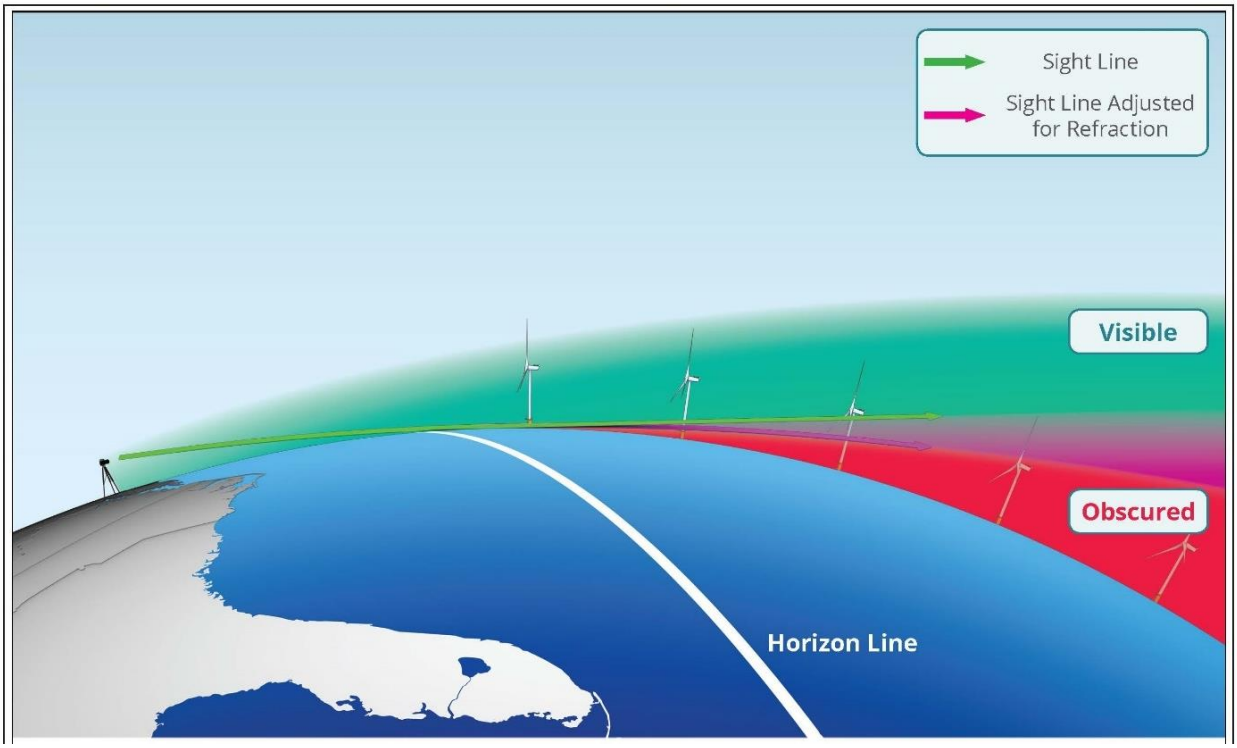



**Figure AA-25 The Effects of the Curvature of the Earth and Atmospheric Refraction on the Apparent Height of Objects**

**Angle of Observation**

Angle of observation refers to the angle between the viewer's line of sight and an object's location (see Section AA.4.1). While **Figure AA-14** is helpful to inform views from the beaches, there are some areas within the Visual Offshore Study Area that have superior views toward the Project Area from potentially sensitive viewpoints, such as the Fire Island Lighthouse on Fire Island, New York and Hartshorne Woods Park, New Jersey. When distance from the wind turbine is consistent, viewers at higher elevations (superior views) will see larger portions of the wind turbines when compared to level viewing conditions at beach level.

**Meteorological Conditions**

Visibility can be reduced by daytime and nighttime meteorological conditions such as haze, fog, rain, snow or a combination thereof. The New York State Energy Research and Development Authority (NYSERDA) developed a Visibility Threshold Study (NYSERDA study) in support of the New York State Offshore Wind Master Plan (NYSERDA 2017). The NYSERDA study assessed the visibility of a hypothetical wind farm at various distances (13.2 and 30 mi [21.2 and 48.2 km]) from shore under different meteorological conditions within an Area of Analysis. The Area of Analysis identified in the NYSERDA study consisted of the Atlantic shoreline of Long Island, which also falls within the Visual Offshore Study Area identified for this VIA. Based on the NYSERDA study visibility during daytime hours was noted as less than 10 mi (16 km) only 17 percent of the time. The study also suggests that "the highest color contrast and most visible condition (morning, clear skies) has the potential to occur during approximately eight percent of the daylight hours in a given year and the least visible condition (overcast, morning) would occur during approximately 22 percent of the daylight hours in a given year" (NYSERDA 2017).

The NYSERDA study assessed airport meteorological data to analyze the frequency of occurrence of various weather/sky conditions on a daily, seasonal, and annual basis. Only daylight records were analyzed for the visibility assessment. Because daylight hours vary by time of year, it was determined that daylight hours and time of day would need to be organized by season. Because the data analysis is based on daylight conditions, it was determined that seasons would follow the astronomical definition. For the purpose of this analysis, sky conditions were organized into three groups: clear, partly cloudy, and overcast. Simulations were then prepared for each distance represented. A total of eleven visual simulations were produced to represent common sky/weather conditions and typical times of day for viewing at each location. These included time of day (morning, mid-day, and afternoon) under three conditions (clear, partly cloudy, and overcast), and the distance from viewer in miles (13.2, 15, 20, 25, and 30 miles). Consequently, a total of 47 individual simulations were prepared (NYSERDA 2017).

As part of the NYSERDA study, an analysis of National Climatic Data Center weather data, completed for the six-year period from January 1, 2010 to December 31, 2016, indicated that visibility was 10 miles or greater during daylight hours approximately 84 percent of the year. Visibility was highest in the summer, with 88 percent of daylight hours having visibility over 10 miles. Visibility was the lowest in winter, with around 81 percent of daylight hours having visibility greater than 10 miles. Generally, 40 percent of the daylight hours when visibility was greater than 10 miles occurred during the morning, 33 percent of those hours occurred during the afternoon, and 27 percent of those hours occurred at midday. During daylight hours, clear sky conditions occurred approximately 17 percent of the time. Partly cloudy conditions had the lowest frequency of occurrence at approximately six percent of the daylight hours, while overcast sky conditions were predominant, occurring about 61 percent of the time. Conditions under which visibility was less than 10 miles occurred during the remaining 16 percent of all daylight hours. When the combination of sky conditions and time of day are considered together, 12 discrete scenarios were defined. The least frequent condition is partly cloudy skies during the midday hours (1.8 percent of total daylight hours). The most frequent condition is overcast skies during the morning hours, which occurs during approximately 21.8 percent of daylight hours, and overcast skies during the afternoon hours, which occurs approximately 21.5 percent of the time (NYSERDA 2017). A summary of this information is presented in Table 8 of the NYSERDA study, and has been inserted into this assessment in **Figure AA-26**. The full NYSERDA study is available on the New York State website.[18]

Visibility and appearance of lighting at night is also influenced by meteorological conditions. Clear nighttime skies may provide better views of lit turbines while dense clouds and fog may obscure turbine lighting. At night, reflections of clouds, the moon, and other light sources may be visible on the surface of the ocean when calm, and may appear more choppy or distorted in less calm conditions.

[18] https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Offshore-Wind-in-New-York-State-Overview/NYS-Offshore-Wind-Master-Plan

**Table 8. Frequency and Degree of Visibility by Time of Day/Weather Scenarios**

| Time of Day | Distance From Viewer (Miles) | | | | |
|---|---|---|---|---|---|
| | 13.2 | 15 | 20 | 25 | 30 |
| Morning | Clear 7.6% | Clear 7.6% | Clear 7.6% | Clear 7.6% | Clear 7.6% |
| | Partly Cloudy 2.2% | Partly Cloudy 2.2% | Partly Cloudy 2.2% | Partly Cloudy 2.2% | Partly Cloudy 2.2% |
| | Overcast 21.8% | Overcast 21.8% | Overcast 21.8% | Overcast 21.8% | Overcast 21.8% |
| | Visibility<10mi 8.4% | Visibility<10mi 8.4% | Visibility<10mi 8.4% | Visibility<10mi 8.4% | Visibility<10mi 8.4% |
| Mid-day | Clear 4.2% | Clear 4.2% | Clear 4.2% | Clear 4.2% | Clear 4.2% |
| | Partly Cloudy 1.8% | Partly Cloudy 1.8% | Partly Cloudy 1.8% | Partly Cloudy 1.8% | Partly Cloudy 1.8% |
| | Overcast 17.0% | Overcast 17.0% | Overcast 17.0% | Overcast 17.0% | Overcast 17.0% |
| | Visibility<10mi 3.6% | Visibility<10mi 3.6% | Visibility<10mi 3.6% | Visibility<10mi 3.6% | Visibility<10mi 3.6% |
| Afternoon | Clear 5.3% | Clear 5.3% | Clear 5.3% | Clear 5.3% | Clear 5.3% |
| | Partly Cloudy 1.9% | Partly Cloudy 1.9% | Partly Cloudy 1.9% | Partly Cloudy 1.9% | Partly Cloudy 1.9% |
| | Overcast 21.5% | Overcast 21.5% | Overcast 21.5% | Overcast 21.5% | Overcast 21.5% |
| | Visibility<10mi 4.6 % | Visibility<10mi 4.6 % | Visibility<10mi 4.6 % | Visibility<10mi 4.6 % | Visibility<10mi 4.6 % |
| Total Daylight Hours | 100% | 100% | 100% | 100% | 100% |

Key:

- Visible
- Not Readily Discernable
- Very Difficult to Discern/Not Visible

**Figure AA-26 Summary of Frequency and Degree of Visibility from NYSERDA (2017)[19]**

### AA.5.1.3 Photographic Simulations

Photographic simulations (simulations) were created to depict the Project components and their potential changes to the existing landscape. The simulations were used to determine the level of contrast between the existing landscape and the expected landscape after the Project is implemented. Approximately one-third of the KOPs, primarily those representing locations with high viewer sensitivity and high potential for impacts to existing visual resources, were selected for development of simulations to demonstrate how the constructed Project will appear to future viewers. One simulation was created for each selected KOP within the Visual Offshore Study Area, depicting the proposed representative wind turbines. Nighttime simulations were also completed for two KOPs, one from Jones Beach State Park on the coast of New York and one from Ocean Grove Beach on the coast of New Jersey. Simulation locations are listed in **Table AA-4** and are included in **Attachment AA-3**. Simulations depict actual weather conditions at the time photography was taken during the field visits (see Section AA.4.2.3). Empire also prepared simulations depicting how the wind turbines would appear with the sun at various angles throughout the day to assist in identifying when the wind turbines would be most noticeable. A series of computer-generated, time-lapse video simulations were prepared for two KOP

[19] For EW 1, the closest wind turbine is approximately 14.2 miles (22.9 km) to shore.

locations, one from Jones Beach State Park on the coast of New York and one from Ocean Grove Beach on the coast of New Jersey and are included in **Attachment AA-4**.

**Table AA-4 Photographic Simulation Locations**

| Map ID Number a/ | Name | Location | Simulations | | | |
|---|---|---|---|---|---|---|
| | | | Daytime | Nighttime | Computer Generated | Time-Lapse Video |
| **New York** | | | | | | |
| 1 | Empire State Building | Manhattan | X | | | |
| 3 | Fire Island Lighthouse | Suffolk | X | | | |
| 6 | Jacob Riis Park | Queens | X | | | |
| 7 | Jones Beach State Park | Nassau | X | X | X | X |
| 8 | Norman J Levy Park and Preserve | Merrick | X | | | |
| 10 | Sunken Forest | Suffolk | X | | | |
| -- b/ | Statue of Liberty | New York City | X | | | |
| **New Jersey** | | | | | | |
| 11 | Hartshorne Woods Park | Monmouth | X | | | |
| 12 | Ocean Grove Beach | Monmouth | X | X | X | X |
| 14 | Sandy Hook - North Beach | Monmouth | X | | | |

Note:
a/ Map ID numbers correspond to the map shown in **Figure AA-21** (see Section AA.4.3.3).
b/ Due to no visibility, the Statue of Liberty was not chosen as a KOP for the offshore Project components; however, a simulation was created. The Statue of Liberty is a KOP for the EW 1 Onshore Substation and O&M Base.

Simulations depicting the onshore substations sites and O&M Base were also created using a generic building (i.e., simple block form that is uniform in color and materials) and a general arrangement of outdoor electrical, internal drive and parking areas and perimeter security fence on the site. Since detailed plans for the onshore substation sites and O&M Base have not been finalized, the simulations depicting outdoor electrical equipment (i.e., shunt reactors, transformers, static masts) are based on the conceptual onshore substation layouts (see Section AA.2.3.1) and conceptual base layout (see Section AA.2.4). Although the onshore substation and O&M Base designs will be refined during state and local permitting, the simulations depicting building masses on site and general equipment arrangement show potential changes to the existing landscape and were used to determine the level of contrast between the existing landscape and the expected landscape after the Project is implemented using conservative conceptual layouts.

A digital single lens reflex (dSLR) camera was used to take the photographs used in the simulations (see Section AA.4.2.3). The camera was equipped with a "normal lens", which means that it most closely approximates the field of vision of the human eye. In photographs taken using this lens, the size and scale of objects in the background and foreground are depicted proportionately and are not distorted. At each photo point, a panorama, or an overlapping series of photographs, was captured. A global positioning system (GPS) device is used to record the latitude, longitude, elevation, date and time of each photo point location.

The simulations were created using geographic information system (GIS) software, Autodesk 3D Studio Max®, and rendering and Photoshop software. To create the simulations, the location data captured by the GPS device were transferred to ArcMap, where it was combined with GIS data of the preliminary layouts of Project components and facilities. A map showing the data was exported at true scale and imported into 3D Studio Max®. Using this scaled map as a base, 3D models of the offshore and onshore Project Areas were created to scale. These 3D models of the Project features, previously modeled to scale in 3D Studio Max®, were added in their appropriate locations and elevations. The views from the existing digital photographs were then matched in the 3D model using virtual cameras with the same focal length and field of view as the dSLR camera setting. After date- and time-specific lighting was added to the 3D model, renderings from the virtual cameras were created. These renderings were then blended into the existing conditions photographs in Adobe Photoshop software. Any necessary modifications to the existing landscape were completed in Photoshop as well. This process of creating a 3D model at true scale and rendering images using the same specifications used by the camera ensures that the spatial relationships of the landscape, Project features, and viewer perspective are accurate and match the existing site photographs. Each simulation was then scaled to be viewed at a specified distance to represent the actual size of the turbines.

Simulations for both offshore and onshore Project components, and nighttime simulations are included in **Attachment AA-3**.

**Nighttime Lighting and Video Simulation**

The wind turbines and offshore substations will be lit and marked in accordance with FAA, BOEM, and USCG guidelines and requirements for aviation and navigation obstruction lighting. For the wind turbines, Federal Aviation Administration lighting (FAA lights) will include two FAA Type L-864 lights mounted on opposite rear sides of the nacelle on the representative wind turbines. The representative wind turbines may also require three or more FAA Type L-810 lights spaced around the mast located midway between the nacelle and aMSL. The L-810 lights will be configured to flash in sync with the L-864 lights. FAA-required lighting will be red. USCG lighting will be located on the foundation of each wind turbine. The proposed lighting for the offshore substations will include lights around the perimeter of each deck level for safety and FAA lights will be mounted to lightning protection rods. Potential impacts associated with nighttime lighting for offshore Project components is discussed in Section AA.5.2.3.

It is anticipated that proposed lighting associated with the onshore Project components (i.e., onshore substations and O&M Base) will include emergency and exterior lighting. Emergency lighting would most likely include lighting installed on the static masts and/or buildings and would be directed downward toward outdoor electrical equipment. Emergency lights would only be turned on during emergency repairs. Exterior lighting would consist of security lighting at building entrances and access gates. The lights would be directed downward and will be motion sensor activated. Potential impacts associated with nighttime lighting for onshore Project components is discussed in Section AA.5.2.3.

Condensed 24-hour time-lapses from two unique locations were also developed and submitted to BOEM (**Attachment AA-5**). The time-lapse videos depict the wind turbines at different times of the day in different lighting conditions. Furthermore, the videos depict the frequency and intensity of proposed FAA lighting during nighttime hours.

## AA.5.2 Potential Effects to Visual Resources

Where visible and noticeable, the Project facilities have the potential to create visual effects. Sections below describe potential visual effects anticipated from the construction and operations of offshore and onshore components of the Project. At the end of the Project's operational life, it will be decommissioned in accordance

with a detailed Project decommissioning plan that will be developed in compliance with applicable laws, regulations, and best management practices at that time. Decommissioning activities will be similar to construction activities but in reverse and will occur over a shorter period of time than initial construction. Once Project components are removed, the visual character of the Project Area will return to baseline conditions.

### AA.5.2.1 Construction

#### Offshore Project Components

Short-term visual effects will occur during construction of the offshore Project components (i.e., wind turbines, offshore substations, foundations, and submarine export and interarray cables) and will result from construction activities and the presence of vessels used to transport components from fabrication and manufacturing facilities directly to the Lease Area.

Vessel traffic is common along the Atlantic coast and it is anticipated that the vessels required to transport Project components from shore to the Lease Area will not substantially increase the volume of traffic along the southern and eastern coast of New York and New Jersey, respectively. **Attachment AA-7** details the existing visual conditions regarding vessel traffic between Long Island and the Lease Area. There are several ports along the coastline of New York and New Jersey. The majority of the vessels that will be used for Project construction will be similar in size and shape to existing commercial and military vessels; therefore, weak contrast will be introduced for viewers along the southern and eastern coast of New York and New Jersey, who will see vessels in the foreground to middleground traveling from ports on the mainland to the Lease Area.

Installation of the submarine export cables in nearshore waters will introduce vessels relatively close to shore along the southern coast of Long Island, New York. While these vessels will be easily visible from shore, they will not remain in any area for more than several weeks. Because of the relatively short duration that they will be in any single location, they are not anticipated to adversely affect visual resources.

Nighttime construction activities are also proposed occur within the Lease Area. Navigation lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform construction activities may be visible from coastal vantage points. However, visual effects resulting from nighttime construction activities will be limited to select locations within the Lease Area. These visual effects will also be short-term because large vessels and lights necessary to perform construction activities will not be present overnight once construction is complete.

#### Onshore Project Components

Short-term visual effects will occur during construction of the onshore substation facilities and O&M Base and will result from visual evidence of construction activities and the presence of construction equipment and work crews. Construction activities associated with the onshore export and interconnection cable routes, onshore substations, cable bridge, and O&M Base will include surveying; clearing the construction site (of either pavement, existing buildings and/or vegetation depending on the site) and linear right-of-way; stockpiling top soil; grading; forming and construction of the buildings and outdoor electrical equipment foundations; placement and erection of buildings and electrical equipment; placement of perimeter security fencing; and restoration and landscaping installation (if required). It is anticipated that contrast will be introduced during Project construction primarily for viewers adjacent to the onshore substation sites, cable bridge, O&M Base, and underground onshore export and interconnection cables, where the presence of construction equipment, materials, and crews will be dominant in the foreground. The onshore export and interconnection cables will be installed underground primarily within existing roadways. Short-term impacts are anticipated during construction. Roads will be repaired and repaved post construction. Unless paving of the entire roadway occurs,

contrast in color (new vs. old paving) may be noticeable. For the onshore substations, cable bridge, and O&M Base, construction and installation activities will be present for viewers. Viewers associated with the construction and installation of the EW 1 onshore substation and O&M Base includes viewers within commercial and industrial buildings along the east side of 2nd Avenue, Columbia Street Esplanade,[20] and marine vessels in Gowanus Bay. Viewers associated with the EW 2 Onshore Substation A site includes viewers along Daly Boulevard, Hampton Road, and Lawson Boulevard. For the EW 2 Onshore Substation C, viewers include those primarily along Long Beach Road. Viewers associated with the cable bridge include commercial and industrial development in the area. However, these visual effects will be short-term because construction equipment and crews will be removed once construction is complete. Views of Project construction from areas not immediately adjacent to the onshore substation sites, cable bridge, and O&M Base will be mostly screened by residential, commercial or industrial buildings, vegetation and/or topography. Visual effects to these viewers will be mostly limited to seeing construction traffic on local roads. The contrast in color between new and old paving may be noticeable to commuters along roadways. However, these are not anticipated to be significant impacts in an urban setting where roadway repairs are likely common.

### AA.5.2.2 Operations and Maintenance

#### Offshore Project Components

Long-term visual effects are expected during the operations and maintenance phases of the Project as a result of introducing several vertical objects (i.e., wind turbines) and the two offshore substations into a landscape setting dominated by open expanses of water and defined by the horizon line. The Lease Area is located approximately 14 mi (23 km) from the south shore of Long Island, New York and 19.5 mi (31.4 km) east of Long Branch, New Jersey. At these distances, the wind turbines will appear in the background distance zone (5 to 15 mi [8 to 24 km]) and seldom seen distance zone (15 mi [24 km] or greater) from onshore viewing locations. The farther away objects are from the viewer the smaller they appear, features lose details and become less distinct, and surface textures become difficult to discern. In addition, objects viewed on the horizon are often not seen in their entirety because they begin to fall below the visible horizon due the curvature of the earth's surface (see Section AA.5.1.2).

Based on the viewshed analysis and field visits (see Section AA.4.1.1 and Section AA.4.2.3, respectively), it is anticipated that views of the Project from the southern coast of New York and eastern coast of New Jersey will be limited primarily to locations on coastal beaches that have unobstructed views of the Atlantic Ocean and elevated locations further inland. It is anticipated that viewers along coastal beaches closest to the Project that are looking toward the broad side of the Project Area (e.g., New York southern coastline locations) will experience greater visibility of Project turbines than viewers located elsewhere on the coastline who are farther away from with the Project Area and/or viewers looking toward the narrow western end of the Project Area (e.g., New Jersey coastline locations).

At a distance of 23 mi (37 km) or less it is anticipated that the representative wind turbines will be noticeable to viewers along the coast. However, the degree to which the wind turbines will be noticeable will vary depending upon atmospheric conditions. Under certain atmospheric conditions the wind turbines located out on the horizon will be "skylined" or seen in front of a contrasting color such as blue sky or sunrise (where the wind turbines may be backlit or side-lit depending on the viewers location in relation to the Project) and will be more likely to draw the viewers' attention. The structures will potentially produce visual contrast by virtue of their design attributes (form, color and line) and the reflectivity of their surfaces (USDI 2013). In addition,

[20] Columbus Street Esplanade is a boardwalk along Columbus Street which is located on Gowanus Bay approximately 0.4 mi (0.6 km) west of the EW 1 onshore substation site and O&M Base.

the movement of the rotors will likely be discernable, based on findings by Sullivan et al (2013) that blade movement was visible for smaller sized wind turbines at up to 24 mi (39 km). If the weather is overcast, hazy or foggy, the wind turbines will produce less contrast because the white/light grey color of the wind turbine structures will be similar to the white/grey color of the backdrop and will be less noticeable.

*Views from the Closest Proximity to the Project Area*

The location along the mainland that is closest to the Project is Jones Beach Island, New York, which is within approximately 14 to 20 mi (22.5 to 32.1 km) of the Lease Area. Viewers at beaches along the southern coast of Jones Beach Island will theoretically have views of the of the nacelle (hub), full rotor blades and the towers of the representative wind turbines. Although much of the turbine structures will be visible, the perceived scale of the wind turbines will be relatively small, amounting to fractions of an inch for viewers onshore. At Short Beach, located within the western portion of Jones Beach State Park, at a distance of 14.2 mi (22.9 km) from the nearest representative wind turbine within the Project Area 879.2 ft (268 m) of the 951.4 ft (290 m) (mean sea level to tip of blades) wind turbine will extend above the horizon. The photographic simulation from Short Beach at Jones Beach State Park (see **Attachment AA-3**) was created so that it is true to scale when viewed at a distance of 24 inches (610 millimeters).[21] Under those conditions, the theoretically visible portion of the closest representative wind turbine would amount to 0.14 inch (3.6 millimeters) when measured on the simulation graphic. From Short Beach, beachgoers will have views looking toward the broad side of the Project Area. Therefore, the wind turbines will appear spread out over a long distance. Given the proximity of the representative wind turbines, the portion of the wind turbines visible, the introduction of vertical elements into a primarily horizontal landscape setting, the motion of the blades, and the spatial dominance within the landscape setting, the Project will attract attention and become a focal point within the view. As such, the representative wind turbines will create strong visual contrast at this location.

*Views Toward the Broadside of the Project Area (Northern and Southern Boundary)*

Visual contrast is anticipated to be reduced at locations elsewhere on the coastline as the distance between the mainland and the Project Area increases. The Project Area is angled away from the New York coastline from west to east and from the New Jersey coastline from north to south. Therefore, as distances increase between the viewer and the Project the further up and down the coastline, some of the wind turbines fall below the horizon and portions of the wind turbines that are visible are limited to the upper portions of the structure and rotor, which become difficult to see at greater distances. For example, from Otis Pike Fire Island High Dunes Wilderness in New York and from Point Pleasant Beach in New Jersey, viewers would be looking toward the Project Area at a distance of approximately 32 mi (51.5 km) and 30 mi (48.2 km), respectively. At such distances the portions of the representative wind turbines that may be visible include from the hub up (wind turbines closest to the viewpoint) and the tip of the rotor blades (wind turbines located farther from the viewpoint). From both viewing locations, it is anticipated that the thin lines created by the blades will not be noticed by recreational users at the wilderness area or beach. As such, the Project is anticipated to create no visual contrast.

*Views Toward the Narrow End of the Project Area (Western Corner)*

Visual contrast is also anticipated to be less for viewers looking toward the narrow end of the Project Area because the wind turbines will appear less spread out along the horizon with wind turbines in the center of the view appearing larger (wind turbines closest to the viewer) and the wind turbines on the edges appearing smaller (wind turbines located farther from the viewer). Views directly toward the narrow end of the Project Area typically include other land masses along the horizon line, as viewers with this viewing condition are primarily

[21] The viewing distance of 24 inches (610 millimeters) is applicable when the simulation is printed at 11-by-17 inches; full size with no scaling.

located along Staten Island and Rockaway Peninsula in New York and Sandy Hook Peninsula in New Jersey. From Sandy Hook – North Beach, viewers are looking toward the narrow end of the Project Area at a distance of 23.7 mi (38.1 km) or more and approximately one-third of the wind turbines fall completely below the horizon. The remainder of the wind turbines that are visible occupy a small area of the horizon and will be similar in scale as existing vertical objects that pierce the horizon line, such as buildings along the southern coast of Long Beach and Rockaway Peninsula in New York, and large vessels and channel markers and buoys in the Atlantic. The thin form of the wind turbines will create less contrast than the dark blocky shapes of the existing vertical elements that currently appear along the horizon, including the extensive city skyline. The city skyline extends across the horizon line in the distance and marine navigation aids/markers, and large marine vessel traffic are present closer to the viewer but also pierce the horizon line across the viewscape. Under clear conditions, the wind turbines appear light gray and contrast with the light blue sky. While the color contrast with the sky is not significant during clear skies, when the angle of the sun is low and the turbines are backlit (i.e., during morning hours), contrast against the sky would most likely increase. However, the color of the turbines is similar to other vertical elements visible along the horizon. The wind turbines will also be seen in the context of the southern coast of Long Island, New York. As noted above, Long Beach and Rockaway Peninsula are visible along the horizon from this viewpoint and the development along the coast tends to draw the viewers' attention. Although the wind turbines are visible in the simulations, they appear as subordinate features due to the viewing distance, the limited number of wind turbines visible, and the presence of other human-made features along the horizon in the existing view (city skyline in the distance) which appears to be an extension of the city skyline. Therefore, the wind turbines will create weak visual contrast and will not change the overall character of the view. Simulations depicting views from Sandy Hook – North Beach are included in **Attachment AA-3**.

*Elevated Views Towards the Project Area*

Viewers located away from the coast will typically not have views of the offshore Project Area because they will be screened by vegetation and/or urban development. Exceptions will be viewers with an elevated or superior viewing position who have unobstructed or partial views toward the Project Area. For example, for visitors at the Fire Island Lighthouse, at a distance of approximately 21.7 mi (34.9 km) or more from the nearest wind turbine with the Project Area and elevated viewing conditions (approximately 160 ft [48.8 m] aMSL), the entire rotor swept area and the majority of the tower structure will be visible above the horizon. From this location, viewers will be looking toward the broad side of the Project Area. The Project will introduce several vertical elements into the landscape setting. Although a few vertical elements exist within the view that extend above the horizon, the Project will introduce greater contrast in size and scale due to the number of wind turbines concentrated along the horizon. The distance of the wind turbines from the viewer will help to reduce their prominence within the landscape setting, however, given the number of wind turbines visible and the horizontal spread across the horizon, the introduction of the wind turbines will change the natural character of the existing landscape. The wind turbines will serve as a focal point within the viewscape. As such, the Project will introduce strong visual contrast. Simulations depicting views from the Fire Island Lighthouse are included in **Attachment AA-3**.

Views toward the Project from Hartshorne Woods Park in New Jersey will range from few unobstructed (coastal locations) to more fully obstructed (trails within forested areas) depending on viewer location within the park. This 794-ac (321-ha) park is hilly and forested with views overlooking the Navesink River to the south, along with a few open ocean views. This park is known for its challenging trail system and scenic views and is frequented by hikers, bicyclists, and outdoor enthusiasts. The park includes group cabin camping, cross country ski trails, fishing in the Navesink River, and trails for hiking, biking, and horseback riding (Monmouth County Park System 2021). Users to this park are primarily engaged in activities throughout the park with a focus on

the area immediately within the park and without views of the ocean and proposed Lease Area. However, this particular KOP includes views towards the Lease Area to identify a worst-case scenario. Views from within the park are often obscured due to the dense stands of trees that cover most of the park area. The portion of the representative wind turbines that are closest to the viewer and visible above the horizon include the entire rotor swept area and a portion of the tower structures. Wind turbines located farther from the viewer begin to fall below the horizon and are not seen in their entirety. From this location, the viewer is looking down the long axis of the Project Area from the narrow western end. Therefore, the wind turbines in the western portion of the Project Area (the closest to the viewpoint) appear larger and begin to appear smaller in the eastern portion (farther from the viewpoint). From coastal locations within the park with less obstructed views, the Project will introduce several new vertical elements into the viewscape and will appear as thin objects on the horizon; however, the strong line of the horizon is already disrupted by existing vegetation in the immediate foreground. At a distance of approximately 22.3 mi (35.9 km) or more, the wind turbines will appear similar in scale to the portion of vegetation in the foreground that is extending above the horizon line. The lighter color of the wind turbines against the light blue sky somewhat mutes the color contrast, therefore creating less contrast than the darker colors of the vegetation backdropped by the sky. While the color contrast with the sky is not significant during clear skies, when the angle of the sun is low and the turbines are backlit (i.e., during morning hours), contrast against the sky would most likely increase. From few areas within the park the wind turbines can be seen but in the context of residential structures and other features in the built environment along the coastline in the immediate foreground. Due to the distance of the wind turbines and the relatively small size they will appear when viewed from this location, vegetation in the foreground creating a break in the horizon line, and the moderately developed context in which the wind turbines will be seen, the wind turbines will appear as subordinate features. As such, the Project will create weak visual contrast. Photographic simulations depicting views from Hartshorne Woods Park are included in **Attachment AA-3**.

*Offshore Substations*

The offshore substations will also be visible from certain vantage points along the southern coast of New York and eastern coast of New Jersey. The distances to the offshore substations vary between 17 and 23 mi (27.4 and 37 km) to the coast of New York and between 27 and 39 mi (43.5 and 62.8 km) to the coast of New Jersey. At these distances it is anticipated that the offshore substations will result in weak contrast or not be noticeable or perceived from coastal vantage points. The offshore substations will be most visible from locations closer to the Project Area, such as from Rockaway Peninsula or Jones Beach in New York. They are not anticipated to be visible from vantage points further up and down the coastline that are farther away from with the Project Area because the offshore substations will fall completely below the horizon line.

**Table AA-5** provides a summary of how the developed simulations and other results of the studies in the Empire Wind COP Visual Impact Assessment were applied to draw conclusions about the impacts to KOPs for which simulations were not developed.

**Table AA-5 Rationale for KOP Conclusions Without Simulations**

| Map ID Number a/ | KOP Name | Distance to Nearest Project Component (mi [km]) | Reference KOP Simulation Used to Base Conclusions Map ID/Name c/ | Reference KOP Distance to Nearest Project Component | Rationale for Applying Reference Simulation and Visibility Comments | Contrast Rating Applied to Un-Simulated KOP b/ |
|---|---|---|---|---|---|---|
| **New York** | | | | | | |
| 2 | Floyd Bennett Field | 22.1 (35.6) | 8 – Norman J Levy Park and Preserve | 18.8 (30.3) | View from Floyd Bennett Field is similar to view from Norman J Levy Park and Preserve, however, 3 miles farther from the nearest turbine. Views towards the Project are obstructed by development along the Rockaway Peninsula, therefore, only the upper portions of wind turbines would be visible. | Weak |
| 4 | Great Kills Park | 32 (51.5) | 6 – Jacob Riis Park | 21 (33.8) | View from Great Kills Park is similar to view from Jacob Riis Park, however, it is 11 miles farther from the nearest turbine. Most of the wind turbines will fall below the horizon and portions of wind turbines that are visible above the horizon include from the hub up. | None |
| 5 | Heckscher State Park | 26.9 (43.3) | 8 – Norman J Levy Park and Preserve | 18.8 (30.3) | View from Heckscher State Park is similar to view from Norman J Levy Park and Preserve, however, it is 7 miles farther from the nearest turbine. Views toward the Atlantic Ocean are screened by barrier islands and only the upper portions of wind turbines may be visible. | Moderate |
| 9 | Otis Pike Fire Island High Dune Wilderness | 32.0 (51.5) | 8 – Norman J Levy Park and Preserve | 18.8 (30.3) | View from Otis Pike Fire Island High Dune Wilderness is similar to view from Norman J Levy Park and Preserve, however, it is 12 miles farther from the nearest turbine. Also, visibility would be from the hub up. | None |

| Map ID Number a/ | KOP Name | Distance to Nearest Project Component (mi [km]) | Reference KOP Simulation Used to Base Conclusions Map ID/Name c/ | Reference KOP Distance to Nearest Project Component | Rationale for Applying Reference Simulation and Visibility Comments | Contrast Rating Applied to Un-Simulated KOP b/ |
|---|---|---|---|---|---|---|
| **Onshore Facilities** | | | | | | |
| 1 d/ | 2nd Avenue | 100 ft (30.5 m) | 2 – Columbia Street Esplanade d/ | 0.4 (0.6) | The simulation prepared for Onshore KOP 2, Columbia Street Esplanade, is representative of foreground views toward the EW 1 Onshore Substation and O&M Base. Although the surrounding area along 2nd Avenue is heavily developed, the area within the South Brooklyn Marine Terminal primarily includes paved areas with one warehouse located south of the EW 1 onshore substation and O&M Base. Due to the proximity of the proposed onshore substation and O&M Base to 2nd Avenue (approximately 100 ft [31 m]) and the scale and form of the proposed buildings, the EW 1 onshore substation and O&M Base will attract attention and dominate the view briefly as motorists and pedestrians pass the facility. | Strong |
| 2 e/ | Woodmere Docks/Residential Neighborhood | 2.3 (3.6) | 3 – Masone Point Beach/Residential Neighborhood e/ | 1.0 (1.6) | View from Woodmere Docks towards EW 2 Onshore Substation A would be similar to waterfront views from Masone Point Beach, although Woodmere Docks is located 1.3 miles farther from the EW 2 Onshore Substation A, on the opposite shore of the bay. The upper portion of the proposed onshore substation buildings may be visible; if so, it will be seen in the context of existing commercial and industrial development, including the Costco store building. At this distance and given the existing commercial development in the nearby vicinity, viewers are not likely to notice the visual change. | Weak/None |

| Map ID Number a/ | KOP Name | Distance to Nearest Project Component (mi [km]) | Reference KOP Simulation Used to Base Conclusions Map ID/Name c/ | Reference KOP Distance to Nearest Project Component | Rationale for Applying Reference Simulation and Visibility Comments | Contrast Rating Applied to Un-Simulated KOP b/ |
|---|---|---|---|---|---|---|
| **New Jersey** | | | | | | |
| 13 | Point Pleasant Beach | 31 (49.9) | 12 – Ocean Grove Beach | 25.4 (40.9) | Viewers would be looking toward the Project Area at a distance of approximately 31 mi (49.9 km), about 6 miles further than the simulated view from Ocean Grove Beach. At such distances the portions of the representative wind turbines that may be visible include from the hub up (wind turbines closest to the viewpoint) and the tip of the rotor blades (wind turbines located farther from the viewpoint). It is anticipated that the thin lines created by the blades will not be noticed by recreational users at the wilderness area or beach. | Weak |
| 15 | Sandy Hook Light | 24 (38.6) | 3 – Fire Island Lighthouse | 21.7 (34.9) | View from Sandy Hook Light towards offshore wind farm would be similar to elevated views from Fire Island Lighthouse and views from Sandy Hook Beach. The rotor swept area will be visible from the elevated deck; no visibility from ground level next to the lighthouse. | Weak |

Notes:
a/ Map ID numbers correspond to the map shown in VIA **Figure AA-21** for wind turbines and **Figure AA-22** (EW 1 site), and **Figure AA-23** (EW 2 site) (see Section AA.4.3.3).
b/ Visual Contrast Rating Worksheets, including representative photos, for each KOP is included in **Attachment AA-2**. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in **Table AA-4**.
c/ Visual simulations are included in **Attachment AA-3**.
d/ Map ID numbers correspond to the maps shown in **Figure AA-22** (EW 1 site).
e/ Map ID numbers correspond to the maps shown in **Figure AA-23** (EW 2 site).

**Table AA-6** provides a summary of the level of contrast created by offshore Project components for each KOP. A Contrast Rating Worksheet for each KOP is located in **Attachment AA-2**. In addition, results describing views with the Project implemented for each KOP are included in **Attachment AA-6**.

**Table AA-6 Summary of Contrast Rating of Key Observation Points for Offshore Project Components**

| Map ID Number a/ | Name | Location | Distance to Nearest Project Component (mi [km]) | Representative Wind Turbine Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| **New York** | | | | | |
| 1 | Empire State Building | Manhattan | 34.2 (55) | Moderate | Yes |
| 2 | Floyd Bennett Field | Brooklyn | 22.1 (35.6) | Weak | - |
| 3 | Fire Island Lighthouse | Suffolk | 21.7 (34.9) | Strong | Yes |
| 4 | Great Kills Park | Staten Island | 32 (51.5) | None | - |
| 5 | Heckscher State Park | Suffolk | 26.9 (43.3) | Moderate | - |
| 6 | Jacob Riis Park | Queens | 21 (33.8) | Weak | Yes |
| 7 | Jones Beach State Park | Nassau | 14.2 (22.9) | Strong | Yes |
| 8 | Norman J Levy Park and Preserve | Merrick | 18.8 (30.3) | Moderate | Yes |
| 9 | Otis Pike Fire Island High Dune Wilderness | Suffolk | 32.0 (51.5) | None | - |
| 10 | Sunken Forest | Suffolk | 34.1 (54.9) | Moderate | Yes |
| -- e/ | Statue of Liberty | Hudson | | None | Yes |
| **New Jersey** | | | | | |
| 11 | Hartshorne Woods Park | Monmouth | 22.3 (35.9) | Weak | Yes |
| 12 | Ocean Grove Beach | Monmouth | 25.4 (40.9) | Moderate | Yes |
| 13 | Point Pleasant Beach | Ocean | 31 (49.9) | None | - |
| 14 | Sandy Hook - North Beach | Monmouth | 23.7 (38.1) | Weak | Yes |
| 15 | Sandy Hook Light | Monmouth | 24 (38.6) | Weak | - |

| Map ID Number a/ | Name | Location | Distance to Nearest Project Component (mi [km]) | Representative Wind Turbine Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|

Notes:
a/ Map ID numbers correspond to the map shown in **Figure AA-21** (see Section AA.4.3.3).
b/ Visual Contrast Rating Worksheets for each KOP is included in **Attachment AA-2**. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in **Table AA-4**.
c/ Visual simulations are included in **Attachment AA-3**.
d/ Where no simulation was prepared, analysis for the contrast rating forms included referencing other simulations, field photography, Google Earth and maps.
e/ Due to no visibility, the Statue of Liberty was not chosen as a KOP for the offshore Project components; however, a simulation was created. The Statue of Liberty is a KOP for EW 1 Onshore Substation and O&M Base.

### Onshore Project Components

Long-term visual effects during operations of the onshore substations sites will result from the visibility of the aboveground components associated with the onshore substation buildings, outside electrical equipment, static masts, perimeter security fence, cable bridge, O&M Base, and underground and aboveground export and interconnection cables (see Section AA.2.3.1). The onshore substations will introduce tall, rectangular forms and vertical and geometric structures into the landscape setting. The onshore substations will include underground interconnection lines that will be placed under existing roadways, and will therefore have no significant long-term effects. Maintenance workers may be required to work in roadways or substation areas infrequently which could cause some minor effects. Potential effects to visual resources associated with each of the proposed onshore substation sites, cable bridge, and O&M Base are described below.

*EW 1 Onshore Substation Site and O&M Base*

The EW 1 onshore substation site and O&M Base is located within a landscape setting that has been heavily modified by commercial and industrial development. Furthermore, the site on which the proposed onshore substation and O&M Base will be located has also been modified. Based on the results of the viewshed analysis and subsequent field visit (see Section AA.4.1.2 and Section AA.4.2.3, respectively), potential views of the EW 1 onshore substation and O&M Base will be primarily from the northwest, west and southwest. Areas to the north, east and south of the EW 1 onshore substation and O&M Base will be screened by dense development associated with Brooklyn, New York. Viewers adjacent to the EW 1 onshore substation and O&M Base along 2nd Avenue and in buildings[22] to the east will have views that are mostly unobstructed. The onshore substation and O&M Base will be seen in the context of other existing development including a recycling center, parking lot, warehouse, an onshore wind turbine, and lighting associated with parking areas. Although the surrounding area is heavily developed, the area within SBMT, where the EW 1 onshore substation and O&M Base is located, primarily includes paved areas with a warehouse located just south of the EW 1 onshore substation and O&M Base. The proposed buildings associated with the EW 1 onshore substation and O&M Base will be larger than the existing warehouse to the south. Furthermore, the proposed onshore substation and O&M Base will be located in front of the recycling center and closer to 2nd Avenue and potential viewers. Due to the proximity of the proposed onshore substation and O&M Base to the road (approximately 100 ft [30.5 m]) and the size of the proposed buildings, the EW 1 onshore substation and O&M Base will attract attention and dominate the view. As such, the Project will introduce strong visual contrast in views from the east.

[22] This view represents viewers at the ground level of adjacent buildings; it does not represent views from upper stories of nearby buildings.

Viewers located to the west, within the Upper Bay and along the western side of the Upper Bay on the coast of New Jersey, will have views that range from unobstructed to partially screened by development. The light color and large, rectangular form of the buildings within the EW 1 onshore substation and O&M Base will be similar in form, color, and scale to other warehouses and commercial buildings along the coast. The outdoor electrical equipment, which will consist of transformers and shunt reactors, will most likely be surrounded by fire walls that will mostly screen views of the equipment itself. Due to the distance of the EW 1 onshore substation and O&M Base to the New Jersey coastline (approximately 3.0 mi [4.8 km] or more) and the densely developed industrial/commercial coastline, an onshore substation and O&M Base at the EW 1 site would appear as a subordinate feature in the heavily developed landscape setting and will not change the characteristic of the view. As such, the Project will introduce weak visual contrast.

There is no onshore cable route for EW 1. The interconnection cable route is 0.2 mi (0.3 km) from the onshore substation site to the POI. There is no vegetation along the route and impacts to buildings or other structures are not anticipated. The entire length of the line will be placed underground. While activities related to pavement cutting and patching are expected, no significant changes to the visual environment are anticipated as the route will be located underground and there will be no significant impacts to vegetation, no grading along the route, and the areas disturbed during construction will be restored according to state and local permit requirements.

Results are discussed in detail for each onshore KOP in **Attachment AA-6**. Simulations depicting the EW 1 onshore substation and O&M Base as seen from the surrounding area are included in **Attachment AA-3**.

*EW 2 Onshore Substation Site A*

Simulations depicting the EW 2 Onshore Substation A site from the surrounding area are included in **Attachment AA-3**.

The EW 2 Onshore Substation A site is located within a landscape setting that has been modified by industrial and commercial development, including residential development. The footprint for where the onshore substation would be located is currently used for industrial purposes (recycling center), though existing electrical equipment and the E.F. Barrett Power Station are in close proximity. Based on the results of the viewshed analysis and subsequent field visits (see Section AA.4.1.2 and Section AA.4.2.3, respectively), potential views of the EW 2 Onshore Substation A site will be primarily from the south and southwest and from along nearby roadways, including Daly Boulevard, which runs parallel to the south side of the EW 2 Onshore Substation A site. Views to the north, northwest, northeast, and south will be primarily screened by development, vegetation, and topography. Views toward the site from along Daly Boulevard and Hampton Road would be mostly unobstructed. The large rectangular form and light color of the potential building will contrast with the browns and tans of the unvegetated site. The onshore substation will be seen in the context of exiting streetlights, utility lines along Daly Boulevard, other industrial buildings in the area, and Costco's light colored building just south of the proposed onshore substation in the foreground, and various warehouse/industrial buildings and smoke stacks in the background. Residential areas to the east will have views of the potential substation building, which is taller than the existing buildings immediately surrounding the onshore substation. Although existing structures and utilities are visible in the view, the Project will be a dominant feature in the foreground view due to the proximity of the EW 2 Onshore Substation A to the adjacent roadways and the large scale of the facility. As such, it is anticipated that the Project will introduce strong visual contrast in views immediately adjacent to the site and moderate contrast for residential areas to the east.

Viewers not directly adjacent to the EW 2 Onshore Substation A site, such as in the residential neighborhoods located around Island Park Harbor located between 0.2 mi (0.3 km) to 2.25 mi (3.6 km) from the EW 2 Onshore Substation A site, will have views toward the Project that vary from mostly to completely screened by vegetation

and/or residential development. For viewers within the western and southern portion of nearby neighborhoods the top of the potential onshore substation buildings may be visible above vegetation and development. However, the portion of the potential buildings that are visible will be seen in the context of existing residential development, industrial and commercial uses, a high-voltage transmission lines, and the smoke stack associated with the existing Oceanside POI. From these views, the substation at the EW 2 Onshore Substation A site will appear as a subordinate feature in the landscape setting. As such, the Project will introduce weak visual contrast in this area. Views toward the EW 2 Onshore Substation A site from residences farther south and east in the residential neighborhoods are anticipated to be completely screened by residential development and will experience no visual contrast.

Along the north side of Long Beach Island views toward the Project will vary between completely screened to partially screened by topography, vegetation, and/or development. Facilities at the EW 2 Onshore Substation A site that may be visible include the upper portion of the potential buildings, which will be seen in the context of existing industrial development such as the recycling area and nearby commercial areas including a large Costco building. The onshore substation will be similar in scale compared to the existing cylinder shaped smoke stacks. At a distance of 2 mi (3.2 km) the EW 2 Onshore Substation A will appear subordinate to other features and will not change the overall character of the view. As such the Project will introduce weak visual contrast in this area. Along the north side of Long Beach Island near the western end (west of Long Beach Boulevard) views toward the Project will be completely screened by vegetation and/or development.

The onshore export and interconnection cable route for EW 2 Onshore Substation A is 5.6 mi (9.1 km) long between the export cable landfall and the POI. There is no significant vegetation along the route and impacts to buildings or other structures are not anticipated. The entire length of the line will be placed underground in areas currently paved until it reaches the substation site. No significant changes to the visual environment are anticipated as the route will be located underground and there will be no significant impacts to vegetation, no grading along the route, and the areas disturbed during construction will be restored according to state and local permit requirements.

Results are discussed in detail for each KOP in **Attachment AA-6**.

*EW 2 Onshore Substation C Site*

The EW 2 Onshore Substation C site is located within a landscape setting that has been modified by residential, commercial, and industrial development. The footprint of the onshore substation would be located in an area that is currently developed with a restaurant, other commercial buildings, and a small vacant area. Based on the results of the viewshed analysis and subsequent field visit (see Section AA.4.1.2 and Section AA.4.2.3, respectively), potential views of the EW 2 Onshore Substation C site will be primarily within the immediate vicinity of the proposed site, from the north and northeast along Long Beach Road, which is adjacent to the EW 2 Onshore Substation C site. Views to the south are partially blocked by the Long Island Railroad bridge across Reynolds Channel, Long Beach Bridge, and existing buildings and vegetation. Views to the west and north are screened by development and vegetation. From Long Beach Road, the large rectangular form and grey color of the perimeter wall will contrast with the dark green, irregular forms of the existing vegetation. The onshore substation will mostly be screened by the perimeter wall, and will be seen in the context of existing development, including a self-storage facility in the foreground, and existing utility poles and lines. Although existing structures and utilities are visible in the view, the Project will be a dominant feature in the view due to the proximity of the EW 2 Onshore Substation C site to the viewpoint and the large scale and light color of the perimeter wall. As such, it is anticipated that the Project will introduce strong visual contrast in views from the southeast looking northwest.

Viewers not directly adjacent to the EW 2 Onshore Substation C site, such as in the residential neighborhood along Quebec Road located approximately 0.07 mi (0.11 km) to the west, will have views toward the Project that vary from mostly to completely screened by vegetation and/or residential development. From Quebec Road, views will be screened by existing development and vegetation which block views towards the proposed substation (see simulation in Appendix I). Based on review of aerial imagery, from residential backyards adjacent to LIRR and the substation, views are anticipated to be mostly screened by vegetation. For residential backyard viewers, the upper portions of the substation building may be visible above existing vegetation. However, the portion of the potential building that is visible will be seen in the context of residential development, power lines, and a commuter railroad line that splits the two areas. The onshore substation at the EW 2 Onshore Substation C site will appear as a subordinate feature in the landscape setting. As such, the Project will introduce none to weak visual contrast in this area. Views toward the EW 2 Onshore Substation C site from residences farther west and north in the residential neighborhood are anticipated to be completely screened by residential development and will experience no visual contrast.

Along the north side of Long Beach Island, west of Long Beach Boulevard and the LIRR bridge, near the Long Beach Skate Park, views toward the Project will vary between completely screened to partially screened by topography and vegetation. Views to the north from the south are partially blocked by the train bridge, Long Beach Bridge, and existing buildings and vegetation except immediately south of the EW 2 Onshore Substation C site. Facilities at the EW 2 Onshore Substation C site that may be visible include the upper portion of the equipment buildings, which will be seen in the context of existing development such as power lines, streetlights, and the train bridge. At a distance of 0.43 mi (0.69 km) from the EW 2 Onshore Substation C site, although existing structures and utilities are visible in the view, the Project will be a co-dominant feature with the train bridge in the view due to the proximity of the EW 2 Onshore Substation C site to the viewpoint and the large scale and light color of the potential buildings. As such, it is anticipated that the Project will introduce moderate visual contrast in views from the south.

Near Island Park Station, views toward the Project will vary between completely screened to partially screened by existing buildings and vegetation. Views to the south from the north are partially blocked by existing buildings and vegetation in the area. Facilities at the EW 2 Onshore Substation C site that may be visible include the upper portion of the buildings, which will be seen in the context of existing development such as power lines, streetlights, and other surrounding buildings. Although existing structures and utilities are visible in the view, the Project will be a co-dominant feature with the other buildings in the view due to the proximity of the EW 2 Onshore Substation C site to the viewpoint and the large scale and light color of the potential building. As such, it is anticipated that the Project will introduce negligible to moderate visual contrast in views from the north.

The onshore export and interconnection cable route for EW 2 Onshore Substation C is approximately 2.5 mi (4 km) long between the export cable landfall and the POI. There is no significant vegetation along the route and impacts to buildings or other structures are not anticipated, except at the onshore substation where existing buildings will be demolished. The entire length of the line will be placed underground in areas currently paved until it reaches the substation site. No significant changes to the visual environment are anticipated as the route will be located underground and there will be no significant impacts to vegetation, no grading along the route, and the areas disturbed during construction will be restored according to state and local permit requirements.

Results are discussed in detail for each KOP in **Attachment AA-6**. Simulations depicting the EW 2 Onshore Substation C site from the surrounding area are included in **Attachment AA-3**.

*Cable Bridge*

The cable bridge crossing over Barnum Channel near the LIRR bridge is located within a landscape setting that has been modified by commercial and industrial development. The bridge would be located adjacent to the existing LIRR bridge in an area that is currently developed. The cable bridge crossing is bordered to the east by the existing commuter LIRR, to the south by the E.F. Barrett Power Station, to the west by a body of water, and to the north by commercial development which includes a gas station and parking lot. Visibility is limited to LIRR commuters, industrial workers to the south and east, residents/travelers at the gas station, and a large waterbody to the west. Viewers that may see the cable bridge include commercial and industrial buildings primarily between Long Beach Road and Daly Boulevard. Additionally, LIRR commuters may see a glimpse of the bridge while commuting. The cable bridge will be seen in the context of an existing train bridge and an overhead pedestrian bridge on the south side of Barnum Channel.

The cable bridge crossing over Barnum Channel near the Long Beach Road bridge is located within a landscape setting that has been modified by commercial and industrial development. The bridge would be located adjacent to the existing Long Beach Road bridge in an area that is currently developed. The cable bridge crossing is bordered to the east by the existing Long Beach Road bridge, to the south by commercial development, to the west by a body of water, and to the north by industrial development. Visibility is limited to Long Beach Road commuters, industrial workers to the north, and commercial workers and visitors to the south. Viewers that may see the cable bridge include commercial and industrial workers adjacent to the bridge. Additionally, Long Beach Road bridge commuters may see a glimpse of the bridge while commuting. The cable bridge will be seen in the context of existing views of the built environment, which currently includes commercial and industrial views.

**Table AA-7** provides a summary of the level of contrast (i.e., strong, moderate, weak, none) for each KOP for the onshore Project components. Contrast Rating Worksheets for each KOP are located in **Attachment AA-2**. In addition, results describing views with the Project implemented for each KOP are included in **Attachment AA-6**.

**Table AA-7 Summary of Contrast Rating of Key Observation Points for Onshore Project Components**

| Map ID Number a/ | Name | Location | Distance to Project Site (mi [km]) | Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| **EW 1 Onshore Substation and O&M Base** | | | | | |
| 1 | 2nd Avenue | Brooklyn, NY | 100 ft (30.5 m) | Strong | -- |
| 2 | Columbia Street Esplanade | Brooklyn, NY | 0.4 (0.6) | Weak | Yes |
| 3 | Hudson River Waterfront Walkway | Jersey City, NJ | 3.7 (6.0) | Weak | Yes |
| 4 | Statue of Liberty | New York, NY | 2.8 (4.5) | None | -- |
| **EW 2 Onshore Substation A** | | | | | |
| 1 | Residential Neighborhood/Oceanlea Drive | Oceanside, NY | 0.2 (0.3) | Weak | Yes |
| 2 | Woodmere Docks/Residential Neighborhood | Hewlett Neck, NY | 2.3 (3.6) | Weak/None | -- |

| Map ID Number a/ | Name | Location | Distance to Project Site (mi [km]) | Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| 3 | Masone Point Beach/Residential Neighborhood | Oceanside, NY | 1.0 (1.6) | Weak | Yes |
| **EW 2 Onshore Substation C** | | | | | |
| 1 | Quebec Road/Residential Neighborhood | Island Park, NY | 0.07 (0.11) | None e/ | Yes |
| 2 | Long Beach Bridge | Island Park, NY | 0.09 (0.15) | Strong | Yes |
| 3 | Long Beach Skate Park | Long Beach, NY | 0.43 (0.69) | Moderate | Yes |
| 4 | Island Park Station | Island Park, NY | 0.19 (0.31) | None | Yes |

Notes:
a/ Map ID numbers correspond to the maps shown in **Figure AA-22** (EW 1 site), and **Figure AA-23** and **Figure AA-24** (EW 2 sites; see figures in Section AA.4.3.3).

b/ Visual Contrast Rating Worksheets for each KOP is included in **Attachment AA-2**. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in **Table AA-6**.

c/ Visual simulations are included in **Attachment AA-3**.

d/ Where no simulation was prepared, analysis for the contrast rating forms included referencing comparable simulations, field photography, Google Earth, and maps.

e/ No contrast from the public right-of-way (see simulations in **Attachment AA-3**); however, from backyards immediately adjacent to the LIRR, intermittent views may be possible.

### AA.5.2.3 Nighttime Lighting

#### Offshore Project Components

Obstruction marking lights installed to meet FAA guidelines (FAA lights) will be mounted on the top of each wind turbine structure and will include two red lights, one on either side of the nacelle, so they are visible to pilots approaching from any direction. The representative wind turbines may also require mid-tower lighting, which will consist of three to four red lights mounted midway between the top of the nacelle and mean sea level and will flash in unison with the nacelle lights. The need and number of mid-tower lights will be dependent upon FAA requirements as well as the diameter of the tower. The proposed lighting for the offshore substations will include lights around the perimeter of each deck level for safety and will be mounted to lightning protection rods. Where visible, the proposed offshore substation lighting will be seen in the context of the FAA lights and therefore is not discussed separately.

FAA lights will be visible from locations where the nacelle is visible above the horizon line. It is anticipated that FAA lights will be more visible along the coastline and that most inland views will be screened by vegetation, topography, and/or development. Exceptions include elevated viewing locations, in which case FAA lights will most likely be seen in the context of other light sources such as marine vessels, residential or urban development, streetlights and vehicle headlights.

The introduction of nighttime lights into the relatively dark setting of the Atlantic Ocean will be most noticeable from the southern coast of Long Island, New York and the eastern coast of New Jersey, respectively, particularly from locations that have views looking at the broad side of the Project Area. It is anticipated that more contrast will be introduced in areas that are relatively void of human-made light sources, such as beaches and natural areas along barrier islands, including Jones Beach, Robert Moses State Park, and Fire Island in New York, and Sea Bright, Monmouth, and Seven Presidents beaches in New Jersey. However, given that these

areas are primarily used during daytime hours and most of the local, state and federal parks and beaches close at sunset, the number of affected viewers will be limited. In areas where boardwalks and other development parallel beaches, such as along the southern coast of Long Beach and the Rockaway Peninsula in Long Island, New York, and Asbury Park and Point Pleasant Beach in New Jersey, nighttime lighting associated with the Project will be seen in the context of human-made lights such as pedestrian lights along the boardwalk and lights associated with restaurants, hotels, arcades and other commercial businesses. For viewers along the southern coast of Long Island, New York and the eastern coast of New Jersey, respectively, the lights will introduce more contrast and may make the wind turbines stand out more against the dark sky. Contrast is anticipated to be reduced elsewhere along the coastline as the distance between the mainland and Project Area increases. At greater distances, turbines in portions of the Project Area will not be visible because the nacelle of some wind turbines will fall below the horizon. For example, from Ocean Grove Beach at a distance of approximately 25 mi (40.2 km), about three-quarters of the representative wind turbines will extend above the horizon. Furthermore, at a distance of 32 mi (51.5 km), the nacelle of the representative wind turbine will be just above the horizon. Visibility at these distances may be reduced or completely obscured by wave action and/or atmospheric conditions, such as haze or fog. Locations within the Visual Offshore Study Area where FAA lights will be at or just below the horizon include places such as Point Pleasant Beach in New Jersey, located approximately 30 mi (48.3 km), and Otis Pike Fire Island High Dunes Wilderness in New York, located approximately 32 mi (51.5 km) from the Project Area.

For viewers looking toward the narrow end of the Project Area, where the spatial spread of the Project is much smaller than if looking at the broad side, fewer wind turbines will be visible above the horizon and fewer lights will be visible. For example, from Sandy Hook – North Beach, New Jersey, at a distance of approximately 23 mi (37.0 km) from the Project Area, just over half of the representative wind turbines (60 percent) will extend above the horizon. Furthermore, FAA lights on wind turbines that are visible above the horizon will be seen in the context of lights on buoys, lane markers, commercial ships, barges and other marine vessels. The wind turbines will not be visible from the eastern shore of Staten Island, New York, as the hub of the representative wind turbines will be below the horizon.

Empire will consider implementing an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Empire conducted an analysis of historical air traffic operations to determine how often the ADLS would activate the obstruction lights for the Project (see **Appendix BB**).

Additionally, the USCG requires navigation lights on all wind turbines including three white lights mounted no less than 20 ft (6 m) above mean high water. In addition, flashing yellow SPS lighting will be located on corner towers or significant points on the periphery of the wind farm. Both array and SPS lighting are designed to be visible up to approximately 5 nm (9.2 km). The nearest onshore vantage point is approximately 14 mi (32 km) from the Project Area. It is anticipated that USCG navigation lights will not be visible from most viewpoints on land because the lights will fall below the horizon line. Elevated viewpoints in areas such as Fire Island Lighthouse on the southern coast of New York and Sandy Hook Light on the eastern coast of New Jersey may have views of the USCG navigation lights, because more of the wind turbine structures will be visible above the horizon. However, because the lighthouses are closed at night the numbers of affected viewers will be limited. In addition, since USCG navigation lights are designed to be visible up to 5 nm (9 km), it is anticipated that these lights will be relatively inconspicuous to onshore viewers (BOEM 2007).

**Onshore Project Components**

Proposed nighttime lighting associated with the onshore Project components includes security lighting installed along onshore substation and O&M Base perimeter security fencing and at building entrances. Security lighting will be directed downward and shielded to avoid light pollution impacts. The amount of light generated by the security lights will be consistent with existing sources produced by human-made structures near the proposed onshore substation sites and O&M Base. For the EW 1 onshore substation site and O&M Base this includes security lighting within SBMT and nearby industrial and commercial facilities, the existing Gowanus POI, streetlights, and lights on marine vessels. For the EW 2 Onshore Substation A site this includes security lighting within the recycling facility, as well as nearby industrial and commercial lighting, streetlights, and some residential lighting For the EW 2 Onshore Substation C site this includes residences, commercial and industrial development, and streetlights.

## AA.6 CUMULATIVE EFFECTS

The Council on Environmental Quality defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" (CEQ 1997). BOEM has identified more than 480,000 ac (1,942,498 ha) as Wind Energy Areas (WEAs) within six identified Lease Areas in the New York Bight. On December 16, 2021, BOEM announced the availability of a final Environmental Assessment (EA). The New York Bight EA evaluated potential environmental consequences of site characterization activities (i.e., biological, archeological, geological, and geophysical surveys and core samples) and site assessment activities (i.e., installation of meteorological buoys) associated with the Lease Areas within the New York Bight (BOEM 2021). On Jan. 12, 2022, BOEM announced it will hold a wind energy auction on February 23, 2022, which will allow offshore wind developers to bid on the six Lease Areas as described in BOEM's Final Sale Notice. The auction commenced on February 23, 2022 and was finalized on February 25, 2022. Provisional winners were announced at that time. The leases have been finalized, and development of the six Lease Areas identified can be considered a reasonable action.

To evaluate existing and planned projects that have the potential to result in cumulative impacts for the onshore components, large-scale projects that include existing infrastructure and past projects that have affected the area around the onshore components were identified.

*EW 1 Onshore Substation and O&M Base:*

- Sims Municipal Recycling Facility – Existing facility within SBMT opened in 2013, minor cumulative impacts to visual resources may result from the increase in marine vessel and land-based vehicle traffic during construction and operations of the onshore substation and O&M Base.
- SMBT Improvements – Existing facility that has been largely inactive for maritime transport since the 1980s, recent revitalization efforts and plans to improve SMBT to support offshore wind projects may result in increased vessel traffic and construction activities in the area, minor cumulative impacts to visual resources may result from the construction activities and increased vessel traffic during operations of the improvements.

*EW 2 Onshore Substation A, EW 2 Onshore Substation C, and Cable Bridge:*

- Bay Park Conveyance Project – Proposed construction to re-direct treated water from the Bay Park Sewage Treatment Plan to the Cedar Creek Water Pollution Control Plant's ocean outfall. Minor cumulative impacts to visual resources may result from the presence of construction vehicles, increased vessel traffic, and equipment.

- Island Park flood and storm mitigation project – Ongoing infrastructure project spanning Suffolk Road and adjacent roads in Island Park, which includes storm drainage, tidal gates, storm water retention and bulkheading. Minor cumulative impacts to visual resources may result from the presence of construction vehicles and equipment.
- Redevelopment of the Long Beach Motor Inn – Proposed construction of apartment building on Austin Boulevard in Island Park, in the vicinity of Project onshore export cable routes. Minor cumulative impacts to visual resources may result from the presence of construction vehicles and equipment and from increased resident traffic during operations.
- Repairs to Austin Boulevard – Planned improvements to a 1.4-mi (2.3-km) stretch of Austin Boulevard for traffic, pedestrian and vehicle safety, drainage and storm resiliency. Potential onshore export cable routes are along or in the vicinity of Austin Boulevard, and minor cumulative impacts to visual resources may result from the presence of construction vehicles.

Cumulative effects to visual resources in the area of the onshore components are likely to be minor and primarily related to the increase in marine vessel and land-based construction activities and additional traffic during operations of the existing and proposed facilities. The onshore components are proposed to be developed in areas with similar land uses (industrial, commercial, and port facilities) and will be similar in scale and appearance to existing and proposed facilities in the area. State and local permitting will be required for these facilities and site design and potential visual mitigation will be further identified as those permitting processes progress.

## AA.7 MITIGATION

### AA.7.1 Offshore Project Components

In general, opportunities to mitigate visual effects for offshore wind projects are limited, given the size and physical characteristics of the wind turbines and the open ocean environment in which they are located. Furthermore, most viewpoints where wind turbines will be visible are from beaches and residential areas along the coast and elevated viewing areas, such as lighthouses, where views of the ocean are desirable. Therefore, measures to screen views from the viewing locations, such as constructing berms or fences or planting vegetation, would not be a viable option. However, as the wind turbines will be viewed against a sky background, a light color, such as white or light gray, will be used for the structures, as dictated by USCG and BOEM requirements. The use of light-colored wind turbines will help to minimize contrast with the sky under most conditions. The proposed wind turbine design and appearance align with mitigation measures recommended by BOEM (BOEM 2007).

FAA and USCG lights on the wind turbines will contribute to their visual effect, as demonstrated in the visual simulations included in **Attachment AA-3**. These warning lights are a required safety measure; therefore, they cannot be reduced in number or eliminated. However, lighting-related impacts can be minimized by limiting the wind turbine lighting to the minimum time duration allowable by the FAA and USCG. Visual effects could be further reduced by implementing a radar-based ADLS. Empire is evaluating the possibility of implementing a radar-based ADLS (or a similar system) to turn the aviation obstruction lights on and off in response to detection of aircraft near the wind farm, as a base case, pending commercial availability, technical feasibility, safety/reliability and agency review and approval. These systems are intended to reduce the amount of time that the lights are illuminated, thereby potentially minimizing the time that wind turbines are visible from shore at night.

### AA.7.2 Onshore Project Components

The undergrounding of the onshore export and interconnection cables will mitigate many of the potential visual effects of the Project that would otherwise occur. For the onshore aboveground Project components, which include the EW 1 onshore substation, the EW 2 Onshore Substation A or EW 2 Onshore Substation C sites, the cable bridge, and the O&M Base (described in Section AA.2.4), the following mitigation measures that will minimize visual contrast will be incorporated into the Project design:

- Construction Phase: (applicable to all onshore substation sites):
  - A Fugitive Dust Control Plan will be implemented to minimize dust (visual pollution);
  - The onshore Project Area will be maintained free of debris, trash, and waste to the extent possible during construction; and
  - Areas temporarily disturbed during construction will be restored to the conditions required by state and/or local permits.

- Operations Phase: (applicable to all onshore sites):
  - The onshore export and onshore interconnection cables, and joint bays will be located underground primarily under roadways, and will not be a visible during Project operations and maintenance;
  - Buildings will be a combination of cladded steel frame and concrete buildings, designed to match the style and visual character of the surrounding urban landscape, and are proposed to be painted a light shade gray or white color. Empire will continue to work with local stakeholders throughout the permitting process and will submit final building architectural design details in the Environmental Management and Construction Plan as part of the New York state approval process for the Project;
  - Minimal presence of crews and equipment conducting maintenance activities;
  - Lighting at the onshore substation and O&M Base will be designed to reduce light pollution where feasible (e.g. downward lighting, motion-detecting sensors); and
  - In coordination with state and local permitting entities and as site design progresses, mitigation measures to reduce visual contrast will be considered such as repetition of form, line, color, and texture based on other existing elements around the site.

- Operations Phase: (applicable to the EW 1 Onshore Substation site and O&M Base):
  - The onshore substation site and O&M Base is located within the jurisdiction of the New York City's Waterfront Revitalization Program; therefore, a pre-engineered building system with prescribed architectural elements incorporated into the design will be used to ensure the Project meets the Waterfront Revitalization Program policies (see Section AA.3.2.1).

## AA.8 CONCLUSIONS

### AA.8.1 Offshore Project Components

Overall, changes to the landscape conditions that will occur as the result of offshore Project components will vary from minimal to strong for viewers within the Visual Offshore Study Area. The level of change perceived by viewers within the Visual Offshore Study Area is dependent upon multiple factors, including distance between the viewer and the structure, the height of the structure, the elevation of the viewer, the curvature of the earth, meteorological conditions, and individual viewer. Viewers within the Visual Offshore Study Area will be able to observe marine traffic associated with the Project on a short-term basis during the construction period for offshore Project components. It is anticipated the level of change perceived by viewers during the

construction period will vary both among locations and over time at a specific location. The degree of change will be greater within New York Harbor and along the southwestern coast of Long Island, New York, where vessels will at times be seen in the foreground to middleground (0 to 5 mi [8 km]); the degree of change will become less as the vessels move farther away from shore.

On a long-term basis during operations of the Project, views of the offshore Project components (i.e. wind turbines) will be limited primarily to coastal areas of New York and New Jersey that are within approximately 26 mi (42 km) from the Project Area and have views of the Atlantic Ocean. Areas along the southern coast of New York (specifically barrier islands along the southern coast of Long Island) and the eastern coast of New Jersey within 26 mi (42 km) of the Project Area will theoretically have views of the nacelle (hub), the majority of the rotor blades and tops of the towers of the representative wind turbines. Viewers along the coast will perceive a change in the landscape, and it is anticipated that the contrast created by the change will vary from strong to none. Perceived change will be higher along the southern coast of Long Island, New York and the eastern coast of New Jersey that are closest to the Project Area and where views are toward the broad side of the Project Area. Perceived change will be less elsewhere on the coastline as viewers get farther away from the Project Area. Among the KOPs representing coastal views (at beach level) along the southern coast of Long Island, New York and the eastern coast of New Jersey, contrast was rated as strong for one KOP, moderate for two KOPs, and none for two KOPs.

The perceived change in the landscape may be greater in coastal areas with elevated viewing locations, where views of the Atlantic Ocean are framed by topography and/or vegetation and only a portion of the ocean is visible; in such cases, more of the Project Area may be visible and the Project may appear more spatially dominant due to the elevated views. However, locations with these viewing conditions are limited in this region. Two of the four KOPs representing elevated viewing conditions received moderate contrast ratings and two KOPs were rated as weak contrast, due to vegetation and development in the foreground that dominated the view.

The perceived change may vary between moderate or none in some parts of the Visual Offshore Study Area, such as inland areas (not elevated) primarily along of shores of inland bays where views of the Atlantic Ocean are screened by barrier islands and/or peninsulas and only the upper portions of wind turbines may be visible. Although primarily only the rotor blades will be visible extending over the barrier islands and/or peninsulas the number and motion of the rotor blades may draw viewers' attention. One of the two KOPs representing inland views along the southern coast of Long Island, New York resulted in moderate contrast and the other KOP resulted in no weak contrast. Perceived change may also be less for viewers looking toward the narrow end of the Project Area, where the spatial spread along the horizon will be less than if looking at the broad side and fewer wind turbines would be visible because the wind turbines in the eastern portion of the Lease Area would fall completely below the horizon. Locations on the southern coast of New York and eastern coast of New Jersey with views toward the narrow end of the Lease Area are located 21 mi (33.8 km) or more from the Project. Two of the three KOPs representing views toward the narrow end of the Lease Area received weak contrast ratings and one was rated as no visual contrast. From elevated inland locations, such as buildings in downtown Manhattan in New York, the Project Area is located 30 mi (48 km) or more away and the Project would be seen in the context of dense urban development. Contrast for the KOP representing elevated views from Manhattan, New York was rated as weak.

Views of the offshore substations will be limited to vantage points along the southern coast of Long Island, New York and the eastern coast of New Jersey. The offshore substations will appear as small, grayish blocks on the horizon and will be seen in the context of the wind turbines and large marine vessels. It is anticipated

that the offshore substations will result in weak contrast or will not be noticeable or perceived from coastal vantage points.

## AA.8.2 Onshore Project Components

Overall, the onshore Project components would result in changes to the landscape conditions that vary from strong to minimal for viewers within the Visual Onshore Study Areas for each of the onshore substations under consideration (EW 1 and EW 2 Onshore Substation A, and EW 2 Onshore Substation C sites, cable bridge, and the O&M Base). On a short-term basis during the construction period for each of the onshore Project components, viewers would be able to observe construction equipment, laydown areas and crews. Varying degrees of visual contrast will occur when equipment and construction crews are present; however, contrast will be short-term since equipment and support facilities will be removed once construction is complete. Long-term visual effects during operations of the onshore substations sites and O&M Base will result from the visibility of the aboveground components associated with the onshore substation buildings, outside electrical equipment, static masts, perimeter fence, and O&M Base and from the occasional presence of crews and equipment for maintenance activities. The onshore substations and O&M Base will introduce tall, rectangular forms and vertical and geometric structures into landscape settings that in many cases have been heavily modified by commercial, industrial and/or residential development.

### EW 1 Onshore Substation and O&M Base

Views of the EW 1 onshore substation and O&M Base will be limited primarily to viewers directly adjacent to the site, including from local roads and commercial buildings, and viewers across Upper Bay along the New Jersey coast. Viewers adjacent to the site and along the New Jersey coast will perceive a change in the landscape, and it is anticipated that the contrast created by the change will vary from strong to none. Perceived change will be higher along roads and from buildings that are closest to the site on the west, where the proposed buildings and outdoor electrical equipment will be located in an open paved area. Perceived change will be less for viewers to the west of the site along the New Jersey coast, where views of the site will be seen in the context of the downtown Manhattan skyline, dense urban development along the coast of Brooklyn, New York, and marine vessels within the Upper Bay. Due to the distance of the EW 1 onshore substation and O&M Base and the densely developed landscape in which the proposed onshore substation and O&M Base would be seen, it is anticipated that the Project will introduce weak contrast or not be perceived within views from New Jersey. Views from areas to the north, east, and south of the site will be screened by dense industrial and commercial development.

### EW 2 Onshore Substation A

Views of the EW 2 Onshore Substation A site are limited primarily to viewers adjacent to the north and west and viewers located on the north side of Long Beach Island to the southeast and southwest of the site. Viewers adjacent to the site (i.e. along local roads) and west and southwest of the site will perceive a change in the landscape, and it is anticipated that the contrast created by the change will vary from strong to weak. Perceived change will be higher from areas close to the site, such as from along Hampton Road and Daly Boulevard where the onshore substation will introduce strong contrast. Residential development adjacent to water (Hewlett Bay) directly west of the site may also have some weak to moderate contrast. Perceived change will be reduced to weak for viewers along the north side of Long Beach Island, where views toward the site will be partially screened by topography, vegetation, and/or development. In addition, the onshore substation will be seen in the context of other similar energy facilities (i.e., E.F. Barrett Power Station and National Grid

Substation) and industrial areas. Views to the northwest, north[23] and northeast will be screened by development, vegetation, and topography and will not be changed by the Project.

**EW 2 Onshore Substation C**

Views of the EW 2 Onshore Substation C site are limited primarily to viewers adjacent to the east and south, with minimal views to the north and west. Viewers adjacent to the site (i.e., along Long Beach Boulevard and Bridge) and south of the site in Long Beach will perceive a change in the landscape, and it is anticipated that the contrast created by the change will vary from strong to weak. Perceived change will be higher from areas close to the site, such as from along Long Beach Boulevard/Bridge, where the substation will introduce strong contrast. Perceived change will be reduced to moderate for viewers along the north side of Long Beach Island, where views toward the site will partially screened by topography, vegetation, and/or existing development. Views to the west, north,[24] and northeast will be screened by development, vegetation, and topography and will not be changed by the Project.

**Cable Bridge**

Views of the cable bridge are limited primarily to viewers adjacent to Barnums Channel, with minimal views to the west towards a large waterbody. Viewers adjacent to the bridge will perceive a change in the landscape, and it is anticipated that the contrast created by the change will be weak. Perceived change will be higher from areas close to the site, such as from commercial and industrial development immediately surrounding Barnums Channel.

[23] This refers to viewers farther north beyond the industrial area.
[24] This refers to viewers farther north beyond the Island Park Station.

## AA.9 REFERENCES

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# ATTACHMENT AA-1 VISUAL RESOURCE INVENTORY

- Table AA-1-1 Visual Resources Inventory within the Visual Offshore Study Area
- Figure AA-1-1 Visual Resource Inventory Map (Visual Offshore Study Area)
- Visual Resource Inventory Photo Log (Visual Offshore Study Area)
    - Baldwin Park, NY
    - Bay Park, NY
    - Breezy Point, NY
    - Coney Island, NY
    - Floyd Bennett Field, NY
    - Fire Island Lighthouse, NY
    - Fort Hamilton, NY
    - Fort Wadsworth, NY
    - Great Kills Park, NY
    - Green-Wood Cemetery, NY
    - Heckscher State Park, NY
    - Wantagh Park, NY
    - Jacob Riis Park, NY
    - Jamaica Bay Wildlife Refuge, NY
    - Jones Beach State Park/Short Beach, NY
    - Long Island Maritime Museum, NY
    - Nickerson Beach Park, NY
    - Norman J Levy Park and Preserve, NY
    - Ocean Beach Park, NY
    - Oceanside Park, NY
    - Otis Pike Fire Island High Dune Wilderness
    - Overlook Beach, NY
    - Robert Moses State Park, NY
    - Rockaway Beach and Boardwalk, NY
    - Shorefront Park, NY
    - Silver Point County Park, NY
    - Smith Point Park, NY
    - Sunken Forest, NY
    - Tobay Beach, NY
    - Holmdel Horn Antenna, NJ
    - Asbury Park, NJ
    - Hartshorne Woods Park, NJ
    - Navesink Lighthouse, NJ
    - Ocean Grove Beach, NJ
    - Point Pleasant Beach, NJ
    - Sandy Hook – North Beach, NJ
    - Sandy Hook Light, NJ
    - Sea Bright Beach, NJ
    - Seven Presidents Oceanfront Park, NJ
- Table AA-1-2 Visual Resource Inventory within the Visual Onshore Study Area
- Figure AA-1-2 Visual Resource Inventory Map – EW 1 Onshore Substation and O&M Base
- Figure AA-1-3 Visual Resource Inventory Map – EW 2 Onshore Substation A

- Figure AA-1-4 Visual Resource Inventory Map – EW 2 Onshore Substation C
- Visual Resource Inventory Photo Log (Visual Onshore Study Areas)
    - EW 1 Onshore Substation and O&M Base
    - EW 2 Onshore Substation A
    - EW 2 Onshore Substation C

## Table AA-1.1: Visual Resource Inventory within the Visual Offshore Study Area

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| **NEW YORK** | | | | |
| 1 | Baldwin Park | Nassau | Public Recreation | Baldwin Park is a local park located on the southwestern portion of Long Island and on the eastern shore of Parsonage Cove. The park is owned and managed by the town of Hempstead. The park includes basketball and tennis courts, softball diamonds, soccer fields, skate parks and open space. |
| 2 | Bay Park | Nassau | Public Recreation | Bay Park is a 96-ac (38.8-ha) county park located on the southern coast of Long Island, New York, approximately 2 mi (3.2 km) north of the Long Beach peninsula. The park is owned and maintained by Nassau County. The park includes tennis and baseball courts, soccer and football fields, roller rink, multi-use paths, golf course, fishing, and boat launch. |
| 3 | Breezy Point | Queens | Public Recreation | Breezy Point is located on the western tip of the Rockaway Peninsula on the southern site of Long Island. Breezy Point is part of the Jamaica Bay unit, one of three geographic units that comprise the Gateway National Recreation Area. The park is owned by the federal government and managed by NPS. Breezy Point is comprised of approximately 200 ac (80.9 ha) of ocean-front beach, bay shoreline, sand dunes, marshes, and grasslands. |
| 4 | Coney Island | Brooklyn | Tourist Destination | Coney Island is a residential and commercial neighborhood located in the southwestern shore of Long Island in the borough of Brooklyn, New York. Coney Island is known for its amusement parks which have been around since the 1830's. There are currently two amusement parks: Luna Park and Deno's Wonder Wheel Amusement Park, which include about 50 rides. Other attractions include movie houses, restaurants, the New York Aquarium, sideshows, concert hall, boardwalk, and beaches. |
| 5 | Empire State Building | Manhattan | Tourist Destination, Historic (NRHP, NHL, NYC Landmark) | The Empire State Building is a 102-story building located in midtown Manhattan, New York City. The building stand approximately 1,454 ft (443.2 m) tall, including its antenna. The Empire State Building is owned by Empire State Realty Trust and was listed on the NRHP in November 1982 and granted NHL status in June 1986. The land surrounding the Empire State Building consists of dense urban development associated with midtown Manhattan. |
| 6 | Floyd Bennett Field | Brooklyn | Tourists Destination, Public Recreation, Historic (NRHP) | Floyd Bennet Field is an airfield located in southeast Brooklyn in New York City, along the north side of Jamaica Bay. The field was used as a municipal airport in the 1930's and as a naval air station in the 1940's. The field was deactivated in 1971 and was soon after made part of the NPS Gateway National Recreation Area. The field is owned by the federal government and managed by NPS. Floyd Bennet Field is part of the Jamaica Bay unit, one of three geographic units that comprise the Gateway National Recreation Area. The property includes several recreational activities opportunities as sports fields, a golf driving range, military history, playground, hiking trails, remote control aircraft field, and camping. The field was listed on the NRHP in April 1980. |
| 7 | Fire Island Lighthouse | Suffolk | Tourist Destination, Public Recreation, Historic (NRHP) | The Fire Island Lighthouse is a 168 ft (51.2 m) lighthouse located on the southwestern end of Fire Island, New York. A two-story keepers house is located adjacent to the lighthouse. The lighthouse is part of the Fire Island National Seashore, which is owned and managed by NPS, and was listed on the NRHP in September 1981. Visitor services at the site are operated by the Fire Island Lighthouse Preservation Society under a cooperating agreement with the NPS. |
| 8 | Fort Hamilton | Kings | Active Military and Residential | Fort Hamilton is an active military installation located in the southwestern portion of the borough of Brooklyn, New York on Long Island. The fort was built in the mid to late 1820's and has been actively in use since 1825. It is the last active-duty military post in New York City. Fort Hamilton is a combined community comprised of active duty Army, Navy, Air Force, Marines, Coast Guard, National Guard and reserve. |
| 9 | Fort Wadsworth | Staten Island | Tourist Destination, Public Recreation, Historic (NRHP) | Fort Wadsworth is one of the oldest military installations in the nation and occupies 226 ac (91.5 ha) on the northeastern shore of Staten Island, on the Narrows of New York Harbor. The fort was owned by the United States Navy until it was turned over the NPS in 1994, when it became part of the Staten Island Unit of the Gateway National Recreation Area. |

## Table AA-1.1: Visual Resource Inventory within the Visual Offshore Study Area

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| | | | | The fort is now owned and operated by the NPS, however, the United States Coast Guard uses many of the buildings and housing on the property. The fort contains several historic structures, such as the Battery Weed located directly on the harbor. The battery was listed on the NRHP in January 1972. |
| 10 | Great Kills Park | Staten Island | Tourist Destination, Public Recreation | Great Kills Park is a 523-ac (211.7-ha) public park located in Great Kills along approximately 2 mi (3.2 km) off Staten Island's south shore. The park is also part of the Gateway National Recreation Area, which is owned by the federal government and managed by NPS. Great Kills Park is part of the Staten Island unit, one of three geographic units that comprise the Gateway National Recreation Area. The park includes several beaches, multi-use path, hiking and biking trails, fishing, and a marina and boat launch. |
| 11 | Green-Wood Cemetery | Brooklyn | Tourist Destination, Historic (NRHP, NHL) | The Green-Wood Cemetery is a 478-ac (193.4-ha) cemetery located in Brooklyn, New York City, and lies several blocks south of Prospect Park. The cemetery was founded in 1838 and was one of the first rural cemeteries in America. The park consists of hills, valleys, several ponds, walking paths, and an arboretum. The cemetery was listed on the NRHP March 1997 and designated an NHL in September 2006. The cemetery is maintained by the Green-Wood Historic Fund. |
| 12 | Heckscher State Park | Suffolk | Public Recreation | Heckscher State Park is a 1,600-ac (647.5 ha) park located on the south shore of Long Island and the north side of the Great South Bay, approximately 3.5 mi (5.6 km) north of Fire Island. The park is owned and managed by the State of New York. The park includes several amenities including trails, playgrounds, playfields, beaches, pavilions, cottages and board launces. |
| 13 | Wantagh Park | Nassau | Public Recreation | Wantagh Park is a 111-ac (44.9 ha) county park located on the southwestern portion of Long Island approximately 2.3 mi (3.7 km) north of Jones Island barrier island. The park is owned and maintained by Nassau County. The park includes tennis and baseball courts, soccer and football fields, roller rink, multi-use paths, playgrounds, swimming complex, fishing, pier and boat launch. |
| 14 | Jacob Riis Park | Queens | Tourist Destination, Public Recreation, Historic (NRHP, Historic District) | Jacob Riis Park is a seaside park located at the southwestern end of Rockaway Peninsula of Queens, New York. The park is part of the Gateway National Recreation Area, which is owned by the federal government and managed by NPS. Jacob Riis Park is part of the Jamaica Bay unit, one of three geographic units that comprise the Gateway National Recreation Area. The park includes an art deco bathhouse, boardwalks, ball courts, and playgrounds. |
| 15 | Jamaica Bay Wildlife Refuge | Brooklyn/Queens | Tourist Destination, Public Recreation | Jamaica Bay Wildlife Refuge covers approximately 20-$mi^2$ (51.8 $km^2$) of open bay, saltmarsh, mudflats, upland field and woods, and freshwater ponds. The refuge is located in the southwestern portion of Long Island. The park is also part of the Gateway National Recreation Area, which is owned by the federal government and managed by NPS. Jamaica Bay Wildlife Refuge is part of the Jamaica Bay unit, one of three geographic units that comprise the Gateway National Recreation Area. The refuge includes a nature center, trails, wildlife viewing. |
| 16 | Jones Beach State Park/Short Beach | Nassau | Tourist Destination, Public Recreation, Historic (NRHP, Historic District) | Jones Beach State Park is located at the southern end of Jones Island a barrier island south of Long Island, New York. The park was listed on the NRHP in 2005. The park is owned and maintained by the New York State Office of Parks, Recreation and Historic Preservation. The park is comprised of approximately 6 mi (9.7 km) of beaches along the Atlantic Ocean, and includes a boardwalk, playgrounds, miniature golf, ball courts, several concession stands, a concert hall, and Jones Beach Nature Center. |
| 17 | Long Island Maritime Museum | Suffolk | Tourist Destination, Historic (NRHP, NHL) | Long Island Maritime Museum is located in West Sayville on south central shore of Long Island, New York. The museum was founded in 1966 and is committed to the research, preservation and interpretation of the regions nautical heritage. The museum is the current home of the Priscilla and Modesty, two vessels which are National Historic Landmarks. The museum also includes the National Historic Landmark, The Rudolph Oyster House, which is a commercial oyster culling building. The museum is privately owned and operated. |

## Table AA-1.1: Visual Resource Inventory within the Visual Offshore Study Area

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| 18 | Nickerson Beach Park | Nassau | Public Recreation | Nickerson Beach is a 155-ac (62.7-ha) park that is part of the Nassau County park since and was established in 1976. The park is located along the Atlantic Ocean on the south shore of Long Island. The beach is approximately 0.5 mi (0.8 km) long. The park is owned and maintained by Nassau County. In addition to the beach, the park includes basketball, volleyball and tennis courts, cabanas, skate park, mini golf course, swimming pools, playground, and a concession stand. |
| 19 | Norman J Levy Park and Preserve | Merrick | Public Recreation | Norman J Levy Park and Preserve is a 52-ac (21-ha) park located along the east side of Meadowbrook Parkway and approximately 3 mi (4.8 km) north of Jones Beach Island. The site was formally used as a landfill and was converted into a park and preserve in early 2000. The park includes approximately three mi (4.8 km) of hiking and jogging trails, exercise stations, wildlife viewing, fishing pier and kayak launch. The preserves highest point is approximately 115 ft (35.1 m) and provides views of the Jones Beach Tower, the New York City skyline and other coastal features. The park is owned and managed by the Town of Hempstead, New York. |
| 20 | Ocean Beach Park | Suffolk | Public Recreation | Ocean Beach Park is a 3.3-mi (5.3 km) stretch of sandy beach along the south-central portion of Long Beach barrier island. Ocean Beach Park is the city's largest park and includes a 2.5-mi (4 km) elevated boardwalk. One of the most unique aspects of the park is its accessibility to the public. The park is maintained by the City of Long Beach. |
| 21 | Oceanside Park | Nassau | Public Recreation | Oceanside Park is a 38-ac (15.4 ha) local park located Nassau County on Long Island, New York. The park is located on the northern side of Middle Bay and the end of Mahlon Brower Drive. The park includes basketball, handball, paddleball, tennis, volleyball courts, a roller rink, outdoor pools, baseball fields, playgrounds and walking trails. The park is owned and maintained by the Town of Hempstead. |
| 22 | Otis Pike Fire Island High Dune Wilderness | Suffolk | Tourist Destination, Public Recreation, Designated Wilderness Area | Otis Pike Fire Island High Dune Wilderness is a barrier island located south of Long Island and adjacent to Smith Point County Park and stretches approximately 7 mi (11.2 km) southwest to Robert Moses State Park. This wilderness area is the only federally designated wilderness in the State of New York and is owned and operated by the NPS. Activities in the wilderness include hiking, backcountry camping, fishing and wildlife viewing. |
| 23 | Overlook Beach | Suffolk | Public Recreation | Overlook Beach is located on the eastern end of the Jones Beach barrier island on the south side of Long Island, New York. The beach is owned and maintained by the Town of Babylon and is a resident only beach. Amenities include playground, picnic areas, beach hut and concession stand. |
| 24 | Robert Moses State Park | Suffolk | Public Recreation | Robert Moses is an 875-ac (354 ha) state park located on the western end of Fire Island, a barrier island off the southern coast of Long Island. The park includes approximately 5 mi (8 km) of beach along the Atlantic Ocean. Other activities include shops, concessions, picnic area, volleyball court, mini golf course, trails, playgrounds, swimming, and surfing. The park is owned and maintained by NY State Parks, Recreation and Historic Preservation department. |
| 25 | Rockaway Beach and Boardwalk | Queens | Tourist Destination, Public Recreation, Residential | Rockaway Beach and boardwalk is a beach along the Atlantic Ocean and located on the Rockaway peninsula on the southwestern side of Long Island, New York. The beach extends for almost the entirety of the peninsula up to where it abuts Jacob Riis Park near the western end. A 5.5-mi (8 km) boardwalk runs along the beach from Beach 9th Street to Beach 126th Street. Rockaway beach also includes a variety of concessions, playgrounds and other outdoor activities, and it is the city's only legal surfing beach. The beach is owned and maintained by New York City Parks department. |
| 26 | Shorefront Park | Suffolk | Public Recreation | Shorefront Park is a located within the Village of Patchogue on the south shore of Long Island in Suffolk County, New York. The park sits on the north shore of Patchogue Bay on Smith Street at the south end of Rider Avenue. The park includes a ballfield, playgrounds, walking path, and hosts several outdoor events. The park is owned and maintained by the Village of Patchogue. |

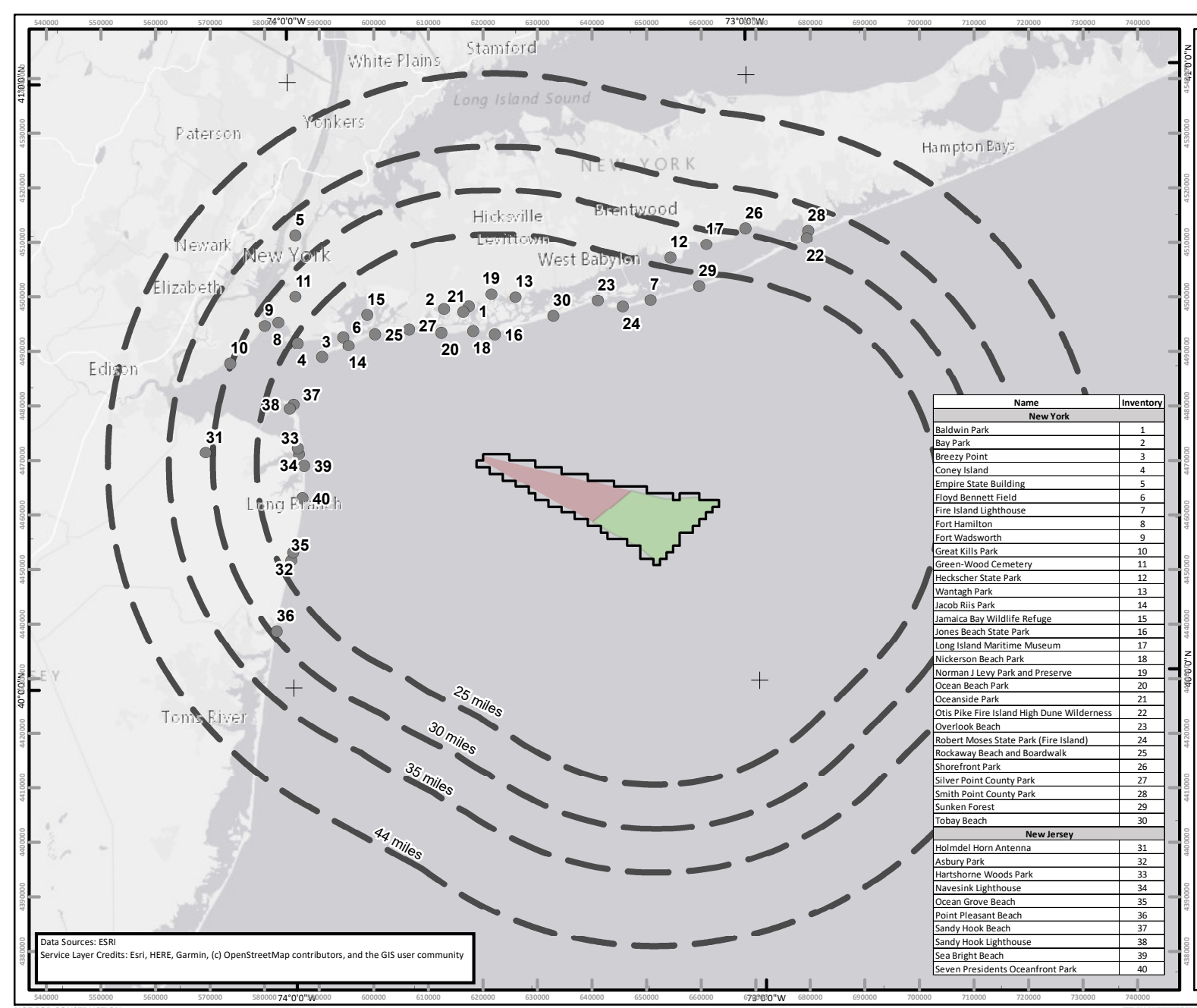
## Table AA-1.1: Visual Resource Inventory within the Visual Offshore Study Area

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| 27 | Silver Point County Park | Nassau | Private Beach Club | Silver Point County Park is located in the Town of Hempstead in Nassau County, New York. The park is located south of Far Rockaway Inlet, at the tip of the westernmost barrier island on Long Island's south shore. The park is now privately owned and is occupied by the Silver Point Beach Club which is a member only club. There is no public access. |
| 28 | Smith Point Park | Suffolk | Public Recreation | Smith Point Park is a beachfront county park located on the east end of Fire Island, along the central south shore of Long Island near Shirley, New York. The park is the largest park owned by Suffolk County and in addition to beaches, the park includes camping, fishing, food concession, playgrounds, bird watching, and off-road outer beach access. |
| 29 | Sunken Forest | Suffolk | Tourist Destination, Public Recreation | The Sunken Forest includes an approximately 50-ac (20.2-ha) tract of beach, dunes and ancient holly forest that is part of the Fire Island National Seashore in New York. The forest is located between the Cherry Grove and Point O' Woods communities on Fire Island and includes a visitor's center and boardwalk. The Sunken Forest was officially designated in 1960 as the Sunken Forest Preserve and the property was donated to the NPS in 1964. The forest is currently owned and maintained by the NPS. |
| 30 | Tobay Beach | Nassau | Public Recreation | Tobay Beach is an exclusive beach in Massapequa just past Jones Beach on the Jones Island peninsula. The park is owned and maintained by the town of Tobay Beach. The beach includes fishing, a spray park playground and restaurant. |
| **NEW JERSEY** | | | | |
| 31 | Holmdel Horn Antenna | Monmouth | Historic (NRHP, NHL) | The Holmdel Horn Antenna is a large microwave antenna used as a satellite communication antenna and radio telescope during the 1960s. The antenna is located at Bell Telephone Laboratories in Holmdel, NJ. The antenna was listed on the NRHP and designated a NHL in December 1989. The antenna is situated on top of a hill in a field surrounded by dense vegetation. |
| 32 | Asbury Park | Monmouth | Tourist Destination, Public Recreation | Asbury Park is one of several beaches located along the eastern New Jersey shoreline and is located south of Ocean Grove Beach. The boardwalk along the beach has a mix of restaurants, shops, arcade, splash park, mini golf, and playgrounds. The beach is maintained by the City of Asbury Park. |
| 33 | Hartshorne Woods Park | Monmouth | Tourist Destination, Public Recreation, Historic (NRHP, Historic District) | Hartsthorne Woods Park is a hilly, forested 794-ac (321-ha) site overlooking the Navesink River in northern Monmouth County, New Jersey. The park is owned and maintained by the Monmouth County Park System. The park is one of the highest elevations along the Atlantic Coast, reaching up to approximately 250 ft (76.2 m). The park includes trails, camping, cabins, hiking, biking, horseback riding, and scenic overlooks. In addition, the park includes several military installations such WWII era bunkers and the Battery Lewis battlement. The 224-ac (90.6-ha) Navesink Military Reservation Historic District, which is located in the eastern portion of the park, was listed on the NRHP in October 2015. |
| 34 | Navesink Lighthouse | Monmouth | Tourist Destination, Public Recreation, Historic (NRHP, NHL, NJRHP) | Navesink Lighthouse is a non-operational lighthouse and museum south of Sandy Hook. The lighthouse was built in 1828 and is situated approximately 200 ft (61.0 m) above sea level. The current lighthouse was built in 1862. The State of New Jersey acquired the lighthouse in 1962. The lighthouse was listed on the NRHP in December 1970, designated an NHL in February 2006, and designated a NJRHP in September 1980. |
| 35 | Ocean Grove Beach | Monmouth | Tourist Destination, Public Recreation, Historic (Historic District) | Ocean Grove Beach is one of several beaches located along the eastern New Jersey shoreline and is located between Asbury Park to the north and Bradley Beach to the south. The beach is owned and operated by the Ocean Grove Camp Meeting Association. |
| 36 | Point Pleasant Beach | Ocean County | Tourist Destination, Public Recreation | Point Pleasant Beach is one of several beaches located along the eastern New Jersey shoreline and is situated on the Barnegat Peninsula and is located between Manasquan Inlet to the north and Osborne Avenue. The beach is owned and maintained by the Borough of Point Pleasant Beach. The landscape surrounding this location includes flat, sandy |

## Table AA-1.1: Visual Resource Inventory within the Visual Offshore Study Area

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| | | | | beaches to the north and south, the Beach Front Boardwalk along the western boundary and residential development located just beyond to the west. |
| 37 | Sandy Hook – North Beach | Monmouth | Tourist Destination, Public Recreation | This beach is located at the northern end of the Sandy Hook peninsula off the coast of central New Jersey. The beach is located in the Sandy Hook unit, one of three geographic units that comprise the Gateway National Recreation Area, and as such is owned by the federal government and managed by NPS. The Sandy Hook peninsula includes several recreational facilities, including camping, a lighthouse, multi-use path, and several historic military structures. |
| 38 | Sandy Hook Light | Monmouth | Tourist Destination, Public Recreation, Historic (NRHP, NHL, NJRHP) | Sandy Hook Light is a 103 ft (31.4 m) lighthouse located at the northern end the Sandy Hook peninsula off the coast of central New Jersey and is the oldest continuously operating lighthouse in the United States since 1764. The lighthouse is located in the Sandy Hook unit, one of three geographic units that comprise the Gateway National Recreation Area, which is owned and managed by NPS. The lighthouse was listed on the NRHP in June 1964. |
| 39 | Sea Bright Beach | Monmouth | Tourist Destination, Public Recreation | Sea Bright Beach is a municipal beach located along the eastern shore of New Jersey approximately 3.5 mi (5.6 km) south of the Sandy Hook peninsula. The beach is maintained by the Borough of Sea Bright, New Jersey. |
| 40 | Seven Presidents Oceanfront Park | Monmouth | Tourist Destination, Public Recreation | Seven Presidents Park is an oceanfront park in the city of Long Branch and is maintained by the Monmouth County Park System. The park includes a mile (1.6 km) of public beach and approximately 38-acs (15.4-ha) of land. Within the park, amenities include swimming and surfing, a snack bar, picnic areas, volleyball court, playground, and a park and rink for skateboarders. |

Notes:
a/ The Inventory ID corresponds to the Visual Offshore Study Area Visual Resource Inventory map.
Acronyms:
NHL (U.S. National Historic Landmark)
NJRHP (New Jersey Register of Historic Places)
NRHP (U.S. National Register of Historic Places)
NYC (New York City)




| Name | Inventory |
|---|---|
| **New York** | |
| Baldwin Park | 1 |
| Bay Park | 2 |
| Breezy Point | 3 |
| Coney Island | 4 |
| Empire State Building | 5 |
| Floyd Bennett Field | 6 |
| Fire Island Lighthouse | 7 |
| Fort Hamilton | 8 |
| Fort Wadsworth | 9 |
| Great Kills Park | 10 |
| Green-Wood Cemetery | 11 |
| Heckscher State Park | 12 |
| Wantagh Park | 13 |
| Jacob Riis Park | 14 |
| Jamaica Bay Wildlife Refuge | 15 |
| Jones Beach State Park | 16 |
| Long Island Maritime Museum | 17 |
| Nickerson Beach Park | 18 |
| Norman J Levy Park and Preserve | 19 |
| Ocean Beach Park | 20 |
| Oceanside Park | 21 |
| Otis Pike Fire Island High Dune Wilderness | 22 |
| Overlook Beach | 23 |
| Robert Moses State Park (Fire Island) | 24 |
| Rockaway Beach and Boardwalk | 25 |
| Shorefront Park | 26 |
| Silver Point County Park | 27 |
| Smith Point County Park | 28 |
| Sunken Forest | 29 |
| Tobay Beach | 30 |
| **New Jersey** | |
| Holmdel Horn Antenna | 31 |
| Asbury Park | 32 |
| Hartshorne Woods Park | 33 |
| Navesink Lighthouse | 34 |
| Ocean Grove Beach | 35 |
| Point Pleasant Beach | 36 |
| Sandy Hook Beach | 37 |
| Sandy Hook Lighthouse | 38 |
| Sea Bright Beach | 39 |
| Seven Presidents Oceanfront Park | 40 |

# EMPIRE OFFSHORE WIND LEASE: OCS-A 0512 EMPIRE WIND PROJECT

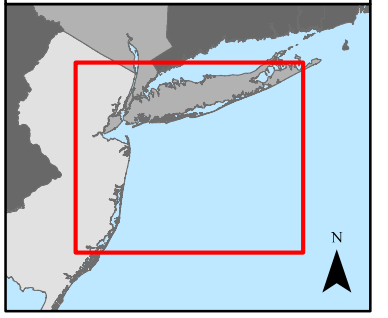
equinor

Inventory Location
EW 1
EW 2
Lease Area
Lease Area Buffer

| | |
|---|---|
| Date | February 1, 2022 |
| File/Job Number | 194-1247-0001 |
| Personnel | Figure Prepared by: Tetra Tech Offshore GIS |

0 5 10 15 20 Miles
0 3 6 9 12 Nautical Miles
0 5 10 15 20 Kilometers

## REFERENCE MAP




NOT FOR CONSTRUCTION

1. Baldwin Park, NY

2. Bay Park, NY

3. Breezy Point, NY

4. Coney Island, NY

Permission to take photographs from the Empire State Building
for the purpose of the visual impact assessment was not obtained by building management.

5. Empire State Building, NY

6. Floyd Bennett Field, NY

7. Fire Island Lighthouse, NY

8. Fort Hamilton, NY

9. Fort Wadsworth, NY

10. Great Kills Park, NY

11. Green-Wood Cemetery, NY

12. Heckscher State Park, NY

13. Wantagh Park, NY


14. Jacob Riis Park, NY

15. Jamaica Bay Wildlife Refuge, NY

16. Jones Beach State Park / Short Beach, NY

17. Long Island Maritime Museum, NY

18. Nickerson Beach Park, NY

19. Norman J. Levy Park & Preserve, NY

20. Ocean Beach Park, NY

21. Oceanside Park, NY

22. Otis Pike Fire Island High Dunes Wilderness, NY

23. Overlook Beach, NY

24. Robert Moses State Park, NY

25. Rockaway Beach and Boardwalk, NY

26. Shorefront Park, NY


27. Silver Point County Park, NY

28. Smith Point Park, NY

29. Sunken Forest, NY

30. Tobay Beach, NY

31. Holmdel Horn Antenna, NJ

32. Asbury Park, NJ

33. Hartshorne Woods Park, NJ

34. Navesink Lighthouse, NJ

35. Ocean Grove Beach, NJ

36. Point Pleasant Beach, NJ

37. Sandy Hook - North Beach, NJ

38. Sandy Hook Light, NJ

39. Sea Bright Beach, NJ

40. Seven Presidents Oceanfront Park, NJ

## Table AA-1.2: Visual Resource Inventory within the Visual Onshore Study Areas

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| **NEW YORK** | | | | |
| **EW 1 ONSHORE SUBSTATION and O&M Base** | | | | |
| 1 | Statue of Liberty | New York City, NY | Tourist Destination, Historic (National Monument, NRHP, NYC Landmark, NJRHP) | The Statue of Liberty is a copper statue that was a gift from the people of France to the people of the United States. The statue was dedicated on October 28, 1886. The statue is part of the Statue of Liberty National Monument which is comprised of the statue and Ellis Island. The statue is owned and operated by the NPS and was listed on the NRHP in September 2017. The statue is also designated as a UNESCO World Heritage Site, U.S. National Monument, NJNRHP, and NYC Landmark. The landscape surrounding this location includes open water with dense urban development along the mainland of New York and New Jersey. |
| 2 | Bush Terminal Piers Park | Brooklyn, NY | Public Recreation | Bush Terminal Piers Park is a 14-ac (5.7-ha) waterfront park located in the industrial section of Sunset Park in Brooklyn, New York. The park is located west of 1st Avenue between 43rd and 51st streets and offers views of the area's tidal pools and the Bay Ridge Channel. The site was once a port complex but was reclaimed and turned into a public park, which opened in 2014. The park is owned and managed by the New York City Department of Parks and Recreation. The park includes baseball and soccer fields, seating and a walking trail. The landscape surrounding this location includes the Upper Bay to the west, piers to the northeast and southwest and dense urban development to the east. |
| 3 | Columbia Street Esplanade | Brooklyn, NY | Public Recreation | Columbia Street Esplanade is located at the end of Columbia Street in Brooklyn, New York. The esplanade runs along the east side of a pier that extends out into Gowanus Bay. Amenities include benches, lighting and a bikeway. The esplanade is privately owned and maintained but is open and accessible to the public. The landscape surrounding the esplanade includes warehouses along the pier to the west and north and Gowanus Bay and east and south with the South Brooklyn Marine Terminal located on the eastern side of the bay. |
| 4 | Ellis Island | New York City, NY | Tourist Destination, Historic (National Monument, NRHP, NYC Landmark, NJRHP) | Ellis Island is located within New York Harbor and is the former immigration inspection station operating between 1892 and 1954. The island is part of the Statue of Liberty National Monument and was designated a U.S. National Monument in May 1965. The island is also designated as a NRHP (October 1966), NJRHP (May 1971), and NYC Landmark (November 1993). The island includes the Ellis Island Immigration Museum and the Wall of Honor, a 770-panel wall including approximately 800,000 names. The island is owned and maintained by the National Park Service. |
| 5 | Green-Wood Cemetery | Brooklyn, NY | Tourist Destination, Historic (NRHP, NHL) | The Green-Wood Cemetery is a 478-ac (193.4-ha) cemetery located in Brooklyn, New York City, and lies several blocks south of Prospect Park. The cemetery was founded in 1838 and was one of the first rural cemeteries in America. The park consists of hills, valleys, several ponds, walking paths, and an arboretum. The cemetery was listed on the NRHP March 1997 and designated an NHL in September 2006. The cemetery is maintained by the Green-Wood Historic Fund. |
| 6 | Hudson River Waterfront Walkway | Hoboken, NJ | Public Recreation | The Hudson River Waterfront Walkway is a 30-ft (9.1-m) wide pathway that extends 18.5 mi (29.8 km) along the western shore of the Upper Bay and Hudson River between Bayonne to the George Washington Bridge on the New Jersey shore. The walkway follows the general contour of the shoreline and traverses residential, commercial, re-developed piers, wetlands, and industrial development. The walkway was developed to provide connectivity between municipalities and to provide public access to the water's edge. There are several parking and points of interest along the walkway route. According to the Hudson River Waterfront Conservancy[1] "The walkway was adopted into New Jersey Administrative |

[1] The Hudson River Waterfront Conservancy is a non-profit organization that works with the New Jersey Department of Environmental Protection to monitor the construction, maintenance and usage of the walkway.

## Table AA-1.2: Visual Resource Inventory within the Visual Onshore Study Areas

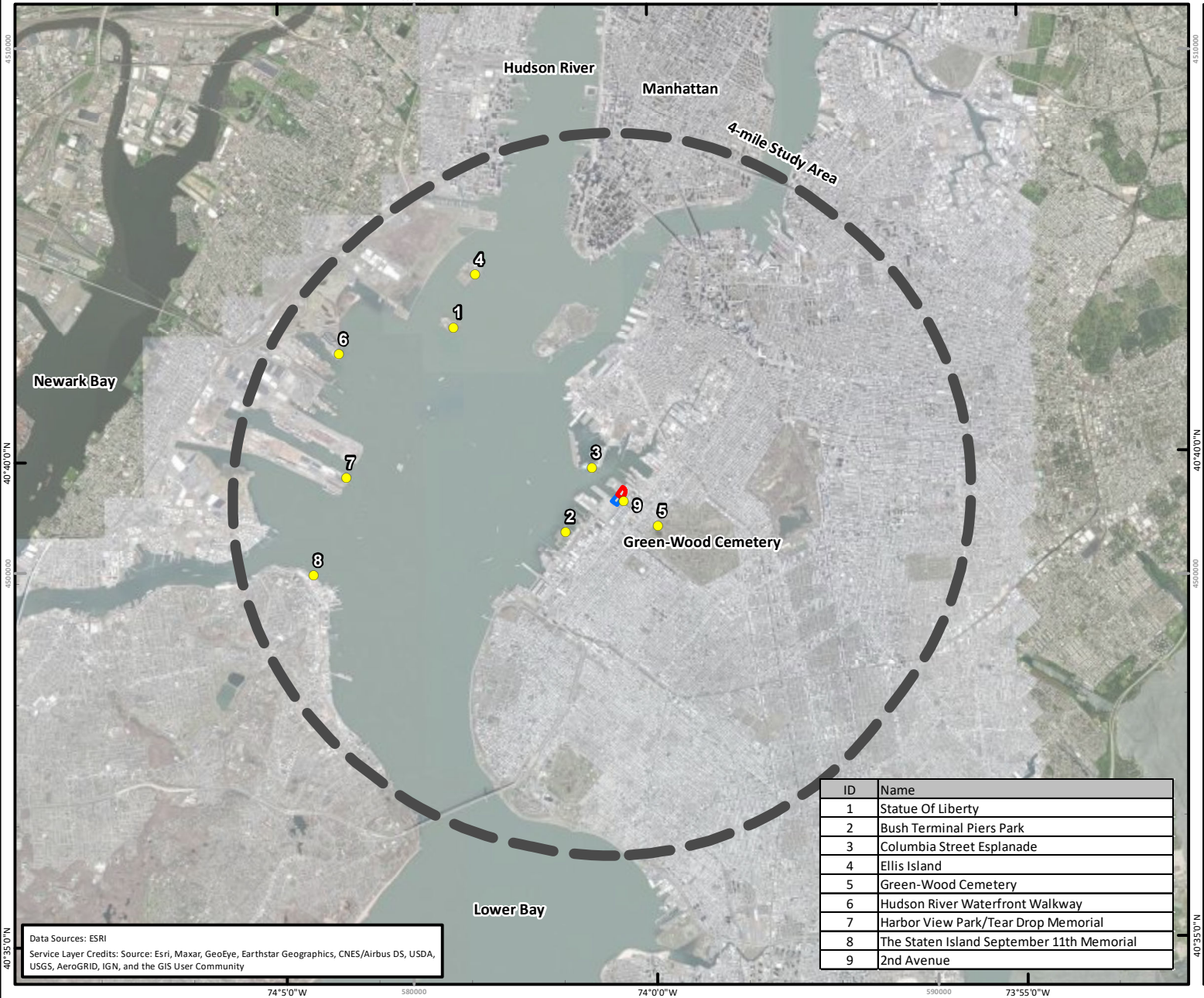
| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| | | | | law in 1988. It requires the construction and maintenance of the Walkway by the owner of the waterfront land. It also requires free, unobstructed access to the Walkway 24 hours a day. An easement conveys the conservation restriction to the NJDEP which is responsible for the enforcement of the regulation." The landscape surrounding the walkway includes the Upper Bay and Hudson River to the east and a variety of land uses to the west, including industrial, residential, and commercial. |
| 7 | Harbor View Park/Tear Drop Memorial | Bayonne, NJ | Tourist Destination, Public Recreation | Harbor View Park is a 2 ac (0.8 ha) public park and is the location of the Tear Drop Memorial (also known as To the Struggle Against World Terrorism and the Tear of Grief). The memorial is a 10-story sculpture given to the United States as a gift from the Russian Government as a memorial to the victims of the September 11 attacks (The Peninsula 2019). The park is owned and maintained by the City of Bayonne, New Jersey. The landscape surrounding the location includes a terminal and Cape Liberty (a year-round cruise port) to the north, Upper Bay to the east, and industrial development associated with cargo/shipping to the south and east. |
| 8 | The Staten Island September 11th Memorial | Staten Island, NY | Tourist Destination, Public Recreation | The Staten Island September 11th Memorial is located along Staten Island's North Shore Waterfront Esplanade. The memorial resembles a pair of wings reaching skyward. The esplanade includes a walking/biking path and benches. The park is owned and maintained by the NYC parks department. |
| 9 | 2nd Avenue | Brooklyn, NY | Travel Way | 2nd Avenue beings just north of 28th Street and extends south-southwest approximately 2 mi (3.2 km) to the Belt Parkway and provides access to several commercial and industrial developments along the waterfront. The landscape surrounding this local road is densely urban and includes heavy industrial and commercial development. Upper Bay is located approximately 0.6 mi (1 km) to the west. |
| **EW 2 ONSHORE SUBSTATION A** | | | | |
| 1 | Harbor Isle Beach | Harbor Isle, NY | Public Recreation, Residential | Harbor Isle Beach is a small beachfront in the Harbor Isle section of Island Park. The beach is for the use of local residents only. Facilities feature a playground and picnic areas. |
| 2 | Shopping Center | Oceanside, NY | Travel Way | A large retail building and associated parking is directly south of Daly Boulevard and east of Hampton Road. The landscape surrounding this area is commercial/industrial development. |
| 3 | Residential Neighborhood/ Oceanlea Drive | Oceanside, NY | Residential Neighborhood, Travel Way | This neighborhood is directly north of the Oceanside Cove neighborhood. This neighborhood has views west towards the onshore substation site as well as views in all other directions of residential development, as well as some commercial and industrial development. |
| 4 | Residential Neighborhood/ Reina Road | Oceanside, NY | Neighborhood, Travel Way | Residential development with some marinas, docks, and commercial development is scattered throughout this area. Views towards the onshore substation site exist in some areas where views are open. |
| 5 | Bay Park | Bay Park, NY | Public Recreation | Bordered by the East Rockaway Channel on the east and Hewlett Bay on the south and west, Bay Park is a scenic 96-ac (38.8-ha) park located in the southwest corner of Nassau County. Bay Park has been in the Nassau County park system since 1947. This park has a golf course, cricket field, several courts, picnic area, dog run, and fishing and boating opportunities. |
| 6 | Natural Area/Residential Neighborhood | Island Park, NY | Tourist Destination, Public Recreation | North of the Masone Point Beach Park is a natural area which includes a trail. This area is also surrounded by residential development. |

## Table AA-1.2: Visual Resource Inventory within the Visual Onshore Study Areas

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| 7 | Daly Boulevard | Oceanside, NY | Tourist Destination, Public Recreation | Daly Boulevard is a thoroughfare for commercial, industrial, and residential traffic. Development along Daly Boulevard between Long Beach Road and Hampton Road includes a commercial strip mall, apartment and townhome complex, Stony Creek aggregate recycling center and National Grid Substation, Costco, and a recycling and construction and demolition dump site. |
| 8 | Hewlett Point Park | Hempstead, NY | Public Recreation, Residential | Hewlett Point Park is owned by the Town of Hempstead and is available to residents only. It includes access to launch boats without a fee. With a fee, residents can use the beach, pool, and other facilities (e.g., parking, restrooms, potable water, picnic area). |
| 9 | Woodmere Dock | Hewlett Neck, NY | Public Recreation | Woodmere Dock offers a dedicated paved ramp for hand launched boats only. The park offers few amenities other than seating and a fishing pier. |
| 10 | Masone Point Beach | Island Park, New York | Tourist Destination, Public Recreation | The Masone Point Beach offers a playground, splash park, basketball and handball courts, concession stand, large picnic area with barbecues, and a gazebo Pavilion for large groups. The park is owned by the Village of Island Park. |
| **EW 2 ONSHORE SUBSTATION C** | | | | |
| 1 | Harbor Isle Bridge | Island Park, NY | Travel Way | Harbor Isle Bridge is a thoroughfare primarily for residential and recreational traffic. Residential houses, beach areas, and marinas can be seen from this bridge. |
| 2 | Warwick Bridge | Island Park, NY | Travel Way | Warwick Bridge is a thoroughfare primarily for residential and recreational traffic. Residential houses, beach areas, and marinas can be seen from this bridge. |
| 3 | Island Park Station | Island Park, NY | Travel Way | Island Park Train Station is public transportation serving residential communities in the area. It is surrounded by the Grand Rehabilitation and Nursing at South Point, mixed commercial and industrial development, and residential development. |
| 4 | Quebec Road | Island Park, NY | Residential, Travel Way | Quebec Road is a public road that serves a nearby residential community. It is bordered by the proposed facility, the Island Park Train Station, and mixed commercial and industrial use. |
| 5 | Railroad Place | Island Park, NY | Public Recreation | Road adjacent to a boat maintenance shop which is adjacent to Pop's Seafood Shack and Grill. Residential development, train, and mixed commercial and industrial use are located nearby. |
| 6 | Barnum Landing Shopping Center | Island Park, NY | Travel Way, Residential | Shopping center located east of Pop's Seafood Shack and Grill includes several stores and a large parking area. Residential development and mixed commercial and industrial use are located nearby. |
| 7 | Long Beach Boulevard | Island Park, NY | Travel Way | Long Beach Boulevard is a thoroughfare for commercial, industrial and residential traffic. Development along Long Beach Boulevard includes a commercial strip mall, residential areas, and the Grand Rehabilitation and Nursing at South Point. |
| 8 | Long Beach Bridge | Island Park, NY | Travel Way | Long Beach Bridge is a thoroughfare for commercial, industrial and residential traffic. Development along Long Beach Bridge includes a commercial strip mall, residential areas, and the Grand Rehabilitation and Nursing at South Point in Island Park, New York, as well as recreation, residential, and mixed commercial uses in Long Beach, New York. |
| 9 | Wreck Lead Channel | Long Beach, NY | Travel Way | Dispersal area near Long Beach Bridge, nearby to roads and mixed commercial and industrial uses. Residential development also located nearby. |
| 10 | Riverside Road | Long Beach, NY | Travel Way, Residential | Riverside Road is a thoroughfare primarily serving residential communities, public recreation, and mixed commercial and industrial uses. |
| 11 | Long Beach Skate Park | Long Beach, NY | Public Recreation | Long Beach Park includes a fishing pier, dog park, skate park, ice arena, and recreational center which sits along Wreck Lead Channel. Adjacent to the park areas are a wastewater treatment plant, soup kitchen, and residential development. |

## Table AA-1.2: Visual Resource Inventory within the Visual Onshore Study Areas

| Inventory ID [a/] | Name | Location | Resource Type | Description |
|---|---|---|---|---|
| Notes:<br>a/ The Inventory ID corresponds to the Visual Offshore Study Area Visual Resource Inventory maps. There is a separate inventory map for each of the onshore substation sites.<br>Acronyms:<br>NPS (National Parks Service)<br>NHL (U.S. National Historic Landmark)<br>NJRHP (New Jersey Register of Historic Places)<br>NRHP (U.S. National Register of Historic Places)<br>NYC (New York City) | | | | |




| ID | Name |
|---|---|
| 1 | Statue Of Liberty |
| 2 | Bush Terminal Piers Park |
| 3 | Columbia Street Esplanade |
| 4 | Ellis Island |
| 5 | Green-Wood Cemetery |
| 6 | Hudson River Waterfront Walkway |
| 7 | Harbor View Park/Tear Drop Memorial |
| 8 | The Staten Island September 11th Memorial |
| 9 | 2nd Avenue |

Data Sources: ESRI

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# EMPIRE OFFSHORE WIND LEASE: OCS-A 0512 EMPIRE WIND PROJECT

equinor

- Inventory Location
- EW 1 Onshore Substation
- O&M Base
- 4-mile Study Area

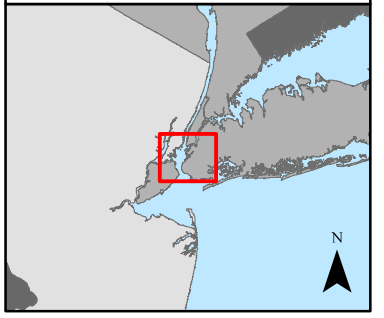
| | |
|---|---|
| Date | January 31, 2022 |
| File/Job Number | 194-1247-0001 |
| Personnel | Figure Prepared by: Tetra Tech Offshore GIS |

0 0.5 1 1.5 2 Miles

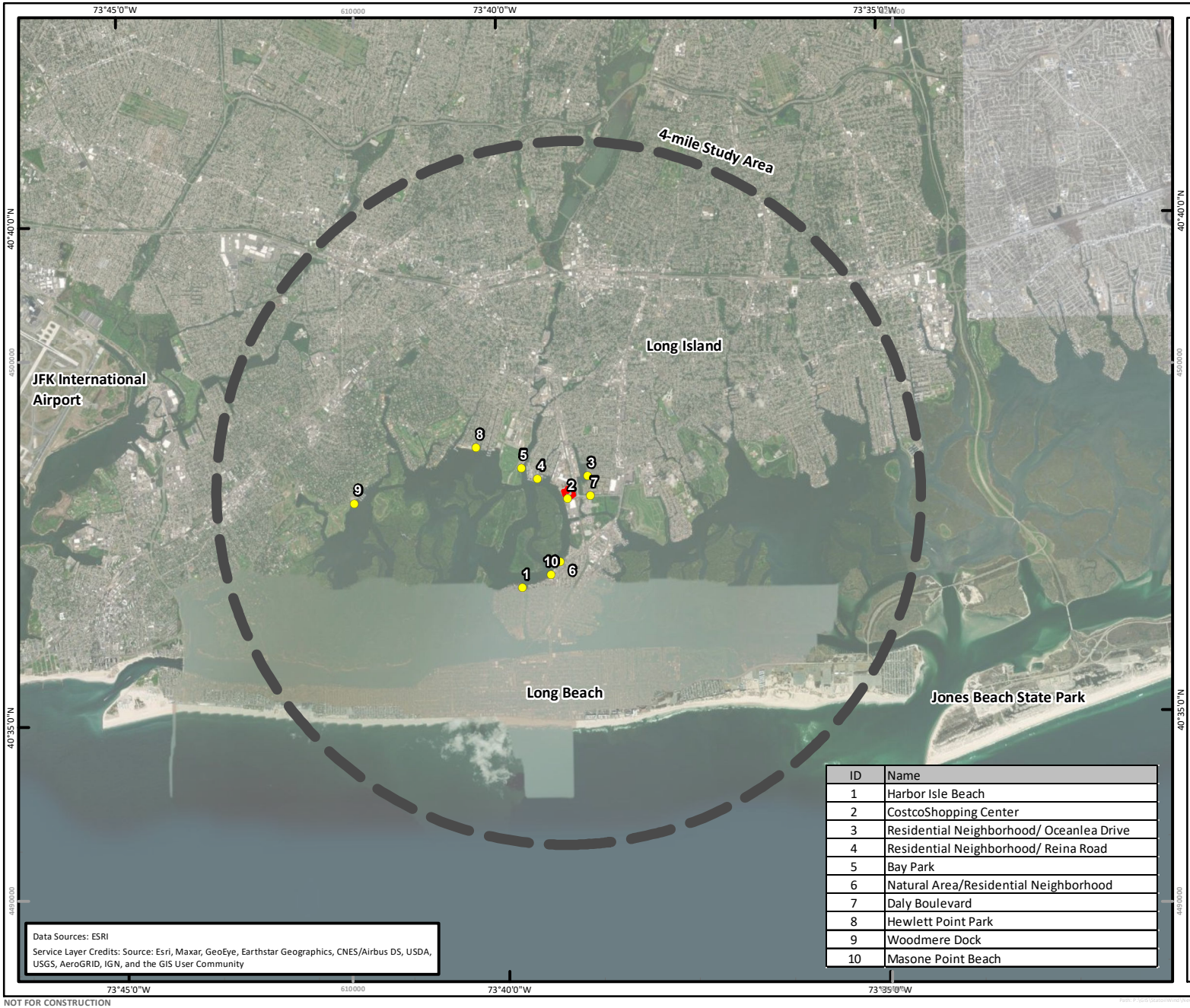
0 0.5 1 1.5 Nautical Miles

0 1 2 3 Kilometers

## REFERENCE MAP




NOT FOR CONSTRUCTION




| ID | Name |
|---|---|
| 1 | Harbor Isle Beach |
| 2 | CostcoShopping Center |
| 3 | Residential Neighborhood/ Oceanlea Drive |
| 4 | Residential Neighborhood/ Reina Road |
| 5 | Bay Park |
| 6 | Natural Area/Residential Neighborhood |
| 7 | Daly Boulevard |
| 8 | Hewlett Point Park |
| 9 | Woodmere Dock |
| 10 | Masone Point Beach |

Data Sources: ESRI

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# EMPIRE OFFSHORE WIND LEASE: OCS-A 0512 EMPIRE WIND PROJECT

equinor

- Inventory Location
- EW 2 Onshore Substation A
- 4-mile Study Area

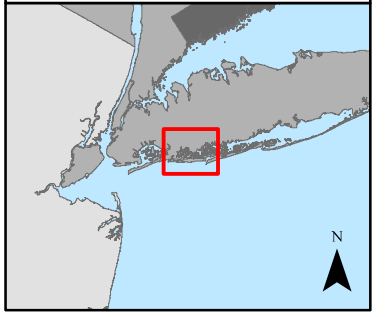
| | |
|---|---|
| Date | January 31, 2022 |
| File/Job Number | 194-1247-0001 |
| Personnel | Figure Prepared by: Tetra Tech Offshore GIS |

0 0.5 1 1.5 2 Miles

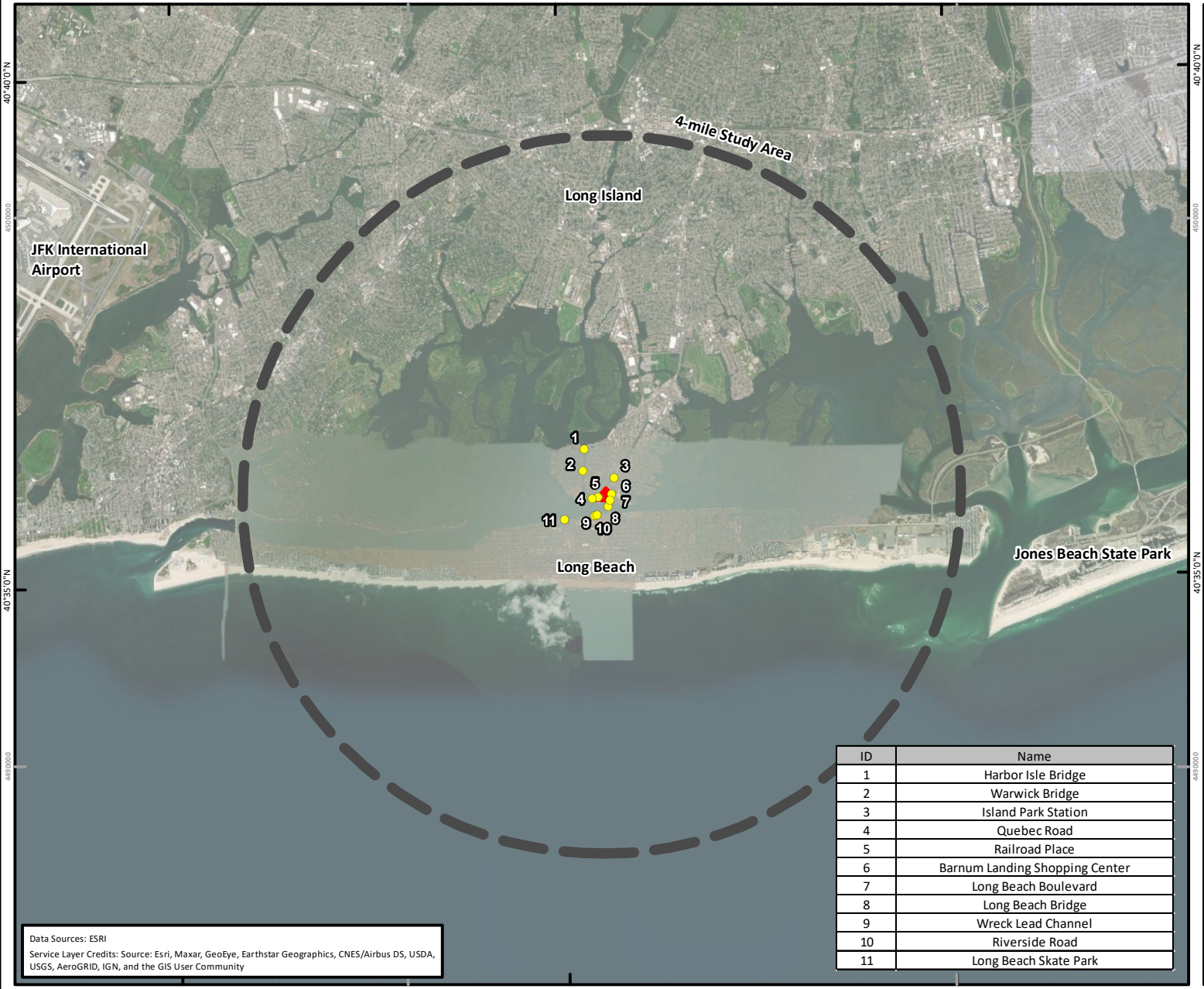
0 0.5 1 1.5 Nautical Miles

0 1 2 3 Kilometers

## REFERENCE MAP




NOT FOR CONSTRUCTION




| ID | Name |
|---|---|
| 1 | Harbor Isle Bridge |
| 2 | Warwick Bridge |
| 3 | Island Park Station |
| 4 | Quebec Road |
| 5 | Railroad Place |
| 6 | Barnum Landing Shopping Center |
| 7 | Long Beach Boulevard |
| 8 | Long Beach Bridge |
| 9 | Wreck Lead Channel |
| 10 | Riverside Road |
| 11 | Long Beach Skate Park |

Data Sources: ESRI

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# EMPIRE OFFSHORE WIND LEASE: OCS-A 0512 EMPIRE WIND PROJECT

equinor

- Inventory Location
- EW 2 Onshore Substation C
- 4-mile Study Area

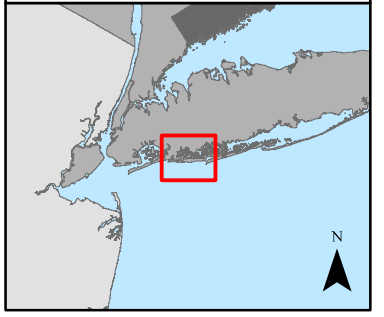
| | |
|---|---|
| Date | January 31, 2022 |
| File/Job Number | 194-1247-0001 |
| Personnel | Figure Prepared by: Tetra Tech Offshore GIS |

0 0.5 1 1.5 2 Miles

0 0.5 1 1.5 Nautical Miles

0 1 2 3 Kilometers

## REFERENCE MAP




NOT FOR CONSTRUCTION

1. Statue Of Liberty, NY

2. Bush Terminal Piers Park, NY

3. Columbia Street Esplanade, NY

4. Ellis Island, NY

5. Green-Wood Cemetery, NY

6. Hudson River Waterfront Walkway, NJ

7. Harbor View Park/Tear Drop Memorial, NJ

8. The Staten Island September 11th Memorial, NY

9. 2nd Avenue, NY


1. Harbor Isle Beach, NY

2. Shopping Center, NY

3. Residential Neighborhood/ Oceanlea Drive , NY

4. Residential Neighborhood/ Reina Road , NY

5. Bay Park, NY

6. Natural Area/Residential Neighborhood , NY


7. Daly Boulevard, NY

8. Hewlett Point Park, NY

9. Woodmere Dock, NY

10. Masone Point Beach, NY

1. Harbor Isle Bridge, NY

2. Warwick Bridge, NY


3. Island Park Station, NY

4. Quebec Road, NY

5. Railroad Place, NY

6. Barnum Landing Shopping Center, NY

7. Long Beach Boulevard, NY

8. Long Beach Bridge, NY

9. Wreck Lead Channel, NY

10. Riverside Road, NY

11. Long Beach Skate Park, NY

# ATTACHMENT AA-2 VISUAL CONTRAST RATING WORKSHEETS

Visual Contrast Rating Worksheets for Offshore Project Components:

- Empire State Building, NY
- Floyd Bennett Field, NY
- Fire Island Lighthouse, NY
- Great Kills Park, NY
- Heckscher State Park, NY
- Jacob Riis Park, NY
- Jones Beach State Park, NY
- Norman J Levy Park and Preserve, NY
- Otis Pike Fire Island High Dune Wilderness, NY
- Sunken Forest, NY
- Hartshorne Woods Park, NJ
- Ocean Grove Beach, NJ
- Point Pleasant Beach, NJ
- Sandy Hook – North Beach, NJ
- Sandy Hook Light, NJ
- Statue of Liberty, NY

Visual Contrast Rating Worksheets for Onshore Project Components:

- EW 1 Onshore Substation Site and O&M Base
  - 2nd Avenue
  - Columbia Street Esplanade
  - Hudson River Waterfront Walkway
  - Statue of Liberty

- EW 2 Onshore Substation A Site
  - Residential Neighborhood/Oceanlea Drive
  - Woodmere Docks/Residential Neighborhood
  - Masone Point Beach/Residential Neighborhood

- EW 2 Onshore Substation C Site
  - Quebec Road/Residential Neighborhood
  - Long Beach Bridge
  - Long Beach Skate Park
  - Island Park Station

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Empire State Building (Observation Deck)** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 33.6** | **Date: 06/30/19** |
| **Latitude: 40.748476° N** | **Longitude: -73.985883° W** |
| **Angle of Observation:** *Level* ☐ *Inferior* ☐ *Superior* ☒ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Tourist | Low to moderate | Moderate | High | Low to Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat, horizontal, curving, gently undulating (water)<br>Background (BG): flat<br>Seldom Seen (SS): flat, level (water) | FG/MG: small irregular patches; clumps<br>BG: block, patch<br>SS: not applicable (N/A) | FG/MG: vertical, parallel, large, geometric, prominent, angular, complex, tall, thin, wide<br>BG: flat, wide, block, linear<br>SS: N/A |
| **Line** | FG/MG: horizontal, curving (water); vertical, straight, thin, wide (land)<br>BG: horizontal, straight<br>SS: horizontal, straight (water) | FG/MG: horizontal, irregular, broken, clumps<br>BG: block, patch<br>SS: N/A | FG/MG: vertical, parallel, square, geometric<br>BG: flat, wide, block, linear<br>SS: N/A |
| **Color** | FG/MG: blue, gray (water)<br>BG/SS: bluish-gray | FG/MG/BG: light green, dark green<br>SS: N/A | FG/MG: gray, tan, blue, brown, red, green, black, white<br>BG: tan, red<br>SS: N/A |
| **Texture** | FG/MG: course, dense; smooth (water)<br>BG/SS: medium to fine | FG/MG: medium, scattered, sparse<br>BG: fine, scattered<br>SS: N/A | FG/MG: coarse, dense<br>BG: course, scattered<br>SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderae | Weak | None | Strong | Moderae | weak | None |
| | Form | | | | X | | | | X | | X | | |
| | Line | | | | X | | | | X | | X | | |
| | Color | | | | X | | | | X | | X | | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Moderate**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The Project will introduce several new vertical elements to the viewscape. The wind turbines will be more than 33.5 mi (53.9 km) from the viewer and will appear as small objects on the horizon. However, from this location the wind turbines appear as a thin dark line above the southern coast of Long Island separated by open ocean. The separation or gap between the wind turbines and the land mass creates contrast as the thin dark line of the wind turbines appear to be floating out on the ocean, thereby drawing the viewers' attention. As such, the Project will create moderate visual contrast.

**Empire State Building (Observation Deck)**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Floyd Bennett Field** | **Reviewers Name: S. Brooks** |
| **Distance to nearest (miles): 21.4** | **Date: 06/30/19** |
| **Latitude: 40.578989° N** | **Longitude: -73.884669° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | Low to moderate | Low to Moderate | Low to Moderate | Low to Moderate |

| **Has a Photo Simulation Been Created for KOP?** ☐ *Yes* ☒ *No* | **If yes, Figure Number:** N/A |
|---|---|

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat to gently rolling (land), horizontal, gently undulating (water)<br>Background (BG)/Seldom Seen (SS): not applicable (N/A) | FG/MG: patchy<br>BG/SS: N/A | FG/MG: vertical, short, thin; large, square, rectangular blocks, tall, thin<br>BG/SS: N/A |
| **Line** | FG/MG: flat, horizontal (butt edge with water)<br>BG/SS: N/A | FG/MG: weak horizontal<br>BG/SS: N/A | FG/MG: short, straight and vertical; bold, horizontal; rectangular, thin, vertical<br>BG/SS: N/A |
| **Color** | FG/MG: tan (land), bluish-gray (water)<br>BG/SS: N/A | FG/MG: tan, gold, reddish-brown, dark green<br>BG/SS: N/A | FG/MG: gray, tan, brown<br>BG/SS: N/A |
| **Texture** | FG/MG: course, dense; rough medium, dense,<br>BG/SS: N/A | FG/MG: fine and sparse, clumps; medium and scattered<br>BG/SS: N/A | FG/MG: fine, ordered; medium to course, scattered<br>BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

From this location, views towards the Project are obstructed by development along the Rockaway Peninsula south of this viewpoint. The limited number and the portion of the wind turbines potentially visible will appear as subordinate features within the landscape and will not change the overall character of the view. Development located along the horizon in the foreground will remain the focal points in the view. As such, the Project will create weak visual contrast under the representative scenario.

**Floyd Bennett Field**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Fire Island Lighthouse** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 21.7** | **Date: 06/30/19** |
| **Latitude: 40.632216° N** | **Longitude: -73.218455° W** |
| **Angle of Observation:** *Level* ☐ *Inferior* ☒ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | Moderate | Low to Moderate | Moderate | Low to Moderate |

| **Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* | **If yes, Figure Number:** Attachment AA-3 |
|---|---|

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat to gently rolling<br>Background (BG)/Seldom Seen (SS): flat, level | FG: rough, rounded, irregular<br>MG/BG/SS: not applicable (N/A) | FG: short, thin, vertical, diagonal, horizontal, geometric<br>MG/BG/SS: N/A |
| **Line** | FG/MG: flat, horizontal, gently curving<br>BG/SS: horizontal, straight, bold | FG: straight to gently curving (butt edge with access drive)/ weak horizontal, undulating<br>MG/BG/SS: N/A | FG: vertical, horizontal, diagonal, square/rectangular<br>MG/BG/SS: N/A |
| **Color** | FG/MG: light gray, beige; blue<br>BG/SS: blue | FG: light green, dark green, brown, tan<br>MG/BG/SS: N/A | FG: light/dark gray, tan, brown<br>MG/BG/SS: N/A |
| **Texture** | FG/MG: smooth, granular<br>BG/SS: smooth | FG: fine to rough, clumped<br>MG/BG/SS: N/A | FG: even, ordered, uniform; even, random<br>MG/BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | X | | | |
| | Line | | | | X | | | | X | X | | | |
| | Color | | | | X | | | | X | | X | | |
| | Texture | | | | X | | | | X | | X | | |

**Overall Level of Contrast: Strong**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The Project will introduce several vertical elements into the landscape setting. The distance of the wind turbines from the viewer will help to reduce their prominence within the landscape setting. However, give the number of wind turbines that are visible and the horizontal spread across the horizon, the introduction of the wind turbines will serve a focal point within the viewscape and change the natural character of the existing landscape setting. As such, the Project will introduce strong visual contrast.

**Fire Island Lighthouse**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Great Kills Park** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 31.0** | **Date: 06/30/19** |
| **Latitude: 40.537427° N** | **Longitude:-74.129643° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Beachgoer | Low to Moderate | Moderate to High | Moderate | Low to Moderate |

| **Has a Photo Simulation Been Created for KOP?** ☐ *Yes* ☒ *No* | **If yes, Figure Number:** N/A |
|---|---|

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat (beach), gently rolling (peninsula<br>Background (BG)/Seldom Seen (SS): flat, level (water) | FG:/MG: scattered, clumps, patch<br>BG/SS: not applicable (N/A) | FG/MG: tall, vertical, wide, thin, geometric, horizontal<br>BG/SS: N/A |
| **Line** | FG/MG: horizontal, straight gently undulating<br>BG/SS: horizontal, straight, bold | FG/MG: not discernible<br>BG/SS: N/A | FG/MG: tall, vertical, wide, thin<br>BG/SS: N/A |
| **Color** | FG/MG: tan (beach/land), light beige, brown (rocks); dark blue (water)<br>BG/SS: dark blue | FG/MG: green<br>BG/SS: N/A | FG/MG: tan, brown, white, red<br>BG/SS: N/A |
| **Texture** | FG/MG: smooth, fine; stippled (rocks)<br>BG/SS: smooth, fine | FG/MG: fine<br>BG/SS: N/A | FG/MG: course, dense, clustered<br>BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

### Representative Turbine

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

At a distance of approximately 31 mi (49.8 km) or more, the majority of the wind turbines will fall below the horizon under both scenarios. Portions of wind turbines that are visible above the horizon include from the hub up. It is anticipated that the thin lines created by the blades will not be noticeable or perceived by recreational users at the beach at this distance. As such, the Project will create no visual contrast.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Heckscher State Park** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 26.9** | **Date: 06/30/19** |
| **Latitude: 40.701257° N** | **Longitude: -73.173596° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | Moderate | Moderate | Low to Moderate | Moderate |

| | |
|---|---|
| **Has a Photo Simulation Been Created for KOP?** ☐ *Yes* ☒ *No* | **If yes, Figure Number:** N/A |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat to gently rolling<br>Background (BG): flat, horizontal, linear<br>Seldom Seen (SS): Not Applicable (N/A) | FG/MG: short, irregular patches<br>BG/SS: N/A | FG/MG: short, thin, vertical; irregular (boats)<br>BG/SS: N/A |
| **Line** | FG/MG: flat, horizontal, straight<br>BG: flat, straight horizontal (butt edge with water)<br>SS: N/A | FG/MG: diagonal, straight (butt edge of gravel road and grass)<br>BG/SS: N/A | FG/MG: vertical, straight, round<br>BG/SS: N/A |
| **Color** | FG/MG: tan, light and dark blue<br>BG: light and dark blue<br>SS: N/A | FG/MG: green, brown, orange, tan<br>BG/SS: N/A | FG/MG: white, black<br>BG/SS: N/A |
| **Texture** | FG/MG: granular, fine<br>BG: smooth, fine (water)<br>SS: N/A | FG/MG: fine, clumps, scattered<br>BG/SS: N/A | FG/MG: fine<br>BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

### Representative Turbine

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | X | | |
| | Line | | | | X | | | | X | | X | | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Moderate**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

From this location, views toward the Atlantic Ocean are screened by barrier islands and only the upper portions of wind turbines may be visible. Although primarily only the rotor blades of the representative wind turbines will be visible extending over the islands, it is anticipated that the number and motion of the rotor blades may draw viewers' attention and will not be overlooked. As such, the Project will create moderate contrast.

**Heckscher State Park**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Jacob Riis Park** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 21** | **Date: 06/30/19** |
| **Latitude: 40.56018° N** | **Longitude: -73.873132° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate to High | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat, level,<br>Background (BG)/Seldom Seen (SS): flat | Not Applicable (N/A) | FG/MG: short, parallel, vertical and horizontal; rectangular<br>BG/SS: small block (cargo ship) |
| **Line** | FG/MG: straight, horizontal<br>BG/SS: straight, horizontal | N/A | FG/MG: straight, simple, parallel<br>BG/SS: simple, geometric |
| **Color** | FG/MG: tan, light beige, grayish blue (water)<br>BG/SS: grayish blue | N/A | FG: brown, white, tan, silver<br>BG/SS: dark gray |
| **Texture** | FG/MG: fine, granular (sand); rough, glossy (water)<br>BG/SS: rough, glossy (water) | N/A | FG: ordered, uniform, continuous<br>BG/SS: simple, fine |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Views toward the Project will be unobstructed and the portion of the wind turbines that are closest to the viewer and visible above the horizon include the entire rotor blade. Wind turbines located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 20 mi (32.1 km), the Project can be seen but will not attract attention given the city skyline in the background. As such the Project will create weak contrast.

**Jacob Riis Park**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Jones Beach State Park** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 14.2** | **Date: 06/30/19** |
| **Latitude: 40.580436°N** | **Longitude: -73.55644° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate to High | High |

| **Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* | **If yes, Figure Number:** Attachment AA-3 |
|---|---|

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat, Background (BG)/Seldom Seen (SS): flat, level | Not Applicable (N/A) | N/A |
| **Line** | FG: gently undulating (beach) MG/BG/SS: straight, horizontal, strong (horizon) | N/A | N/A |
| **Color** | FG: tan MG/BG/SS: dark blue | N/A | N/A |
| **Texture** | FG: striated MG/BG/SS: stippled | N/A | N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| Elements | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | X | | | |
| | Color | | | | X | | | | X | X | | | |
| | Line | | | | X | | | | X | X | | | |
| | Texture | | | | X | | | | X | X | | | |

**Overall Level of Contrast: Strong**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

At a distance of approximately 14 mi (22.5 km) from the nearest wind turbine, the entire rotor blade and the majority of the tower structure will be visible above the horizon. The Project will introduce several new vertical elements into the viewscape and will appear as thin objects on the horizon. Given the close proximity of the wind turbines, the portion of the wind turbines visible, the introduction of vertical elements into a primarily horizontal landscape setting, the motion of the blades, and the spatial dominance within the landscape setting, the Project will attract attention and become a focal point within the view. Although marine vessels may be seen traveling to and from port, the introduction of the wind turbines in the primarily natural setting will change the characteristic of the view. As such, the Project will introduce strong visual contrast.

**Jones Beach State Park**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Norman J Levy Park and Preserve** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 18.8** | **Date: 06/30/19** |
| **Latitude: 40.646587° N** | **Longitude: -73.562871° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Low to Moderate | Moderate | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): gently to moderately rolling; flat (water/islands)<br>Background (BG)/Seldom Seen (SS): flat, level | FG/MG: conical, rounded, dense strip; irregular patches (water/islands)<br>BG/SS: Not Applicable (N/A) | FG/MG: round; rectangular, blocks (homes); tall, thin<br>BG/SS: N/A |
| **Line** | FG/MG: horizontal and irregular<br>BG/SS: horizontal, straight | FG/MG: irregular, curving (butt edge with water)<br>BG/SS: N/A | FG/MG: vertical, short, horizontal; angular,<br>BG/SS: N/A |
| **Color** | FG/MG: light gray; blue-light blue (water)<br>BG/SS: bluish -gray | FG/MG: green, orange, brown, red, tan<br>BG/SS: N/A | FG/MG: tan, beige, white, gray, red<br>BG/SS: N/A |
| **Texture** | FG/MG: granular; fine and glossy (water)<br>BG/SS: not discernible | FG/MG: fine, dense; scattered<br>BG/SS: N/A | FG: simple; complex, dense (homes)<br>BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Textures** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

### Representative Turbine

**Features**

| Elements | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | X | | |
| | Line | | | | X | | | | X | | X | | |
| | Color | | | | X | | | | X | | X | | |
| | Texture | | | | X | | | | X | | X | | |

**Overall Level of Contrast: Moderate**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Although the Project will introduce several new vertical elements into the viewscape and will appear as thin objects on the horizon, the strong horizontal line of the horizon is already disrupted by existing development along the Jones Beach Island, including the Jones Beach Tower and the Nikon Theater. The distance of the wind turbines from the viewer will help to reduce their dominance within the landscape setting and the Project will appear as a co-dominant feature with the other elements competing with the viewer's attention. Furthermore, the existence of other features in the built environment within the view lessens the contrast between the character of the existing view and the view with the Project. As such, the Project will introduce moderate visual contrast.

**Norman J Levy Park and Preserve**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Otis Pike Fire Island High Dune Wilderness** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 32.0** | **Date: 06/30/19** |
| **Latitude: 40.728276° N** | **Longitude: -72.876978° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate to High | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** ☐ *Yes* ☒ *No* | | **If yes, Figure Number:** | N/A |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG); flat, level<br>Background (BG)/Seldom Seen (SS): flat, level | Not Applicable (N/A) | N/A |
| **Line** | FG/MG: curving/undulating (butt edge between land/water)<br>BG/SS: horizontal, straight, strong (horizon) | N/A | N/A |
| **Color** | FG/MG: beige, blue and white (waves)<br>BG/SS: white, light blue, dark blue | N/A | N/A |
| **Texture** | FG/MG: fine (beach); rough, glossy (water)<br>BG/SS: rough, glossy (water) | N/A | N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

### Representative Turbine

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

At a distance of approximately 32 mi (51.5 km) or greater, portions of the wind turbines , that are visible include from the hub up (wind turbines closest to the viewpoint) and the tip of the rotor blades (wind turbines located farther from the viewpoint). Due to the distance of the wind turbines from the viewpoint, it is anticipated that the thin lines created by the blades will not be noticeable or perceived by recreational users at the beach. As such, the Project will create no visual contrast.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Sunken Forest** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 34.1** | **Date: 06/30/19** |
| **Latitude: 40.653639° N** | **Longitude: -73.112649° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat to gently rolling<br>Background (BG)/Seldom Seen (SS): flat, level | Not Applicable (N/A) | small blocks |
| **Line** | FG/MG: straight, horizontal<br>BG/SS: straight, horizontal, strong | N/A | not discernible |
| **Color** | FG/MG: beige (beach); grayish-blue (water)<br>BG/SS: grayish-blue | N/A | dark gray |
| **Texture** | FG/MG: medium, granular (beach); fine, glossy (water) | N/A | not discernible |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| Elements: Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| Form | | | | X | | | | X | | X | | |
| Line | | | | X | | | | X | | X | | |
| Color | | | | X | | | | X | | X | | |
| Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Moderate**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

From this viewpoint, there are a few elements competing for the viewer's attention, including the horizon along the Atlantic Ocean and the shoreline and dunes along the coast. In addition, there are limited features in the built environment that include marine vessels such as fishing boats that may be seen scattered along the horizon. The distance of the wind turbines from the viewer will help to reduce their dominance within the landscape setting and the Project will appear as a co-dominant feature with the shoreline and horizon. As such, the wind turbines will introduce moderate visual contrast.

**Sunken Forest**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | | | | |
|---|---|---|---|---|
| **KOP: Hartshorne Woods Park** | | | **Reviewers Name: S. Brooks** | |
| **Distance to nearest turbine (miles): 22.3** | | | **Date: 06/30/19** | |
| **Latitude: 40.386566° N** | | | **Longitude: -73.98347° W** | |
| **Angle of Observation:** *Level* ☐ *Inferior* ☐ *Superior* ☒ | | | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ | |
| **Type of User:** Recreation | **Visual Sensitivity:** | | | |
| | *User Expectation:* High | *Duration of View:* Low to Moderate | *Use Volume:* Moderate | *Overall Sensitivity:* High |
| **Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* | | | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat to gently rolling<br>Background (BG)/Seldom Seen (SS): flat, level | FG/MG: linear strip, patch; rounded and irregular<br>BG/SS: Not Applicable (N/A) | FG/MG: geometric, blocks (homes); small blocks (boats)<br>BG/SS: small blocks (boats) |
| **Line** | FG/MG: gently undulating<br>BG/SS: horizontal, straight, broken (horizon line) | FG: horizontal, straight; vertical (butt edge between grasses and lawn)<br>BG/SS: N/A | FG/MG: rectangular, angular, complex<br>BG/SS: not discernible |
| **Color** | FG/MG: beige, blue (water)<br>BG/SS: blue | FG: green, brown, tan, golden<br>BG/SS: N/A | FG/MG: gray, tan, brown, white<br>BG/SS: white |
| **Texture** | FG/MG: fine<br>BG/SS: fine, smooth | FG: fine to course<br>BG/SS: N/A | FG/MG: course, scattered<br>BG/SS: not discernible |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| Elements | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The Project will introduce several new vertical elements into the viewscape and the wind turbines will appear as thin objects on the horizon. However, the strong horizontal line of the horizon is already disrupted by existing vegetation in the immediate foreground, and there is an existing presence of disturbed areas in the view (including residential development). Views toward the Project from this location will range from few unobstructed (coastal locations) to more fully obstructed (trails within forested areas) depending on viewer location within the park. Due to the distance of the wind turbines, other vertical features in the foreground creating a break in the horizon line, and the moderately developed context in which the wind turbines will be seen, the wind turbines will appear as subordinate features. The development and horizon line will remain as the focal points and the presence of the wind turbines will not change the overall character of the view. As such, the Project will create weak visual contrast.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: Ocean Grove Beach** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 25.4** | **Date: 06/30/19** |
| **Latitude: 40.211317° N** | **Longitude: -74.035476° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate to High | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): gently undulating; blocks<br>Background (BG)/Seldom Seen (SS): flat, level | Not Applicable (N/A) | FG/MG: blocks, rectangular, angular<br>BG/SS: small blocks (boats/ships) |
| **Line** | FG/MG: curving (beach); short, horizontal, straight<br>BG/SS: horizontal, straight, strong (horizon) | N/A | FG/MG: diagonal, geometric, vertical<br>BG/SS: not discernible |
| **Color** | FG/MG: beige, gray, light and dark blue<br>BG/SS: white, light and dark blue | N/A | FG/MG: brown, gray, tan<br>BG/SS: white |
| **Texture** | FG/MG: fine, granular; fine, glossy (water)<br>BG/SS: fine, glossy (water) | N/A | FG/MG: dense, complex<br>BG/SS: not discernible |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | X | | |
| | Line | | | | X | | | | X | | X | | |
| | Color | | | | X | | | | X | | X | | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Moderate**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

From this location, viewers are looking toward the broadside of the Lease Area. The wind turbines in the western portion of the Lease Area (the closest to the viewpoint) appear larger and begin to appear smaller in the eastern portion (the farthest to the viewpoint). The entire rotor blade and a portion of the tower structure of the representative wind turbine will be visible above the horizon. The groupings of wind turbines and the size and rotation of the rotor blades may attract attention. The distance of the wind turbines from the viewer will help to reduce their dominance within the landscape setting and the Project will appear as a co-dominant feature with the horizon line. As such, the Project will create moderate visual contrast under the representative scenario.

**Ocean Grove Beach**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Point Pleasant Beach** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 30.5** | **Date: 06/30/19** |
| **Latitude: 40.094701° N** | **Longitude: -74.035476° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate to High | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☐ *Yes* ☒ *No* | **If yes, Figure Number:** | N/A |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): gently undulating, blocks;<br>Background (BG)/Seldom Seen (SS): flat, level | Not Applicable (N/A) | FG/MG: blocks, rectangular, angular<br>BG/SS: small blocks (boats/ships) |
| **Line** | FG/MG: curving (beach)<br>BG/SS: horizontal, straight, strong (horizon) | N/A | FG/MG: diagonal, geometric, vertical<br>BG/SS: not discernible |
| **Color** | FG/MG: beige, gray, blue<br>BG/SS: blue | N/A | FG/MG: brown, gray, tan, white<br>BG/SS: white |
| **Texture** | FG/MG: fine, granular; dine, glossy (water)<br>BG/SS: fine, glossy (water) | N/A | FG/MG: dense, complex<br>BG/SS: not discernible |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

### Representative Turbine

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

At a distance of approximately 30 mi (48.2 km) or greater approximately half of the wind turbines will fall below the horizon. The portion of the of the wind turbines that are visible include the hub up (wind turbines closest to the viewpoint) and the tip of the rotor blades. Due to the distance of the wind turbines to the viewpoint, it is anticipated that the thin lines created by the blades will not be noticeable or perceived by recreational users at the beach. As such, the Project will create no visual contrast.

**Point Pleasant Beach**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: Sandy Hook – North Beach** | **Reviewers Name: S. Brooks** |
| **Distance to nearest turbine (miles): 23.7** | **Date: 06/30/19** |
| **Latitude: 40.469226° N** | **Longitude: -73.993681° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate to High | Moderate | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat, level<br>Background (BG)/Seldom Seen (SS): flat, level | FG/MG: irregular patch<br>BG/SS: Not Applicable (N/A) | FG/MG: vertical, thin; curving; pyramidal<br>BG/SS: small blocks, triangle (boats) |
| **Line** | FG/MG: horizontal, straight, strong (beach)<br>BG/SS: horizontal, straight, strong (horizon) | FG/MG: diffuse edge between grasses and beach<br>BG/SS: N/A | FG/MG: short, straight, angular<br>BG/SS: not discernible |
| **Color** | FG/MG: beige, blue<br>BG/SS: blue | FG/MG: green<br>BG/SS: N/A | FG/MG: gray and brown<br>BG/SS: white and gray |
| **Texture** | FG/MG: fine, granular<br>BG/SS: fine | FG/MG: fine, stippled<br>BG/SS: N/A | FG/MG: simple, even, ordered, uniform<br>BG/SS: not discernible |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: N/A<br>BG: low |
| **Line** | N/A | N/A | FG/MG: N/A<br>BG: straight, vertical |
| **Color** | N/A | N/A | FG/MG: N/A<br>BG: white, gray |
| **Texture** | N/A | N/A | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

### Representative Turbine

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Although the wind turbines are visible under both scenarios, due to the distance of the wind turbines, the limited number of wind turbines visible, and the presence of other features in the built environment along the horizon in the existing view, the wind turbines will be seen but will not attract attention and will not change the overall character of the view. As such, the Project will create weak visual contrast.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | | | | |
|---|---|---|---|---|
| **KOP: Sandy Hook Light** | | | **Reviewers Name: S. Brooks** | |
| **Distance to nearest turbine (miles): 23.0** | | | **Date: 06/30/19** | |
| **Latitude: 40.461723° N** | | | **Longitude: -74.002027° W** | |
| **Angle of Observation:** *Level* ☐ *Inferior* ☐ *Superior* ☒ | | | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ | |
| **Type of User:** Recreation | **Visual Sensitivity:** | | | |
| | *User Expectation:* High | *Duration of View:* Low | *Use Volume:* Low | *Overall Sensitivity:* Moderate |
| **Has a Photo Simulation Been Created for KOP?** ☐ *Yes* ☒ *No* | | | **If yes, Figure Number:** N/A | |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG)/Middleground (MG): flat to gently rolling<br>Background (BG)/Seldom Seen (SS): flat, level | FG/MG: rounded; irregular large patch<br>BG/SS: Not Applicable (N/A) | FG: geometric; large patch (parking lot)<br>BG/SS: N/A |
| **Line** | FG/MG: horizontal, curving<br>BG/SS: horizontal, straight | FG/MG: horizontal broken (butt edge with beach<br>BG/SS: N/A | FG/MG: short, angular and straight<br>BG/SS: N/A |
| **Color** | FG/MG: beige, grayish-white<br>BG/SS: bluish-white | FG/MG: light green, dark green, brown<br>BG/SS: N/A | FG/MG: gray, tan, brown, white<br>BG/SS: N/A |
| **Texture** | FG/MG: fine<br>BG/SS: fine | FG/MG: rough, dense<br>BG/SS: N/A | FG/MG: fine to medium<br>BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | | | |
|---|---|---|---|---|---|
| | Land/Water | Vegetation | | Structures | |
| Form | N/A | | N/A | | FG/MG: N/A<br>BG: low |
| Line | N/A | | N/A | | FG/MG: N/A<br>BG: straight, vertical |
| Color | N/A | | N/A | | FG/MG: N/A<br>BG: white, gray |
| Texture | N/A | | N/A | | FG/MG: N/A<br>BG: fine, smooth |

## CONTRAST RATING

**Representative Turbine**

**Features**

| Elements: Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| Form | | | | X | | | | X | | | X | |
| Line | | | | X | | | | X | | | X | |
| Color | | | | X | | | | X | | | X | |
| Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria:**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Although the wind turbines are visible, due to the distance of the wind turbines, the limited number of wind turbines visible, and the presence of other features in the built environment in the foreground and along the horizon in the existing view, the wind turbines will appear as subordinate features and will not change the overall character of the view. As such, the Project will create weak visual contrast.

**Sandy Hook Light**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: N/A – Statue of Liberty** | **Reviewers Name: S. Brooks** |
| **Distance to nearest Project component: 33.5 mi (53.9 km)** | **Date: 12/22/2022** |
| **Latitude: 40.689298° N** | **Longitude: -74.044553° W** |
| **Angle of Observation:** *Level* ☐ *Inferior* ☐ *Superior* ☒ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☒ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Tourist | Moderate | Moderate to Low | High | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level (water)/flat, to gently rolling (land)<br>Background (BG): Not Applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: thin, narrow strip<br>BG: large irregular patch | BG: small, large, blocky; vertical tall and thin; low thin, narrow |
| **Line** | FG/MG: horizontal straight, strong (shoreline);<br>BG: horizontal straight, and irregular | FG/MG/BG: horizontal irregular | BG: geometric; short thin; short narrow strips |
| **Color** | FG/MG: grayish/blue<br>BG: not discernible | FG/MG/BG: dark green | BG: brown, tan, gray, black |
| **Texture** | FG/MG: fine, stippled, glossy<br>BG: not discernible | FG/MG/BG: fine, dense | BG: course, dense |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | BG: not discernible |
| **Line** | N/A | N/A | BG: not discernible |
| **Color** | N/A | N/A | BG: not discernible |
| **Texture** | N/A | N/A | BG: not discernible |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

From this location, the Lease Area is entirely obscured by foreground terrain and existing vegetation.

**Statue of Liberty**

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 1 Onshore Substation and O&M Base – 2nd Avenue** | **Reviewers Name: L. Davidson** |
| **Distance to nearest Project component: 100 ft (31 m)** | **Date: 9/19/2019** |
| **Latitude: 40.659049° N** | **Longitude: -74.006444 °W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ *Backdropped* ☐ *Skylined* ☒ (Partially/Completely) |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Travel way | Low | Moderate to Low | High | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☐ *Yes* ☒ *No* | **If yes, Figure Number:** | N/A |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level<br>Background (BG): not discernible<br>Seldom Seen (SS): not applicable (N/A) | N/A | FG/MG: tall, thin; geometric (utility poles), transparent and solid (fence/building); large contiguous (parking lot)<br>BG/SS: N/A |
| **Line** | FG/MG: straight horizontal | N/A | FG/MG: straight vertical and horizontal, angular; tall, thin; short thin<br>BG/SS: N/A |
| **Color** | FG/MG: not discernible | N/A | FG/MG: brown, light and dark gray, black, white, orange, red<br>BG/SS: N/A |
| **Texture** | FG/MG: not discernible | N/A | FG/MG: fine, ordered; course<br>BG/SS: N/A |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: large, rectangular |
| **Line** | N/A | N/A | FG/MG: vertical and horizontal, straight, long, thin |
| **Color** | N/A | N/A | FG/MG: light beige, gray |
| **Texture** | N/A | N/A | FG/MG: medium |

## CONTRAST RATING

**Level of Contrast**

**Features**

**Elements**

| Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| Form | | | | X | | | | X | X | | | |
| Line | | | | X | | | | X | X | | | |
| Color | | | | X | | | | X | X | | | |
| Texture | | | | X | | | | X | | X | | |

**Overall Level of Contrast: Strong**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Although the surrounding area is heavily developed, the area within the South Brooklyn Marine Terminal primarily includes paved areas with one warehouse located south of the EW 1 onshore substation and O&M Base. The proposed buildings associated with the EW 1 onshore substation and O&M Base will be larger than the existing warehouse to the south. Furthermore, the proposed substation and O&M Base will be located in front of the recycling center and closer to 2nd Avenue and potential viewers. Due to the close proximity of the proposed onshore substation/O&M Base to the road (approximately 100 ft [31 m]) and the size of the proposed buildings, the EW 1 onshore substation and O&M Base will attract attention and dominate the view.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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## PROJECT INFORMATION

| | |
|---|---|
| **KOP: EW 1 Onshore Substation and O&M Base – Columbia Street Esplanade** | **Reviewers Name: L. Davidson** |
| **Distance to nearest Project component: 0.4 mi (0.6 km)** | **Date: 9/19/2019** |
| **Latitude: 40.664841° N** | **Longitude: -74.013545° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☒ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | Moderate | Moderate to Low | Low | Moderate |

**Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* **If yes, Figure Number:** Attachment AA-3

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level (water/land)<br>Background (BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: large irregular patch; rounded | FG/MG: vertical, tall and thin; large rectangular and angular, transparent and solid; (buildings); small rectangular |
| **Line** | FG/MG: horizontal straight, strong (shoreline) | FG/MG: horizontal irregular; narrow strip (along shoreline) | FG/MG: straight vertical and horizontal, angular; tall vertical narrow; square |
| **Color** | FG/MG: grayish/blue (water); not discernible (land) | FG/MG: light and dark green, brown | FG/MG: beige, white, brown, gray, red, black, brown |
| **Texture** | FG/MG: fine, stippled, glossy (water); not discernible (land) | FG/MG: fine to medium | FG/MG: smooth, fine to rough |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: solid, large and small, rectangular; vertical, narrow; short geometric, transparent |
| **Line** | N/A | N/A | FG/MG: vertical and horizontal, straight; straight, thin; short |
| **Color** | N/A | N/A | FG/MG: light beige, light gray |
| **Texture** | N/A | N/A | FG/MG: fine, smooth |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Portions of the EW 1 onshore substation and O&M Base that are visible will be seen in the context of the recycling center which is a prominent feature in the view and other commercial and industrial development along the western shoreline of Brooklyn, New York. At a distance of 0.4 mi (0.6 km) the buildings associated with the EW 1 onshore substation and O&M Base will attract attention, however the recycling center which is located between the EW 1 onshore substation/O&M Base and the viewer will remain a dominant feature for viewers.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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## PROJECT INFORMATION

| | |
|---|---|
| **KOP: EW 1 Onshore Substation and O&M Base – Hudson River Waterfront Walkway** | **Reviewers Name: L. Davidson** |
| **Distance to nearest Project component: 3.7 mi (6.0 km)** | **Date: 9/19/2019** |
| **Latitude: 40.684785° N** | **Longitude: -74.070244° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ *Backdropped* ☒ *Skylined* ☐ (Partially/Completely) |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | Moderate | Moderate to Low | Moderate to High | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level<br>Background (BG): gently rolling<br>Seldom Seen (SS): N/A | FG/MG: n/a<br>BG: large irregular patch; short linear | FG/MG: narrow strip; low thin (vessels)<br>BG: small, large, blocky; vertical tall and thin (buildings) |
| **Line** | FG/MG: horizontal straight; short vertical repetitive<br>BG: strong (shoreline); horizontal irregular (land) | FG/MG: N/A<br>BG: horizontal irregular; short narrow strip | FG/MG: straight horizontal; short, parallel; short narrow strips (vessels)<br>BG: rectangular; short thin |
| **Color** | FG/MG: grayish/blue<br>BG: not discernible | FG/MG: N/A<br>BG: dark green | FG/MG: tan, gray, brown<br>BG: beige, tan, white, brown, gray, red, black, yellow |
| **Texture** | FG/MG: fine, stippled, glossy<br>BG: not discernible | FG/MG: n/a<br>BG: fine, stippled | FG/MG: fine, simple<br>BG: course, dense |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | BG: small geometric |
| **Line** | N/A | N/A | BG: rectangular, straight |
| **Color** | N/A | N/A | BG: light beige |
| **Texture** | N/A | N/A | BG: smooth |

## CONTRAST RATING

### Level of Contrast

**Features**

| Elements: Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| Form | | | | X | | | | X | | | X | |
| Line | | | | X | | | | X | | | X | |
| Color | | | | X | | | | X | | | X | |
| Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Portions of the EW 1 onshore substation and O&M Base that are visible will be seen in the context of other commercial and industrial development along the western shoreline of Brooklyn, New York. At a distance of approximately 4 mi (6.4 km) the EW 1 onshore substation and O&M Base will blend into the existing landscape setting. Due to the distance of the EW 1 onshore substation/O&M Base and the densely developed industrial/commercial coastline the EW 1 onshore substation and O&M Base may attract attention but would appear as a subordinate feature in the heavily developed landscape setting.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 1 Onshore Substation O&M Base – Statue of Liberty** | **Reviewers Name: L. Davidson** |
| **Distance to nearest Project component: 2.8 mi (4.5 km)** | **Date: 9/19/2019** |
| **Latitude: 40.689148° N** | **Longitude: -74.044451° W** |
| **Angle of Observation:** *Level* ☐ *Inferior* ☐ *Superior* ☒ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☒ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Tourist | Moderate | Moderate to Low | High | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☐ *Yes* ☒ *No* | **If yes, Figure Number:** | N/A |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level (water)/flat, to gently rolling (land)<br>Background (BG): Not Applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: thin, narrow strip<br>BG: large irregular patch | BG: small, large, blocky; vertical tall and thin; low thin, narrow |
| **Line** | FG/MG: horizontal straight, strong (shoreline);<br>BG: horizontal straight, and irregular | FG/MG/BG: horizontal irregular | BG: geometric; short thin; short narrow strips |
| **Color** | FG/MG: grayish/blue<br>BG: not discernible | FG/MG/BG: dark green | BG: brown, tan, gray, black |
| **Texture** | FG/MG: fine, stippled, glossy<br>BG: not discernible | FG/MG/BG: fine, dense | BG: course, dense |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | BG: not discernible |
| **Line** | N/A | N/A | BG: not discernible |
| **Color** | N/A | N/A | BG: not discernible |
| **Texture** | N/A | N/A | BG: not discernible |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

Portions of the EW 1 onshore substation and O&M Base that are visible will be seen in the context of other commercial and industrial development along the western shoreline of Brooklyn, New York. At a distance of approximately 2.8 mi (4.5 km) the EW 1 onshore substation and O&M Base will blend into the existing landscape setting. Due to the distance of the EW 1 onshore substation/ O&M Base from the viewer and that most of the site will be screened by existing development, the EW 1 onshore substation and O&M Base will not attract attention or be perceived.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

equinor

| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 2 Onshore Substation A – Residential Neighborhood/Oceanlea Drive** | **Reviewers Name: S. Brooks** |
| **Distance to nearest Project component: 0.2 mi (0.3 m)** | **Date: 3/5/2021** |
| **Latitude: 40.62395° N** | **Longitude: -73.648° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Residential | High | High | Moderate | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level<br>Background (BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: thin, narrow strips; scattered; irregular patch; rectangular and rounded | FG/MG: blocky (buildings); tall thin, horizontal thin (utility lines/poles); flat narrow (road/sidewalk); long horizontal strip solid (fence) |
| **Line** | FG/MG: horizontal straight | FG/MG: straight butt edge with sidewalk/road; angular, rounded | FG/MG: multiple, thin horizontal; tall thin; rectangular; straight; short, thin |
| **Color** | FG/MG: not discernible | FG/MG: tan, brown | FG/MG: gray, white, black, red, brown, tan |
| **Texture** | FG/MG: not discernible | FG/MG: fine, stippled; course | FG/MG: fine to course; even, ordered |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: blocky |
| **Line** | N/A | N/A | FG/MG: rectangular |
| **Color** | N/A | N/A | FG/MG: light grey |
| **Texture** | N/A | N/A | FG/MG: fine, smooth |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The EW 2 Onshore Substation A will be partially screened by existing vegetation and existing industrial buildings. The large horizontal, rectangular forms and light grey color of the proposed building will be similar to the white and grey tones of the existing buildings and tents on site and nearby. The texture of the proposed building contrasts in texture as the proposed building appears smooth compared to the rougher texture of the existing buildings. The onshore substation will be seen in the context of other industrial buildings but could be noticed because the onshore substation GIS building may be slightly taller than the existing buildings immediately in front of the substation in the foreground. Although existing development and utilities are visible in the view, due to the close viewing distance and the heights of certain facility components, it is anticipated that the Project will introduce weak visual contrast at this KOP.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 2 Onshore Substation A – Woodmere Dock** | **Reviewers Name: S. Brooks** |
| **Distance to nearest Project component: 2.25 mi (3.6 m)** | **Date: 3/5/2021** |
| **Latitude: 40.61993° N** | **Longitude: -73.6991° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate | Moderate | Moderate |

| | |
|---|---|
| **Has a Photo Simulation Been Created for KOP?** ☐ *Yes* ☒ *No* | **If yes, Figure Number:** N/A |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level (water)/flat, to gently rolling (land)<br>Background (BG): Not Applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: thin, narrow strip<br>BG: large irregular patch | BG: small, large, blocky; vertical tall and thin; low thin, narrow, wide |
| **Line** | FG/MG: horizontal straight, strong (shoreline);<br>BG: horizontal straight, and irregular | FG/MG/BG: horizontal irregular | BG: geometric; short thin; short narrow strips |
| **Color** | FG/MG: grayish/blue<br>BG: not discernible | FG/MG/BG: tan, dark green | BG: brown, tan, gray, black, white |
| **Texture** | FG/MG: fine, stippled, glossy<br>BG: not discernible | FG/MG/BG: fine, dense | BG: course, dense |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG:blocky |
| **Line** | N/A | N/A | FG/MG: rectangular |
| **Color** | N/A | N/A | FG/MG: light beige |
| **Texture** | N/A | N/A | FG/MG: fine, smooth |

## CONTRAST RATING

### Level of Contrast

**Features**

| Elements | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | X |
| | Line | | | | X | | | | X | | | X | X |
| | Color | | | | X | | | | X | | | X | X |
| | Texture | | | | X | | | | X | | | X | X |

**Overall Level of Contrast: Weak/None**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The EW 2 Onshore Substation A will be partially screened by other existing industrial buildings in the area. The upper portion of the proposed onshore substation buildings may be visible; if so, it will be seen in the context of existing commercial and industrial development, including the Costco building and power lines. The onshore substation buildings will be comparable in height to the existing cylinder shaped buildings in the middleground. At a distance of 1 mi (1.6 km), the onshore substation buildings at the EW 2 Onshore Substation A site will appear subordinate to other features. As such, the Project will introduce weak to no visual contrast at this KOP.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 2 Onshore Substation A – Masone Point Park** | **Reviewers Name: S. Brooks** |
| **Distance to nearest Project component: 1 mi (1.6 m)** | **Date: 3/5/2021** |
| **Latitude: 40.60755° N** | **Longitude: -73.6563° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Recreation | High | Moderate | Moderate | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): flat, level (paved areas and water), horizontal, curved (shoreline)<br>Background (BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG/BG: thin, narrow strip, small irregular patch | BG: small, large, blocky; vertical tall and thin; low thin, narrow; flat, horizontal |
| **Line** | FG/MG: horizontal straight, strong (shoreline);<br>BG: horizontal straight, and irregular | FG/MG/BG: horizontal irregular | BG: geometric; short thin; short narrow strips; wide short vertical strips; horizontal |
| **Color** | FG/MG: grayish/blue<br>BG: not discernible | FG/MG/BG: tan, golden | BG: brown, tan, gray, black, red, white |
| **Texture** | FG/MG: fine, stippled, glossy<br>BG: not discernible | FG/MG/BG: fine, dense | BG: course, dense |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: blocky |
| **Line** | N/A | N/A | FG/MG: rectangular |
| **Color** | N/A | N/A | FG/MG: light beige |
| **Texture** | N/A | N/A | FG/MG: fine, smooth |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | X | |
| | Line | | | | X | | | | X | | | X | |
| | Color | | | | X | | | | X | | | X | |
| | Texture | | | | X | | | | X | | | X | |

**Overall Level of Contrast: Weak**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

At a viewing distance of 1 mi, proposed facility is difficult to identify among the existing similarly scaled development. The EW 2 Onshore Substation A will be nearly fully screened by existing industrial buildings along the shoreline near the onshore substation site. The upper portion of the proposed onshore substation buildings will be visible but seen in the context of existing commercial and industrial development, including the Costco store building and power lines. The onshore substation buildings will be comparable in height to the existing cylinder shaped buildings in the middleground. At a distance of 1 mi (1.6 km), the onshore substation buildings at the EW 2 Onshore Substation A site will appear subordinate to other features. As such, the Project will introduce weak visual contrast at this KOP.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 2 Onshore Substation C – Quebec Road/Residential Neighborhood** | **Reviewers Name: S. Brooks** |
| **Distance to nearest Project component: 0.07 mi (0.11 km)** | **Date: 9/12/2021** |
| **Latitude: 40.597048° N** | **Longitude: -73.660342° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☐ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Residential/Travel Way | High | High | Low | High |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 | |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground (FG): Flat, level<br>Middleground/Background (MG/BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG: small, patchy | FG: blocky (buildings); tall thin, horizontal thin (utility lines/poles); flat narrow (road); long horizontal, vertical strip solid (fence) |
| **Line** | FG: horizontal straight, curved, vertical | FG: irregular | FG: multiple, thin horizontal slightly curving; tall thin; rectangular; straight, horizontal (road); short, thin |
| **Color** | FG: tan, brown | FG: green, dark green, brown, tan | FG: gray, white, black, tan |
| **Texture** | FG: fine to medium | FG: fine, stippled to course, dense | FG: fine to medium |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | N/A |
| **Line** | N/A | N/A | N/A |
| **Color** | N/A | N/A | N/A |
| **Texture** | N/A | N/A | N/A |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The EW 2 Onshore Substation C will be screened from view by residential development and vegetation.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | |
|---|---|
| **KOP: EW 2 Onshore Substation C – Long Beach Bridge** | **Reviewers Name: S. Brooks** |
| **Distance to nearest Project component: 0.09 mi (0.15 km)** | **Date: 9/12/2021** |
| **Latitude: 40.595684° N** | **Longitude: -73.656966° W** |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | **Visibility:** *Screened* ☐ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ |

| **Type of User:** | **Visual Sensitivity:** | | | |
|---|---|---|---|---|
| | *User Expectation:* | *Duration of View:* | *Use Volume:* | *Overall Sensitivity:* |
| Travel Way | Moderate | Moderate | High | Moderate |

| | | | |
|---|---|---|---|
| **Has a Photo Simulation Been Created for KOP?** | ☒ *Yes* ☐ *No* | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): Flat, level<br>Background (BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: irregular patches; strips | FG/MG: blocky (buildings); tall thin, horizontal thin (utility lines/poles); flat narrow (road/sidewalk, railroad) |
| **Line** | FG/MG: horizontal straight | FG/MG: horizontal, angular, rounded | FG/MG: multiple, thin horizontal; tall thin; rectangular; straight, horizontal (road); short, thin |
| **Color** | FG/MG: gray | FG/MG: green, dark green, brown | FG/MG: gray, white, black, red, brown, tan |
| **Texture** | FG/MG: rippled | FG/MG: fine, stippled; course | FG/MG: fine to course; even, ordered |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG: narrow strip |
| **Line** | N/A | N/A | FG: straight horizontal, vertical |
| **Color** | N/A | N/A | FG: tan, light gray/white |
| **Texture** | N/A | N/A | FG: fine, medium |

## CONTRAST RATING

**Level of Contrast**

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | X | | | |
| | Line | | | | X | | | | X | X | | | |
| | Color | | | | X | | | | X | X | | | |
| | Texture | | | | X | | | | X | X | | | |

**Overall Level of Contrast: Strong**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The EW 2 Onshore Substation C will be located in the foreground and can be seen in the context of existing development, such as streetlights, utility lines, and commercial and residential development. Although existing development and utilities are visible in the view, due to the close proximity of the EW 2 Onshore Substation C to the viewpoint and the form and scale of the facility, it is anticipated that the Project will introduce strong visual contrast.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | | | | |
|---|---|---|---|---|
| **KOP: EW 2 Onshore Substation C – Long Beach Skate Park** | | | **Reviewers Name: S. Brooks** | |
| **Distance to nearest Project component: 0.43 mi (0.69 km)** | | | **Date: 9/12/2021** | |
| **Latitude: 40.593785° N** | | | **Longitude: -73.666107° W** | |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | | | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☒ | |
| **Type of User:** Recreation | **Visual Sensitivity:** | | | |
| | *User Expectation:* High | *Duration of View:* Moderate | *Use Volume:* High | *Overall Sensitivity:* High |
| **Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* | | | **If yes, Figure Number:** | Attachment AA-3 |

## CHARACTERISTIC LANDSCAPE DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | Foreground/Middleground (FG/MG): flat, level<br>Background (BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG/MG: narrow triangular patch | FG/MG: tall, narrow, thin; short and long thin, small blocky |
| **Line** | FG/MG: horizontal straight | FG/MG: straight, horizontal, vertical; slightly curving | FG/MG: multiple, thin horizontal and vertical straight lines; paralleling |
| **Color** | FG/MG: tan/brown (land); grayish-blue (water) | FG/MG: green, dark green | FG/MG: brown, white, blue |
| **Texture** | FG/MG/BG: fine to medium, choppy | FG/MG: fine, stippled | FG/MG: fine to moderate |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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## PROPOSED ACTIVITY DESCRIPTION

| | Land/Water | Vegetation | Structures |
|---|---|---|---|
| **Form** | N/A | N/A | FG/MG: large, blocky |
| **Line** | N/A | N/A | FG/MG: rectangular |
| **Color** | N/A | N/A | FG/MG: light beige, gray |
| **Texture** | N/A | N/A | FG/MG: fine, medium |

## CONTRAST RATING

### Level of Contrast

**Features**

| Elements: Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| Form | | | | X | | | | X | | X | | |
| Line | | | | X | | | | X | | X | | |
| Color | | | | X | | | | X | | X | | |
| Texture | | | | X | | | | X | | X | | |

**Overall Level of Contrast: Moderate**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The EW 2 Onshore Substation C will be partially screened by the existing train bridge. Portions of the EW 2 Onshore Substation C that will be visible include the upper portion of the proposed building, which will be seen in the context of existing commercial and industrial development. At this distance, the EW 2 Onshore Substation C will appear as a co-dominate feature with moderate contrast.

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

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| PROJECT INFORMATION | | | | |
|---|---|---|---|---|
| **KOP: EW 2 Onshore Substation C – Island Park Station** | | | **Reviewers Name: S. Brooks** | |
| **Distance to nearest Project component: 0.19 mi (0.31 km)** | | | **Date: 9/12/2021** | |
| **Latitude: 40.600392° N** | | | **Longitude: -73.655512° W** | |
| **Angle of Observation:** *Level* ☒ *Inferior* ☐ *Superior* ☐ | | | **Visibility:** *Screened* ☒ (Partially/Completely) *Backdropped* ☐ *Skylined* ☐ | |
| **Type of User:** Residential | **Visual Sensitivity:** | | | |
| | *User Expectation:* Moderate | *Duration of View:* Moderate | *Use Volume:* High | *Overall Sensitivity:* Moderate |
| **Has a Photo Simulation Been Created for KOP?** ☒ *Yes* ☐ *No* | | | **If yes, Figure Number:** | Attachment AA-3 |

| CHARACTERISTIC LANDSCAPE DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | Foreground/Middleground (FG): flat, level<br>Middleground/Background (MG/BG): not applicable (N/A)<br>Seldom Seen (SS): N/A | FG: scattered | FG: tall, narrow, thin; short and long thin, small blocky, wide |
| **Line** | FG: horizontal straight | FG: straight, horizontal, vertical | FG: multiple, thin horizontal and vertical straight lines; paralleling |
| **Color** | FG: tan/brown | FG: green, dark green | FG: brown, green |
| **Texture** | FG: fine to medium | FG: medium | FG: fine to moderate |

## REPRESENTATIVE PHOTOGRAPH

# VISUAL CONTRAST RATING WORSHEET

*Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)*

| PROPOSED ACTIVITY DESCRIPTION | | | |
|---|---|---|---|
| | **Land/Water** | **Vegetation** | **Structures** |
| **Form** | N/A | N/A | FG/MG: large, blocky |
| **Line** | N/A | N/A | FG/MG: rectangular |
| **Color** | N/A | N/A | FG/MG: light beige, gray |
| **Texture** | N/A | N/A | FG/MG: fine, medium |

## CONTRAST RATING

### Level of Contrast

**Features**

| **Elements** | Degree of Contrast | Land/Water | | | | Vegetation | | | | Structures | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| | Form | | | | X | | | | X | | | | X |
| | Line | | | | X | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

**Overall Level of Contrast: None**

**Contrast Rating Criteria**

| Degree of Contrast | Rating Criteria |
|---|---|
| **Strong** | The element contrast demands attention, will not be overlooked, and is dominant in the landscape. |
| **Moderate** | The element contrast begins to attract attention and begins to dominate the characteristic landscape. |
| **Weak** | The element contrast can be seen but does not attract attention. |
| **None** | The element contrast is not visible or perceived. |

**Additional Comments:**

The EW 2 Onshore Substation C will be screened from view by several existing buildings.

# ATTACHMENT AA-3 VISUAL SIMULATIONS

Single-Frame Daytime Photographic Simulations:

- Statue of Liberty, NY
- Empire State Building, NY
- Fire Island Lighthouse, NY
- Jacob Riis Park, NY
- Jones Beach State Park, NY
- Norman J Levy Park and Preserve, NY
- Sunken Forest, NY
- Hartshorne Woods Park, NJ
- Ocean Grove Beach, NJ
- Sandy Hook – North Beach, NJ
- EW 1 Onshore Substation Site and O&M Base, NY – Columbia Street Esplanade
- EW 1 Onshore Substation Site and O&M Base, NY – Hudson River Waterfront Walkway
- EW 2 Onshore Substation A Site, NY – Residential Neighborhood/Oceanlea Drive
- EW 2 Onshore Substation A Site, NY – Masone Point Beach/Residential Neighborhood
- EW 2 Onshore Substation C Site, NY – Quebec Road/Residential Neighborhood
- EW 2 Onshore Substation C Site, NY – Long Beach Bridge
- EW 2 Onshore Substation C Site, NY – Long Beach Skate Park
- EW 2 Onshore Substation C Site, NY – Island Park Station

Single-Frame Nighttime Photographic Simulations:

- Jones Beach, NY
- Ocean Grove Beach, NJ

Panoramic Daytime and Nighttime Simulations:

- Jones Beach, NY
- Ocean Grove Beach, NJ

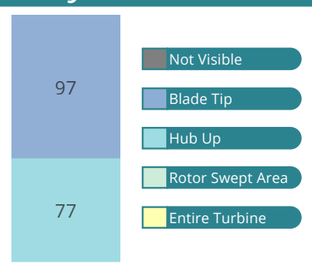
## Panoramic Photograph


## Vicinity Map

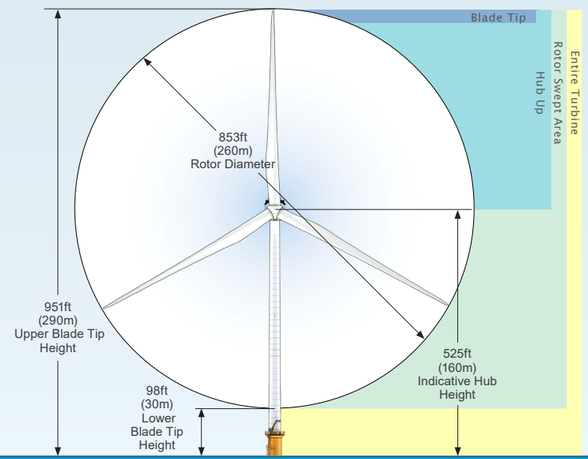

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | The Statue Of Liberty |
| Date of Photograph: | November 17, 2022 |
| Time of Photograph: | 11:30 AM (EDT) |
| Weather Condition: | Partly Cloudy |
| Latitude: | 40.689298° N |
| Longitude: | -74.044553° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 265 feet |

## Turbine Visibility




## Turbine Data

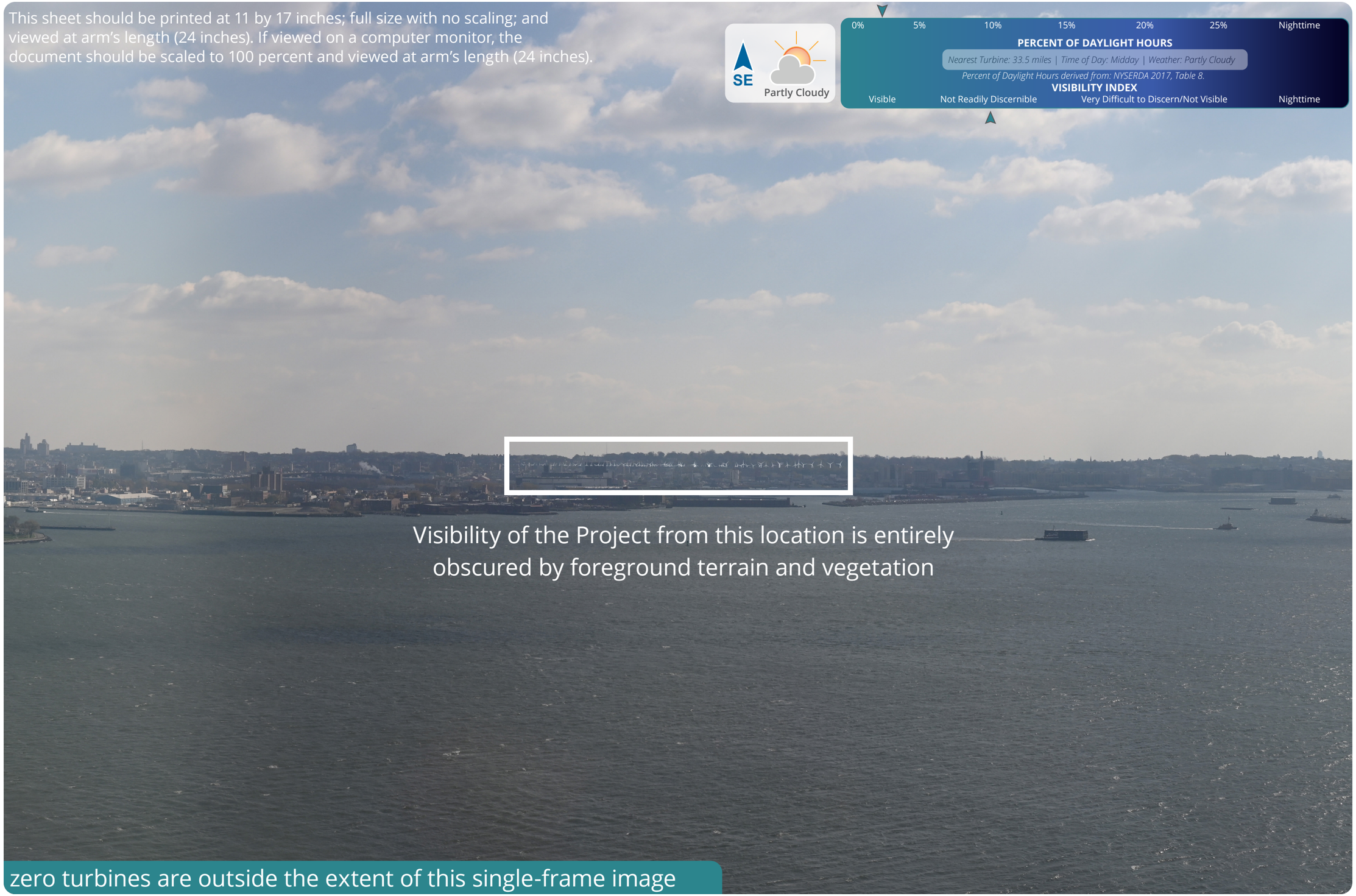



**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 33.5 miles |
| Farthest Visible Turbine | 49.6 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).




Visibility of the Project from this location is entirely obscured by foreground terrain and vegetation

zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

The Statue Of Liberty

equinor

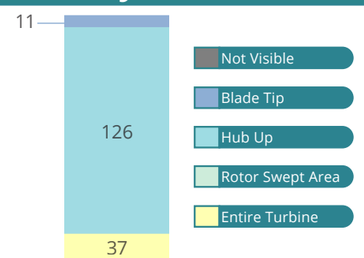
## Panoramic Photograph


## Vicinity Map

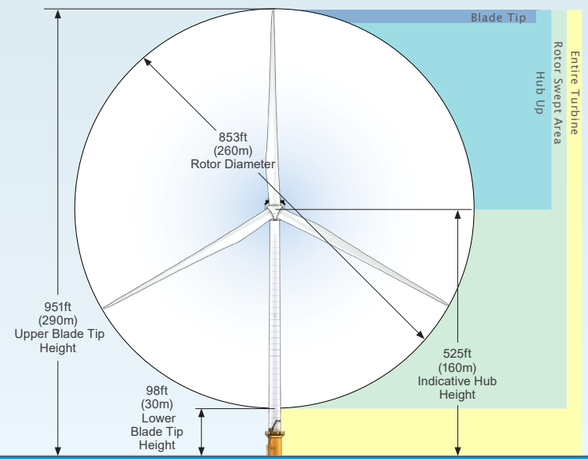

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Empire State Building 102nd Floor |
| Date of Photograph: | November 14, 2022 |
| Time of Photograph: | 11:45 AM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.748476° N |
| Longitude: | -73.985883° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 1,250 feet |

## Turbine Visibility




## Turbine Data

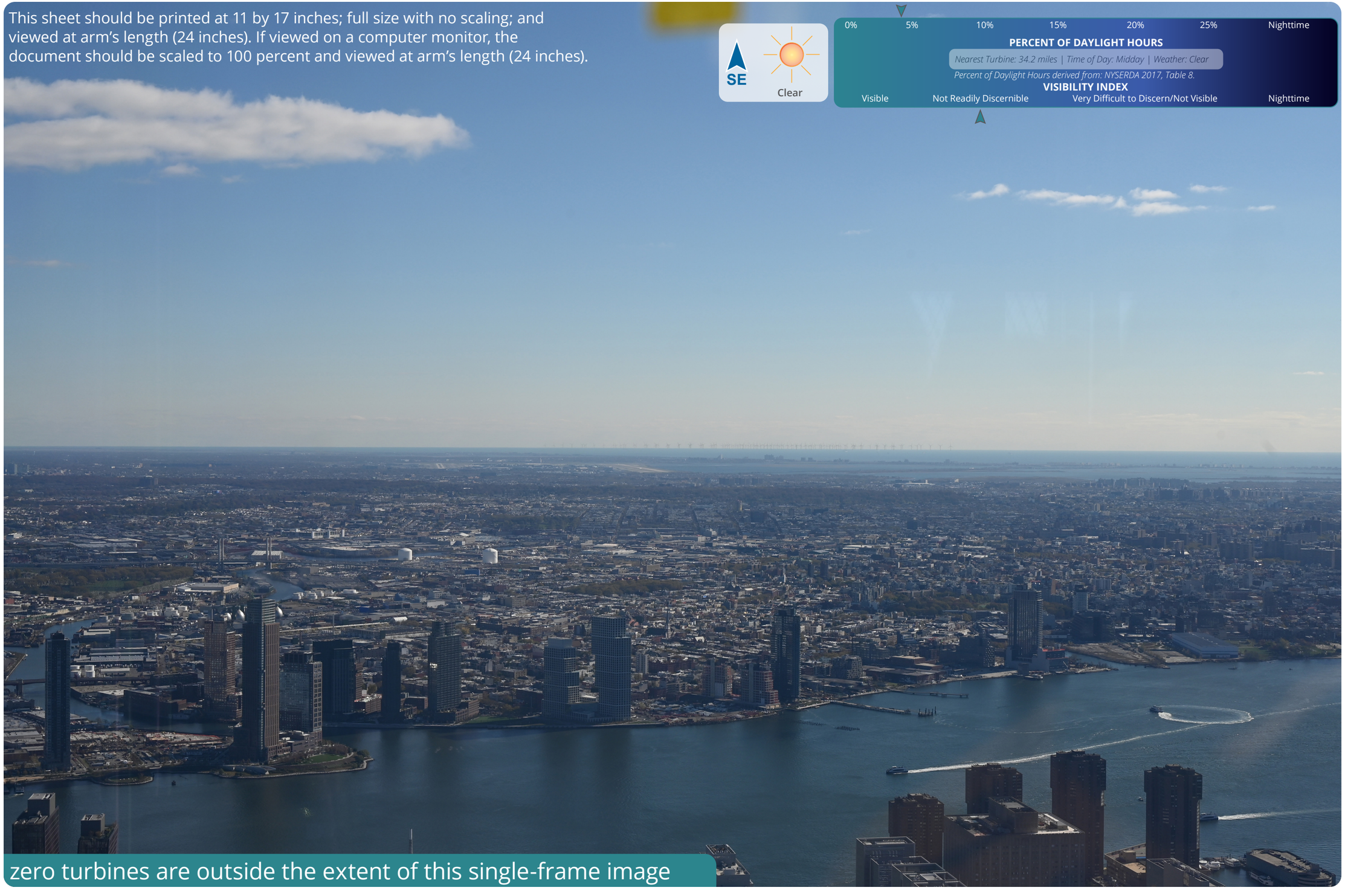



**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 34.2 miles |
| Farthest Visible Turbine | 56.7 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).




zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Empire State Building: 102nd Floor

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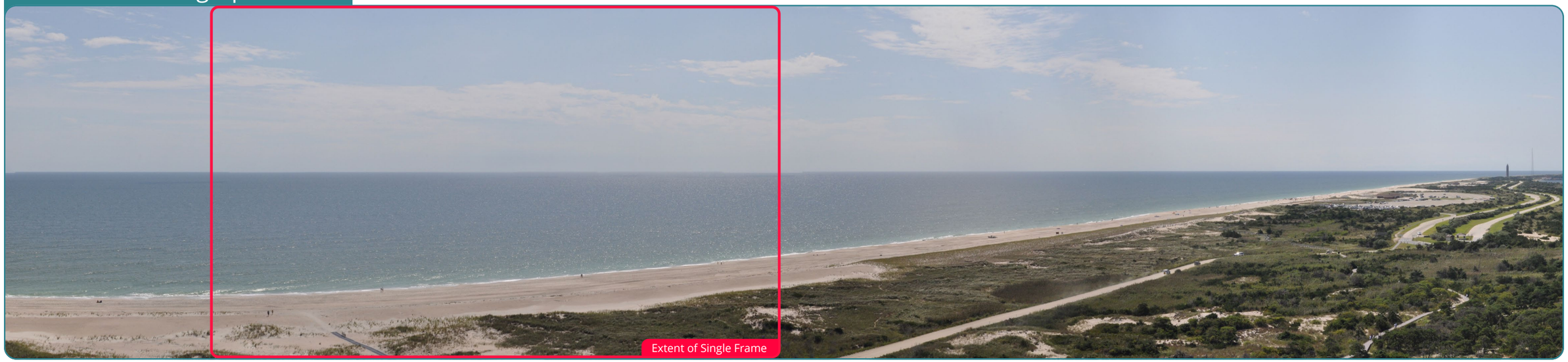
## Panoramic Photograph

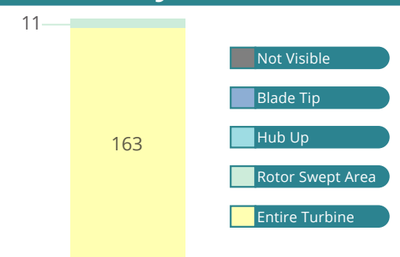



## Vicinity Map

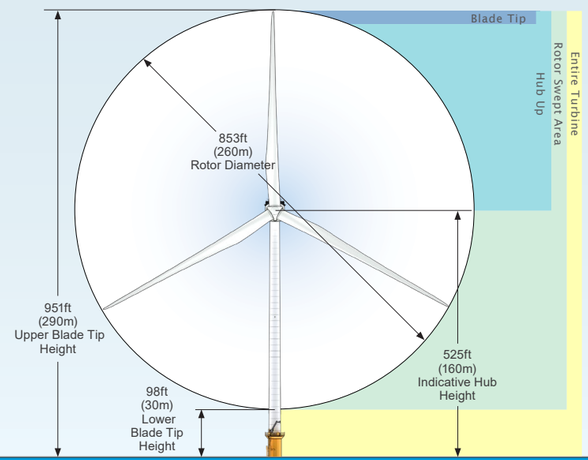

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Fire Island Lighthouse |
| Date of Photograph: | September 9, 2019 |
| Time of Photograph: | 1:50 PM (EDT) |
| Weather Condition: | Hazy |
| Latitude: | 40.632216° N |
| Longitude: | -73.218455° W |
| Viewing Direction: | South |
| Ground Elevation + Tripod Height: | 160 feet |

## Turbine Visibility




## Turbine Data

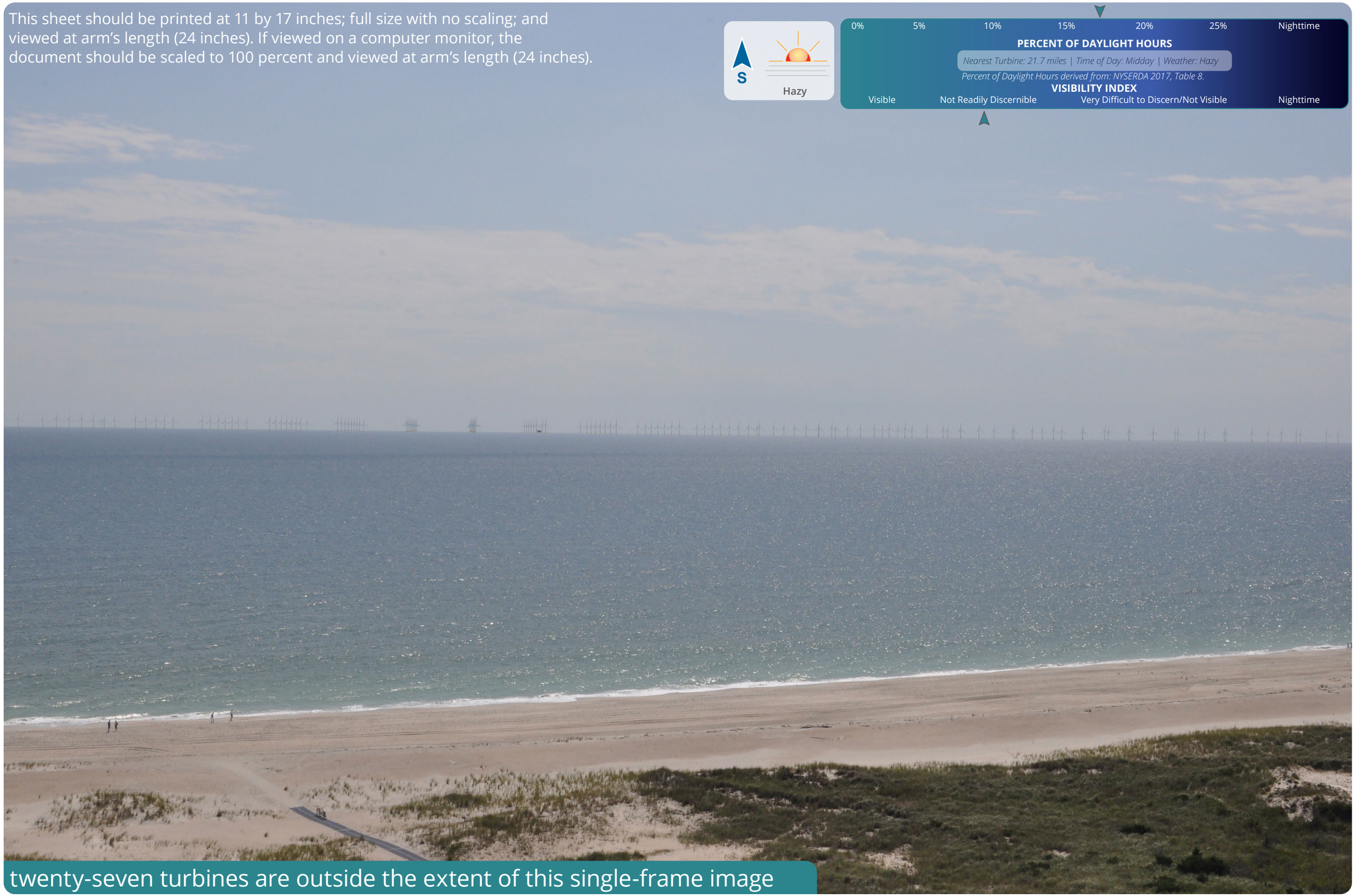



**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 21.7 miles |
| Farthest Visible Turbine | 29.6 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).




twenty-seven turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Fire Island Lighthouse

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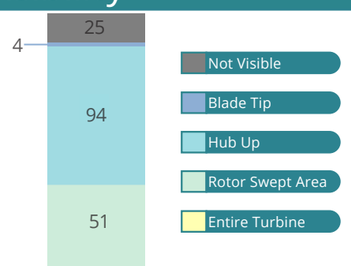
## Panoramic Photograph


## Vicinity Map

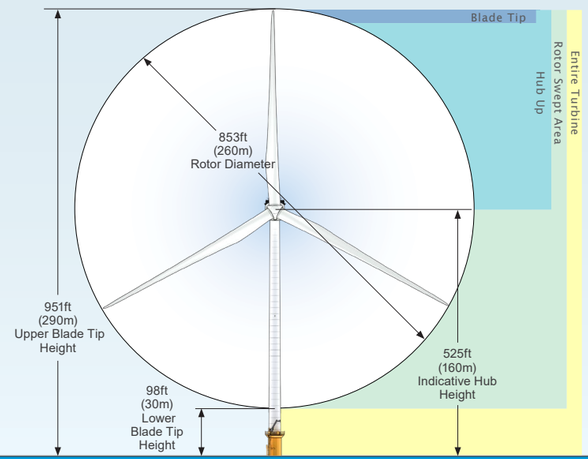

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Jacob Riis Park |
| Date of Photograph: | November 11, 2018 |
| Time of Photograph: | 11:07 AM (EDT) |
| Weather Condition: | Partly Cloudy |
| Latitude: | 40.565018° N |
| Longitude: | -73.873132° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data

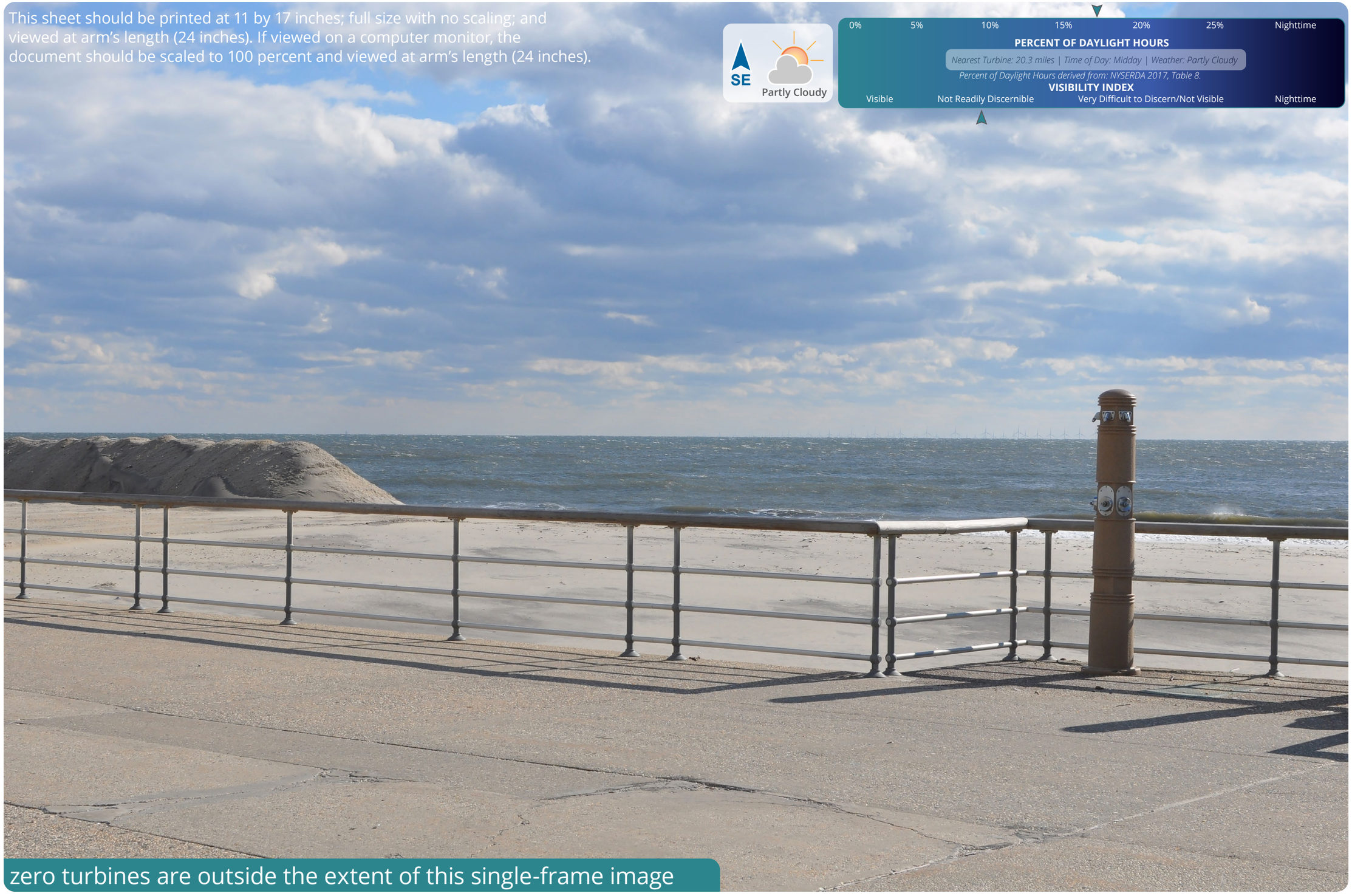



**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 21.0 miles |
| Farthest Visible Turbine | 44.7 miles |
| Structures Potentially Visible | 149 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).




zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Jacob Riis Park

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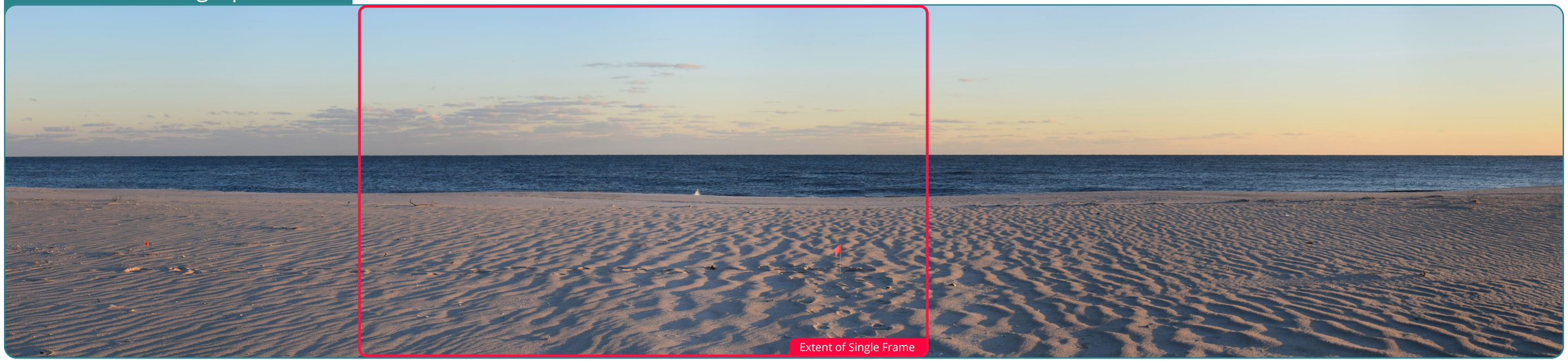
## Panoramic Photograph

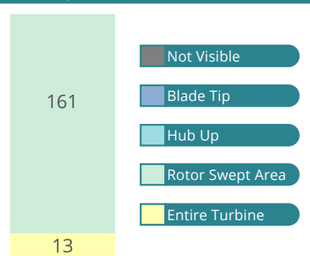



## Vicinity Map

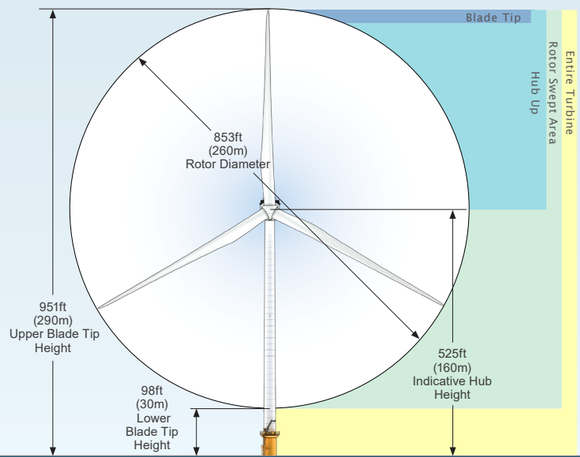

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Short Beach |
| Date of Photograph: | December 7, 2018 |
| Time of Photograph: | 3:30 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.580436° N |
| Longitude: | -73.55644° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 16 feet |

## Turbine Visibility




## Turbine Data

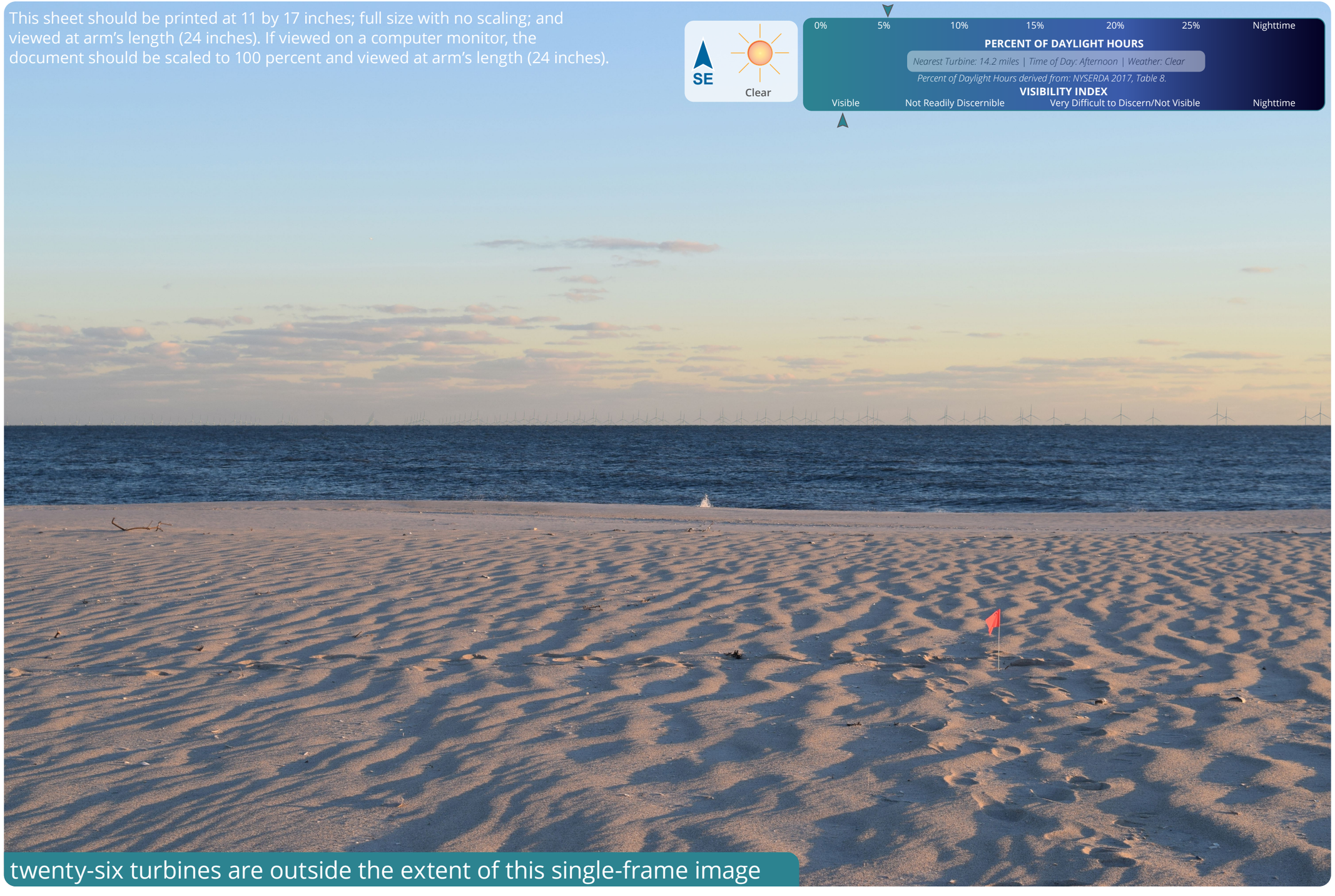



**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 14.2 miles |
| Farthest Visible Turbine | 31.8 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).




twenty-six turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Short Beach at Jones Beach State Park

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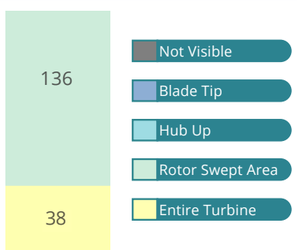
## Panoramic Photograph


## Vicinity Map

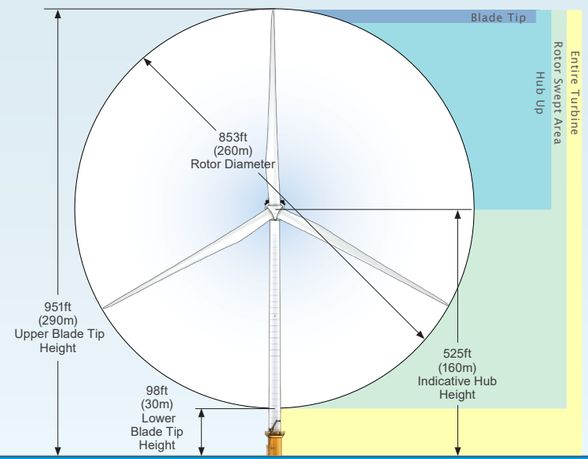

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Norman J. Levy Park |
| Date of Photograph: | November 8, 2018 |
| Time of Photograph: | 2:35 PM (EDT) |
| Weather Condition: | Partly Cloudy |
| Latitude: | 40.646587° N |
| Longitude: | -73.562871° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 105 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 18.8 miles |
| Farthest Visible Turbine | 35.8 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


nine turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Norman J. Levy Park and Preserve

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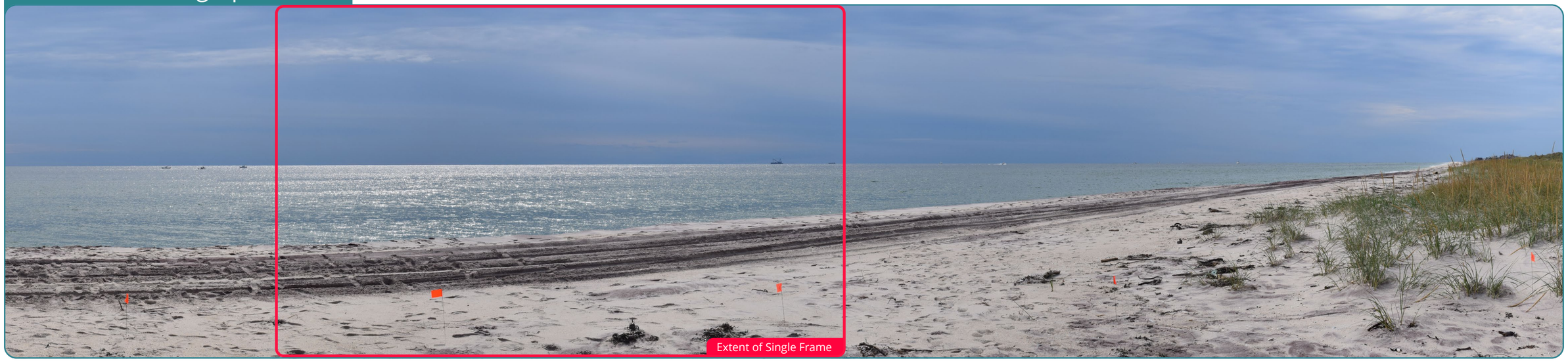
## Panoramic Photograph

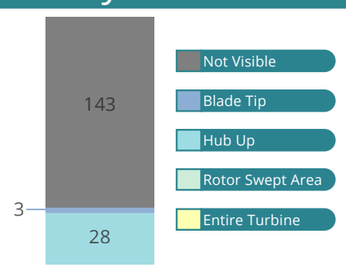



## Vicinity Map

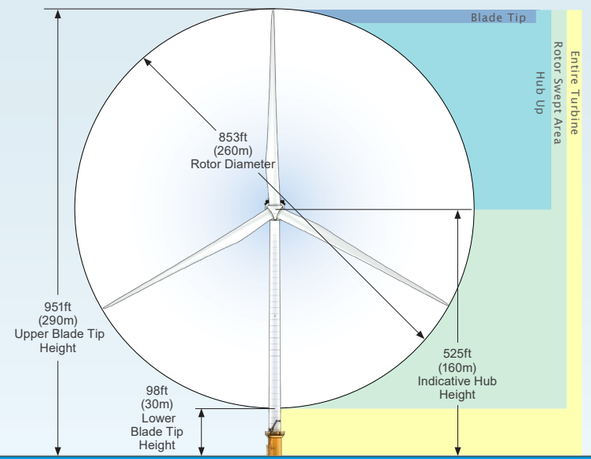

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Sunken Forest |
| Date of Photograph: | October 14, 2018 |
| Time of Photograph: | 1:00 PM (EDT) |
| Weather Condition: | Overcast |
| Latitude: | 40.653639° N |
| Longitude: | -73.112649° W |
| Viewing Direction: | South-southwest |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 24.3 miles |
| Farthest Visible Turbine | 56.7 miles |
| Structures Potentially Visible | 31 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


thirty-three turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Sunken Forest

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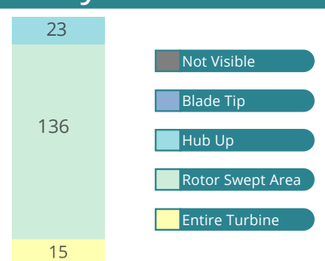
## Panoramic Photograph


## Vicinity Map

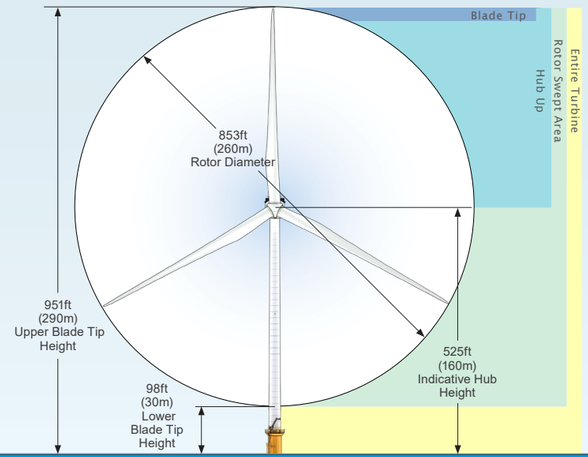

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Hartshorne Woods Park Overlook |
| Date of Photograph: | November 11, 2018 |
| Time of Photograph: | 11:40 AM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.386566° N |
| Longitude: | -73.98347° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 164 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 22.3 miles |
| Farthest Visible Turbine | 47.6 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Hartshorne Woods Park

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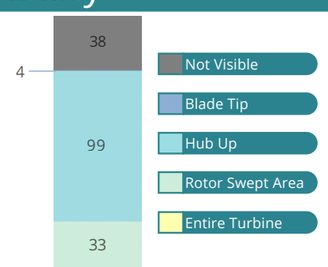
## Panoramic Photograph


## Vicinity Map

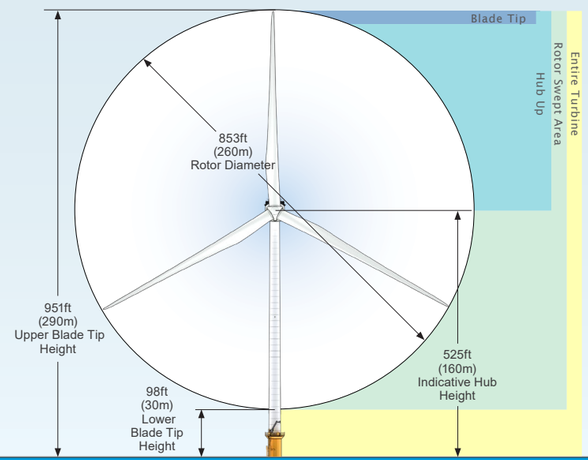

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Ocean Grove Beach |
| Date of Photograph: | November 11, 2018 |
| Time of Photograph: | 2:35 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.211317° N |
| Longitude: | -74.002595° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 25.4 miles |
| Farthest Visible Turbine | 48.5 miles |
| Structures Potentially Visible | 136 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation



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This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Ocean Grove Beach

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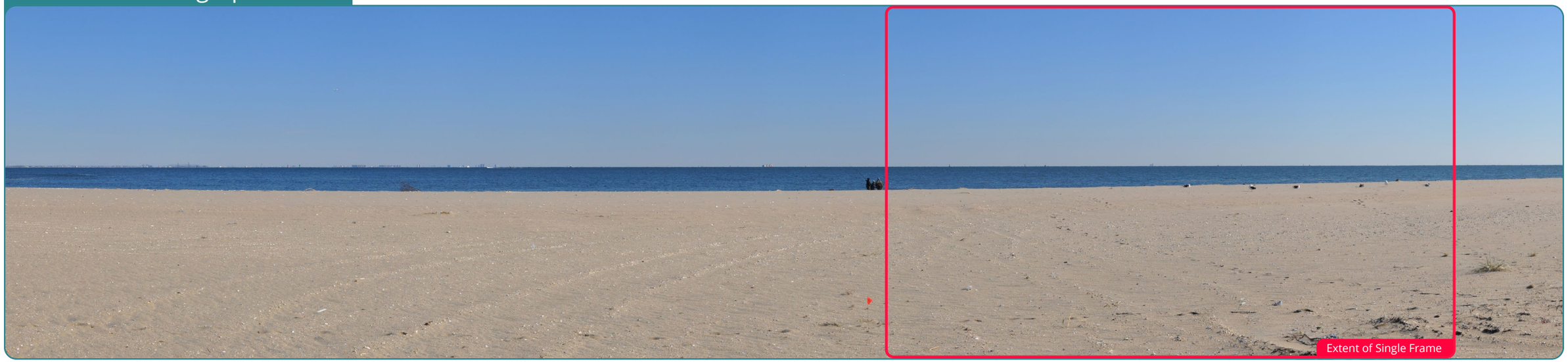
## Panoramic Photograph

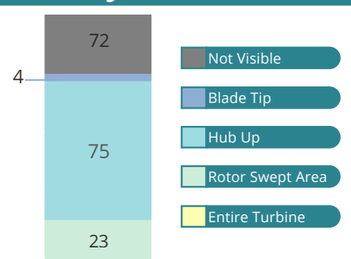



## Vicinity Map

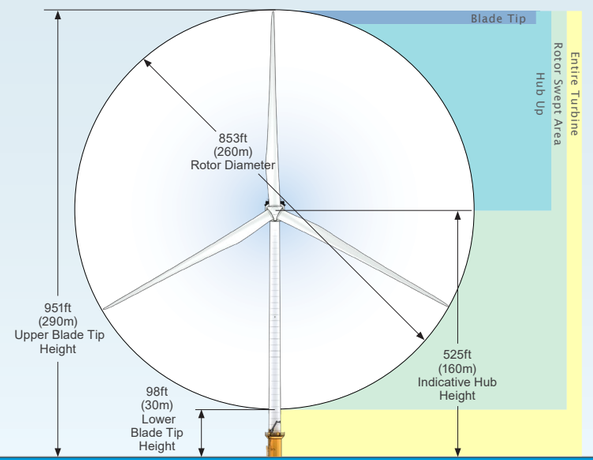

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Sandy Hook - North Beach |
| Date of Photograph: | November 11, 2018 |
| Time of Photograph: | 10:38 AM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.469226° N |
| Longitude: | -73.993681° W |
| Viewing Direction: | East-southeast |
| Ground Elevation + Tripod Height: | 8 feet |

## Turbine Visibility




## Turbine Data

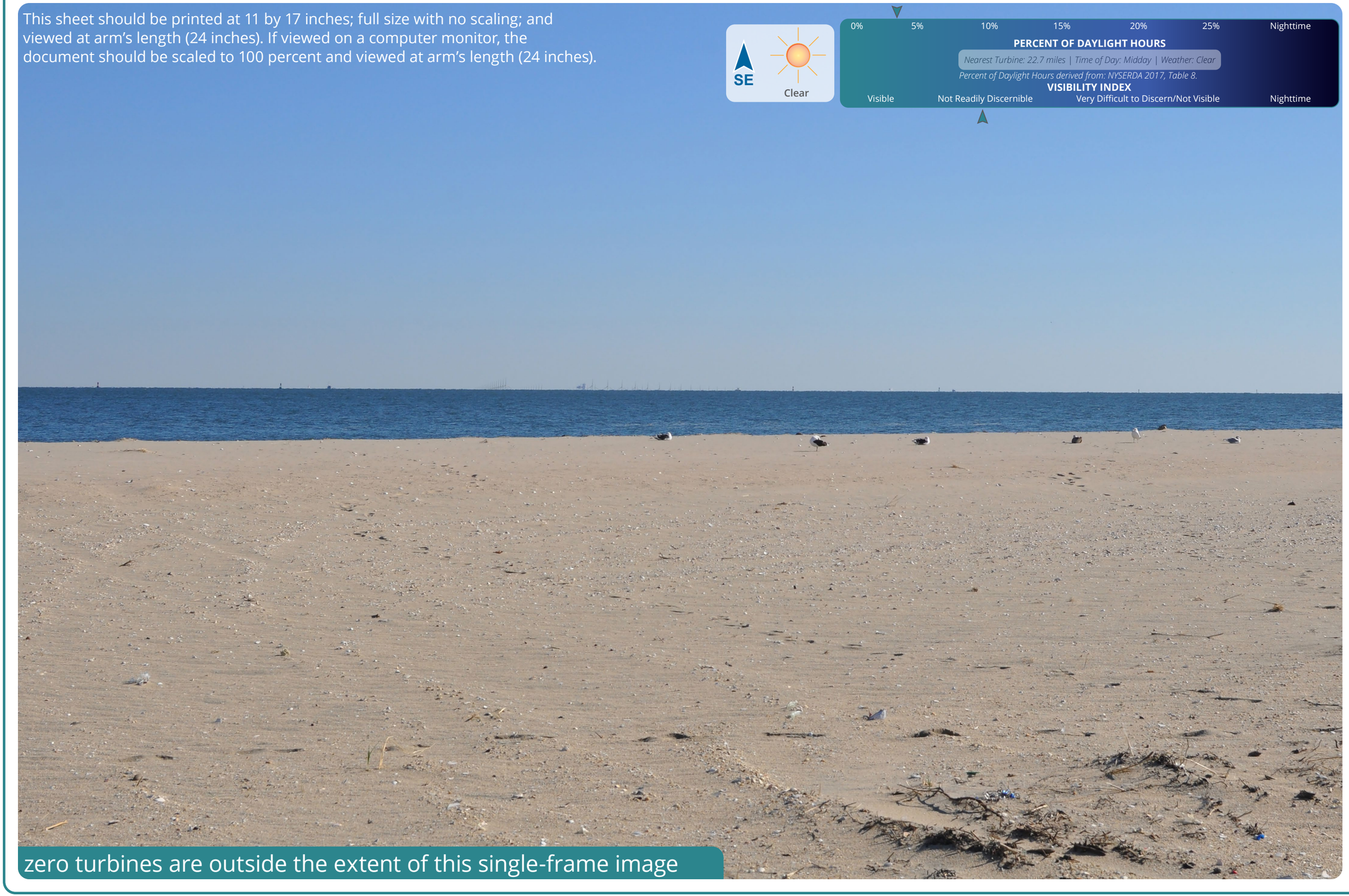



**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 23.7 miles |
| Farthest Visible Turbine | 49.2 miles |
| Structures Potentially Visible | 102 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).




zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Sandy Hook - North Beach

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## Panoramic Photograph


## Vicinity Map


## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Columbia Street Esplanade |
| Date of Photograph: | October 11, 2019 |
| Time of Photograph: | 10:00 AM (EDT) |
| Weather Condition: | Partly Cloudy |
| Latitude: | 40.664841° N |
| Longitude: | -74.013545° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 12 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

EW 1 Onshore Substation | Columbia Street Esplanade

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## Panoramic Photograph


## Vicinity Map


## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Hudson River Waterfront Walkway |
| Date of Photograph: | September 18, 2019 |
| Time of Photograph: | 4:45 PM (EDT) |
| Weather Condition: | Partly Cloudy |
| Latitude: | 40.684785° N |
| Longitude: | -74.070244° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 10 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

EW 1 Onshore Substation | Hudson River Waterfront Walkway

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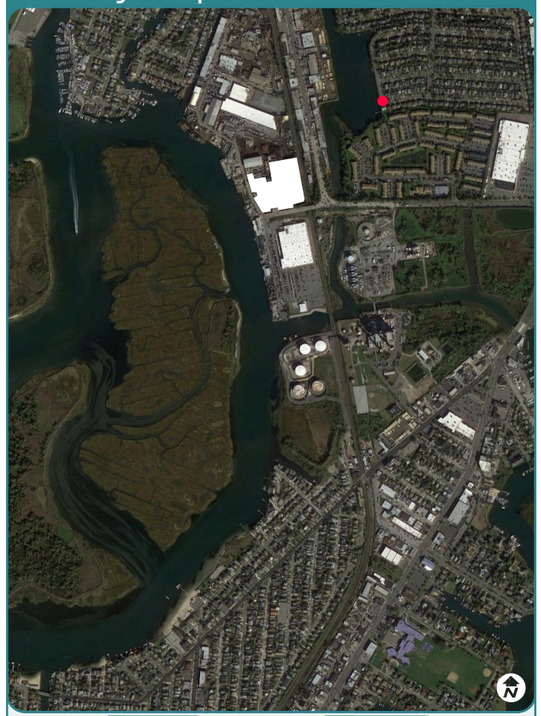
## Panoramic Photograph


## Vicinity Map




## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Oceanlea Drive |
| Date of Photograph: | February 4, 2021 |
| Time of Photograph: | 10:38 AM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.6239505° N |
| Longitude: | -73.6479803° W |
| Viewing Direction: | Southwest |
| Ground Elevation + Tripod Height: | 6 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)
EW 2 Onshore Substation A | Oceanlea Drive

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This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

EW 2 Onshore Substation A + Hampton Road Substation | Oceanlea Drive

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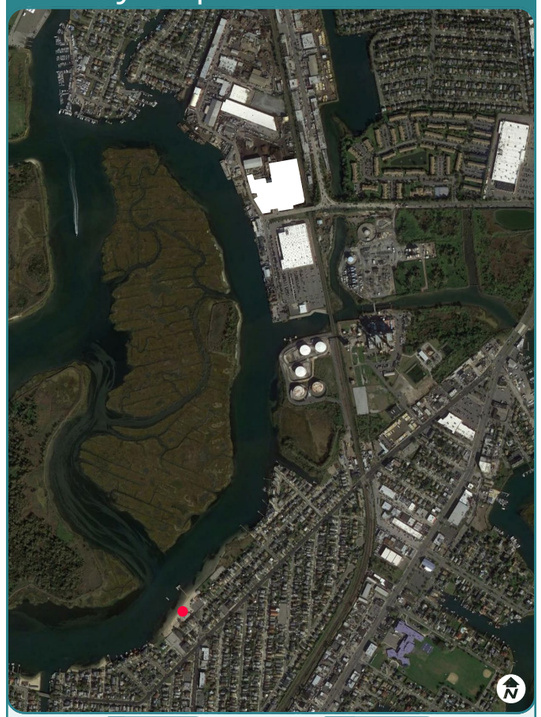
## Panoramic Photograph


## Vicinity Map




## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Masone Point Beach |
| Date of Photograph: | February 4, 2021 |
| Time of Photograph: | 9:08 AM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.6075482° N |
| Longitude: | -73.6563308° W |
| Viewing Direction: | North |
| Ground Elevation + Tripod Height: | 6 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

EW 2 Onshore Substation A | Masone Point Beach

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This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

EW 2 Onshore Substation A + Hampton Road Substation | Masone Point Beach

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## Panoramic Photograph


## Vicinity Map


## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Quebec Road |
| Date of Photograph: | September 1, 2021 |
| Time of Photograph: | 2:55 PM (EDT) |
| Weather Condition: | Overcast |
| Latitude: | 40.597048° N |
| Longitude: | -73.660342° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 10 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

The view of the Onshore Substation is blocked by the existing buildings and vegetation

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)
EW 2 Onshore Substation c | Quebec Road

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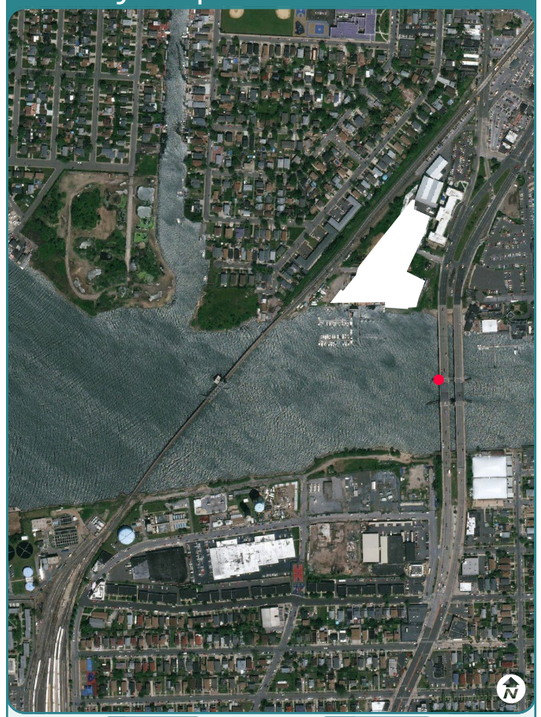
## Panoramic Photograph


## Vicinity Map




## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Long Beach Road |
| Date of Photograph: | September 1, 2021 |
| Time of Photograph: | 12:45 PM (EDT) |
| Weather Condition: | Overcast |
| Latitude: | 40.595684° N |
| Longitude: | -73.656966° W |
| Viewing Direction: | Northwest |
| Ground Elevation + Tripod Height: | 30 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

EW 2 Onshore Substation 1E | Long Beach Road

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## Panoramic Photograph


## Vicinity Map


## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Long Beach Park |
| Date of Photograph: | September 1, 2021 |
| Time of Photograph: | 2:10 PM (EDT) |
| Weather Condition: | Overcast |
| Latitude: | 40.593714° N |
| Longitude: | -73.666350° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 8 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)
EW 2 Onshore Substation C | Long Beach Park

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## Panoramic Photograph


## Vicinity Map


## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Island Park Station |
| Date of Photograph: | September 1, 2021 |
| Time of Photograph: | 12:30 PM (EDT) |
| Weather Condition: | Overcast |
| Latitude: | 40.600392° N |
| Longitude: | -73.655512° W |
| Viewing Direction: | Southwest |
| Ground Elevation + Tripod Height: | 12 feet |

## Viewing Instructions

The single-frame simulations on the following pages should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches).

If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

## Preliminary Substation Design

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


The view of the Onshore Substation is blocked by the existing buildings and vegetation

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)
EW 2 Onshore Substation C | Island Park Station

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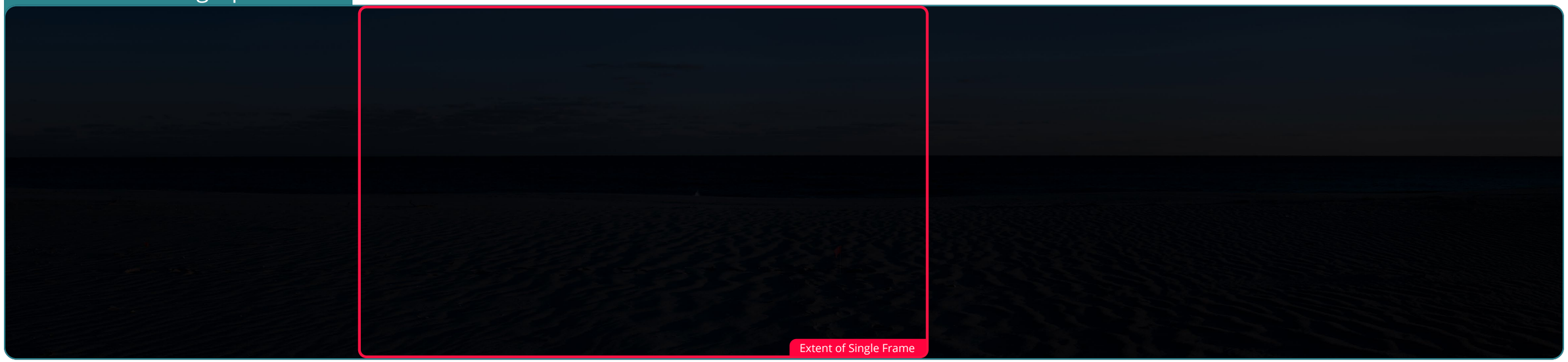
## Panoramic Photograph

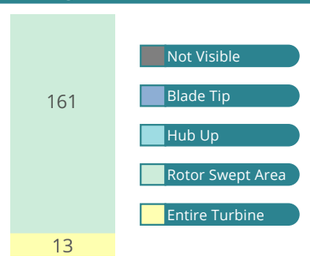



## Vicinity Map

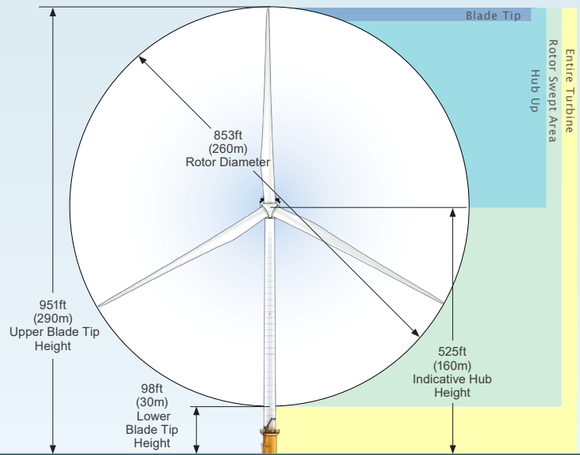

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Short Beach |
| Date of Photograph: | December 7, 2018 |
| Time of Photograph: | Night (simulated) |
| Weather Condition: | Clear |
| Latitude: | 40.580436° N |
| Longitude: | -73.55644° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 16 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 14.2 miles |
| Farthest Visible Turbine | 31.8 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


Equinor Wind proposes to implement an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Therefore, while this simulation is static and represents nighttime lighting as activated, this is not anticipated to be a constant nighttime condition.

twenty-six turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Short Beach at Jones Beach State Park

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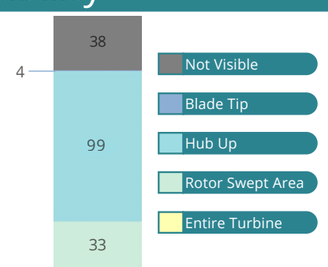
## Panoramic Photograph


## Vicinity Map

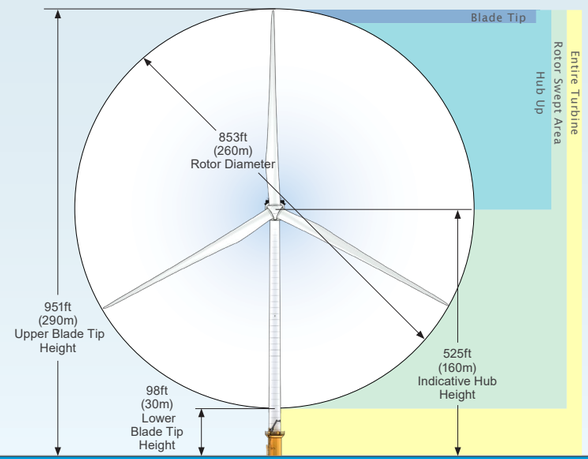

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Ocean Grove Beach |
| Date of Photograph: | September 10, 2019 |
| Time of Photograph: | 9:40 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.211768° N |
| Longitude: | -74.002643° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 25.4 miles |
| Farthest Visible Turbine | 48.5 miles |
| Structures Potentially Visible | 136 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation



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This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).


Equinor Wind proposes to implement an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Therefore, while this simulation is static and represents nighttime lighting as activated, this is not anticipated to be a constant nighttime condition.

zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

Ocean Grove Beach

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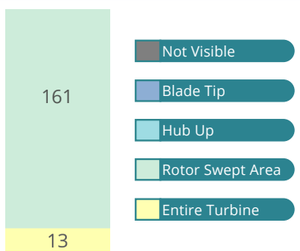
## Panoramic Photograph

## Vicinity Map

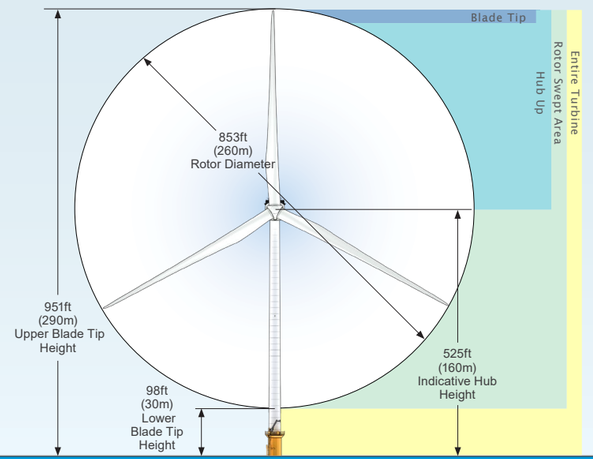

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Short Beach |
| Date of Photograph: | December 7, 2018 |
| Time of Photograph: | 3:30 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.580436° N |
| Longitude: | -73.55644° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 16 feet |

## Turbine Visibility




## Turbine Data



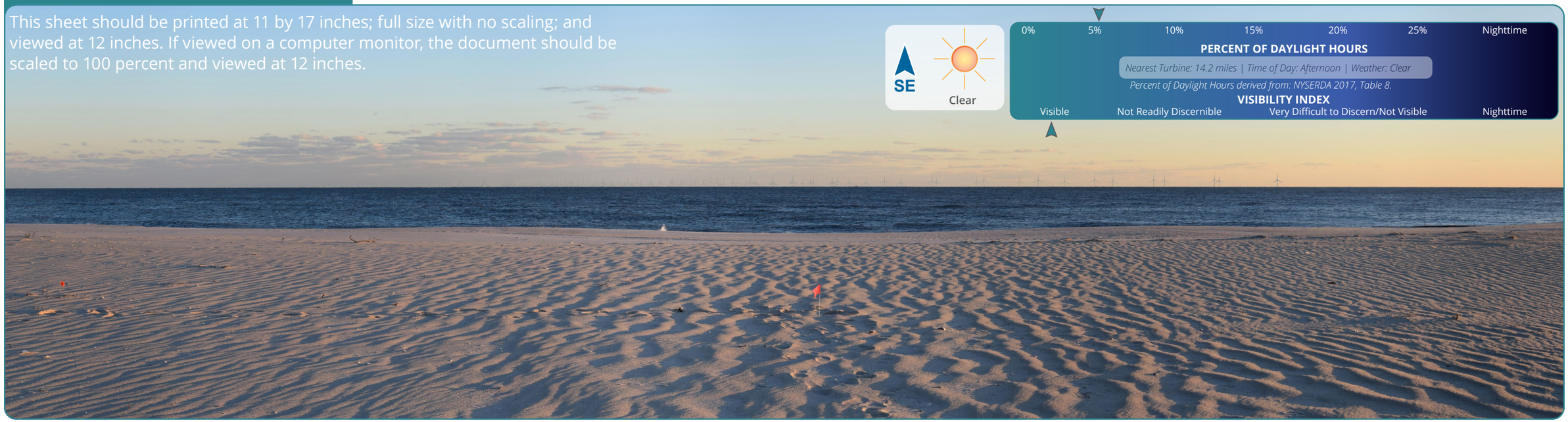

**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 14.2 miles |
| Farthest Visible Turbine | 31.8 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

# Panoramic Simulation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at 12 inches. If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at 12 inches.



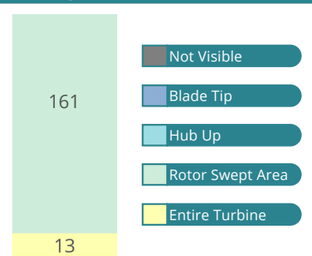
## Panoramic Photograph

## Vicinity Map

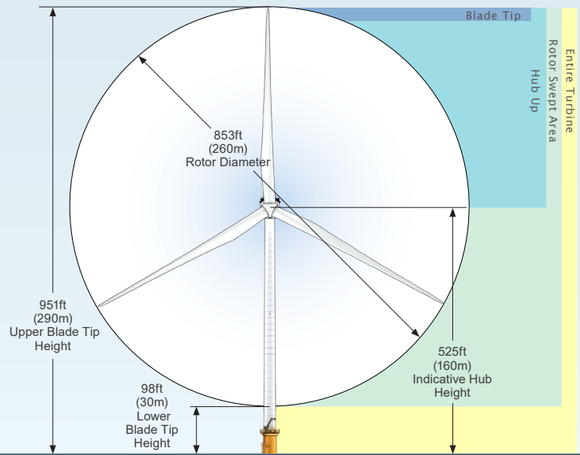

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Short Beach |
| Date of Photograph: | December 7, 2018 |
| Time of Photograph: | Night (simulated) |
| Weather Condition: | Clear |
| Latitude: | 40.580436° N |
| Longitude: | -73.55644° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 16 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 14.2 miles |
| Farthest Visible Turbine | 31.8 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation



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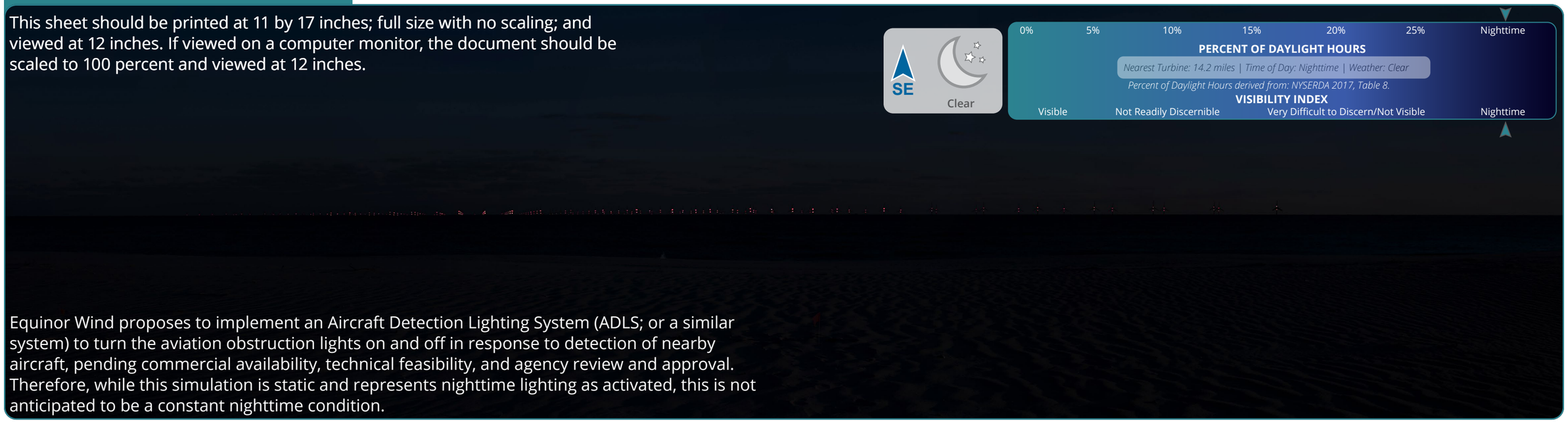
# Panoramic Simulation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at 12 inches. If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at 12 inches.




Equinor Wind proposes to implement an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Therefore, while this simulation is static and represents nighttime lighting as activated, this is not anticipated to be a constant nighttime condition.

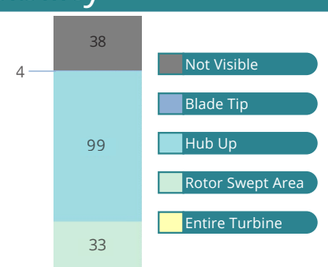
## Panoramic Photograph

## Vicinity Map

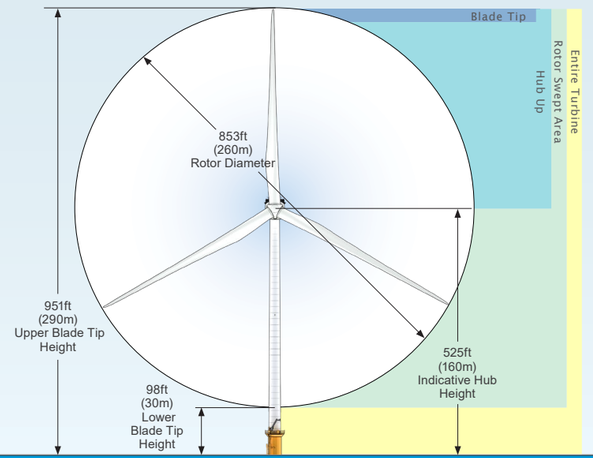

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Ocean Grove Beach |
| Date of Photograph: | November 11, 2018 |
| Time of Photograph: | 2:35 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.211317° N |
| Longitude: | -74.002595° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 25.4 miles |
| Farthest Visible Turbine | 48.5 miles |
| Structures Potentially Visible | 136 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation

# Panoramic Simulation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at 12 inches. If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at 12 inches.

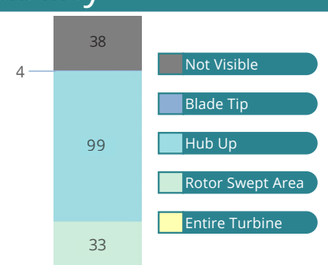
## Panoramic Photograph

## Vicinity Map

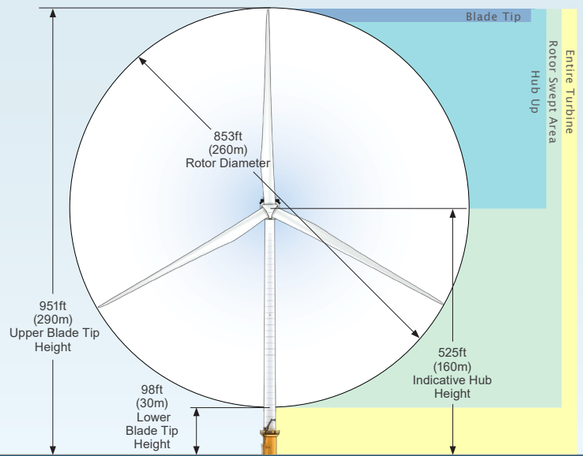

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Ocean Grove Beach |
| Date of Photograph: | September 10, 2019 |
| Time of Photograph: | 9:40 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.211768° N |
| Longitude: | -74.002643° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 25.4 miles |
| Farthest Visible Turbine | 48.5 miles |
| Structures Potentially Visible | 136 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation



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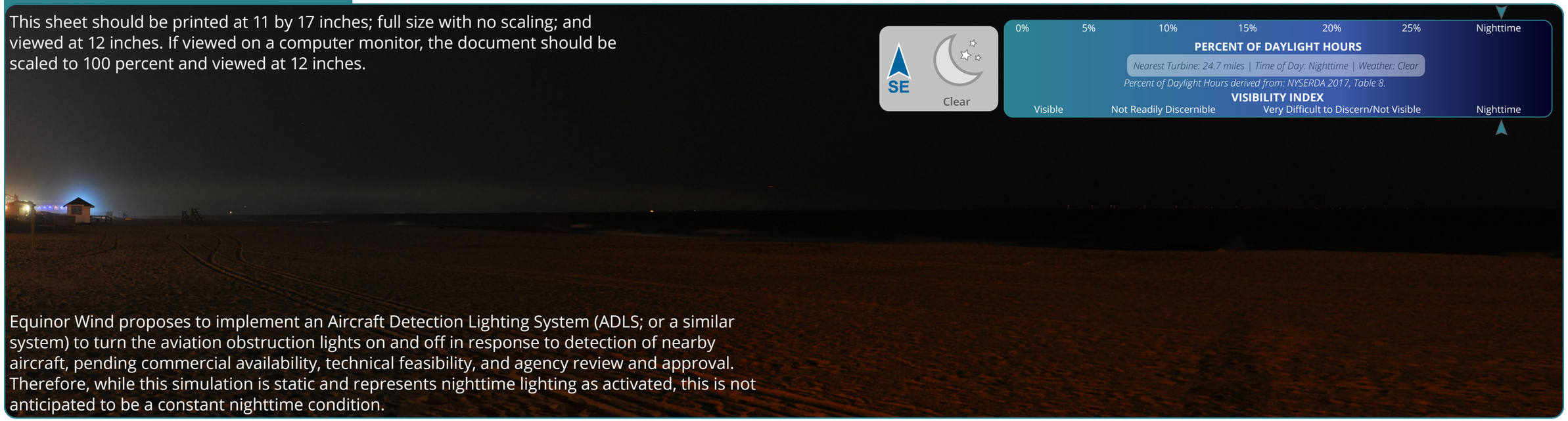
# Panoramic Simulation

This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at 12 inches. If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at 12 inches.




Equinor Wind proposes to implement an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Therefore, while this simulation is static and represents nighttime lighting as activated, this is not anticipated to be a constant nighttime condition.

# ATTACHMENT AA-4 COMPUTER GENERATED SIMULATIONS

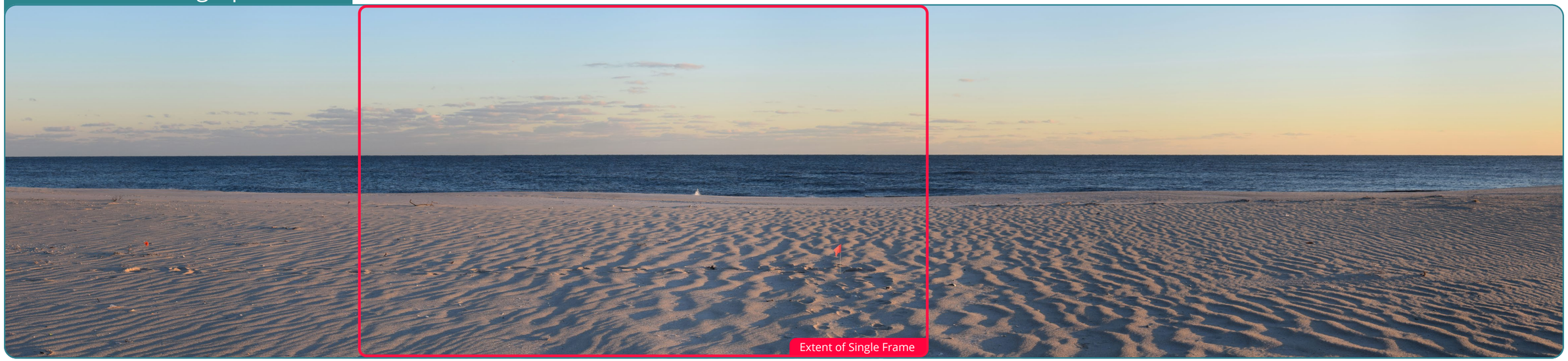
Determination of potential visual effects that may occur from development of a project requires analysis of a number of factors including, but not limited to, distance of the viewer from the Lease Area, the number of wind turbines visible, view of the broad side or narrow end of the Lease Area, the portion of the wind turbines visible above the horizon, motion of the turbine blades, lighting and weather conditions, and angle of observation. In order to assist in identifying when the wind turbines would be most noticeable, Empire prepared simulations that depict three distinct computer-generated conditions: back-, front-, and side-lit conditions under clear skies. Simulations depicting the three distinct computer-generated sun angle conditions were created for two KOPs: Jones Beach State Park in New York and Ocean Grove Beach in New Jersey. These two locations represent coastal states that are nearest to the Lease Area as well as locations that are nearest to the wind turbines. Furthermore, these KOPs represent views from the beach which are important recreational/tourist destinations for both states.

These conditions occur at various times throughout the day and are dependent upon a viewer's location and the path of the sun, based on the time of year, in relation to the Project. Since the path of the sun is constantly changing, the computer-generated simulations were developed using the day on which the original photography was captured during the field visits.

Computer Generated Simulations:

- Jones Beach, NY
- Ocean Grove Beach, NJ

## Panoramic Photograph

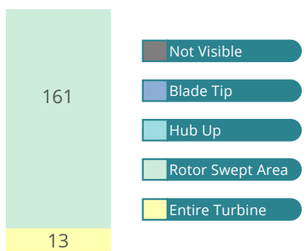



## Vicinity Maps

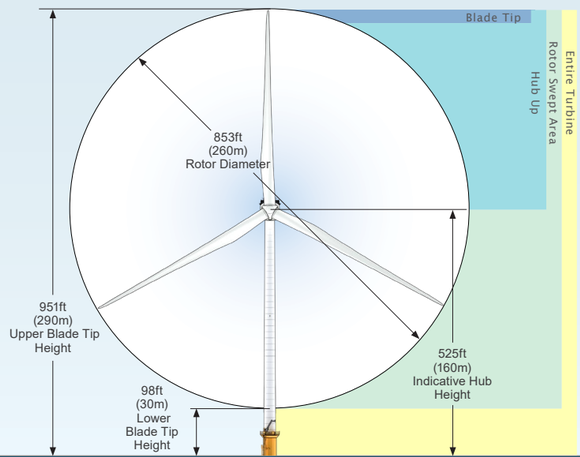

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Short Beach |
| Date of Photograph: | December 7, 2018 |
| Time of Photograph: | 3:30 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.580436° N |
| Longitude: | -73.55644° W |
| Viewing Direction: | Southeast |
| Ground Elevation + Tripod Height: | 16 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 14.2 miles |
| Farthest Visible Turbine | 31.8 miles |
| Structures Potentially Visible | 174 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation



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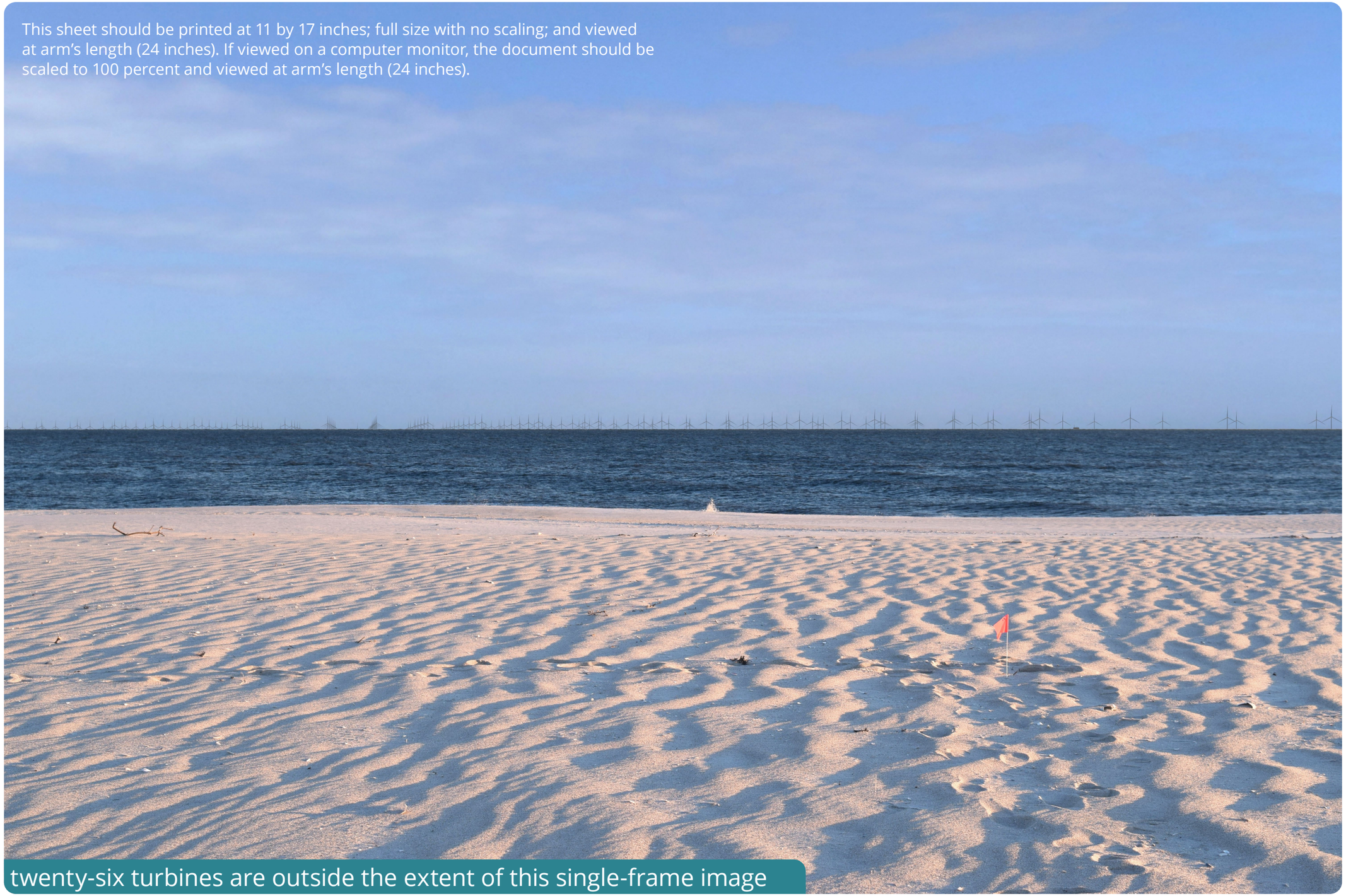
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



twenty-six turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) | Short Beach at Jones Beach State Park

Computer Generated Back-Lit Conditions

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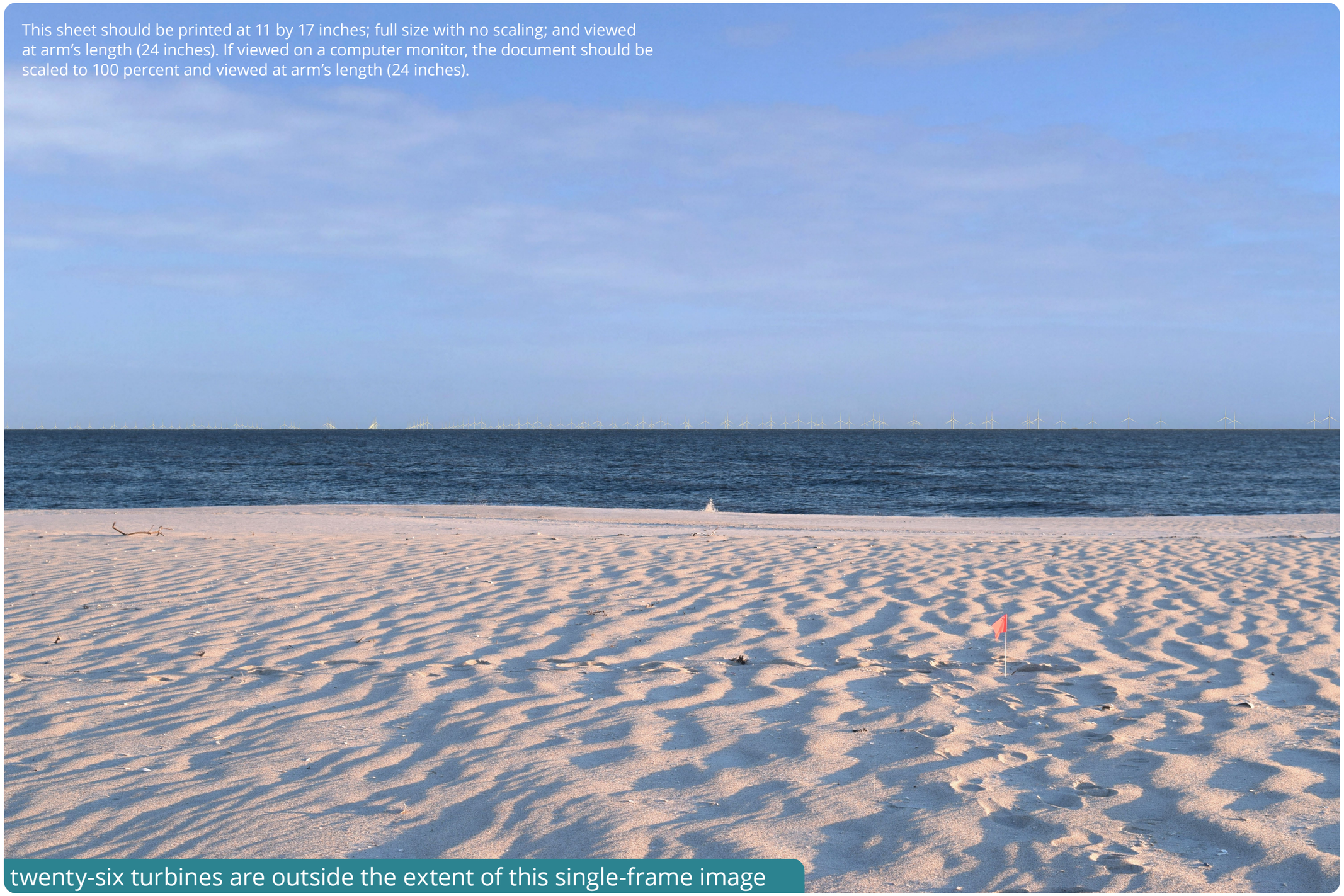
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



twenty-six turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) | Short Beach at Jones Beach State Park

Computer Generated Front-Lit Conditions

equinor

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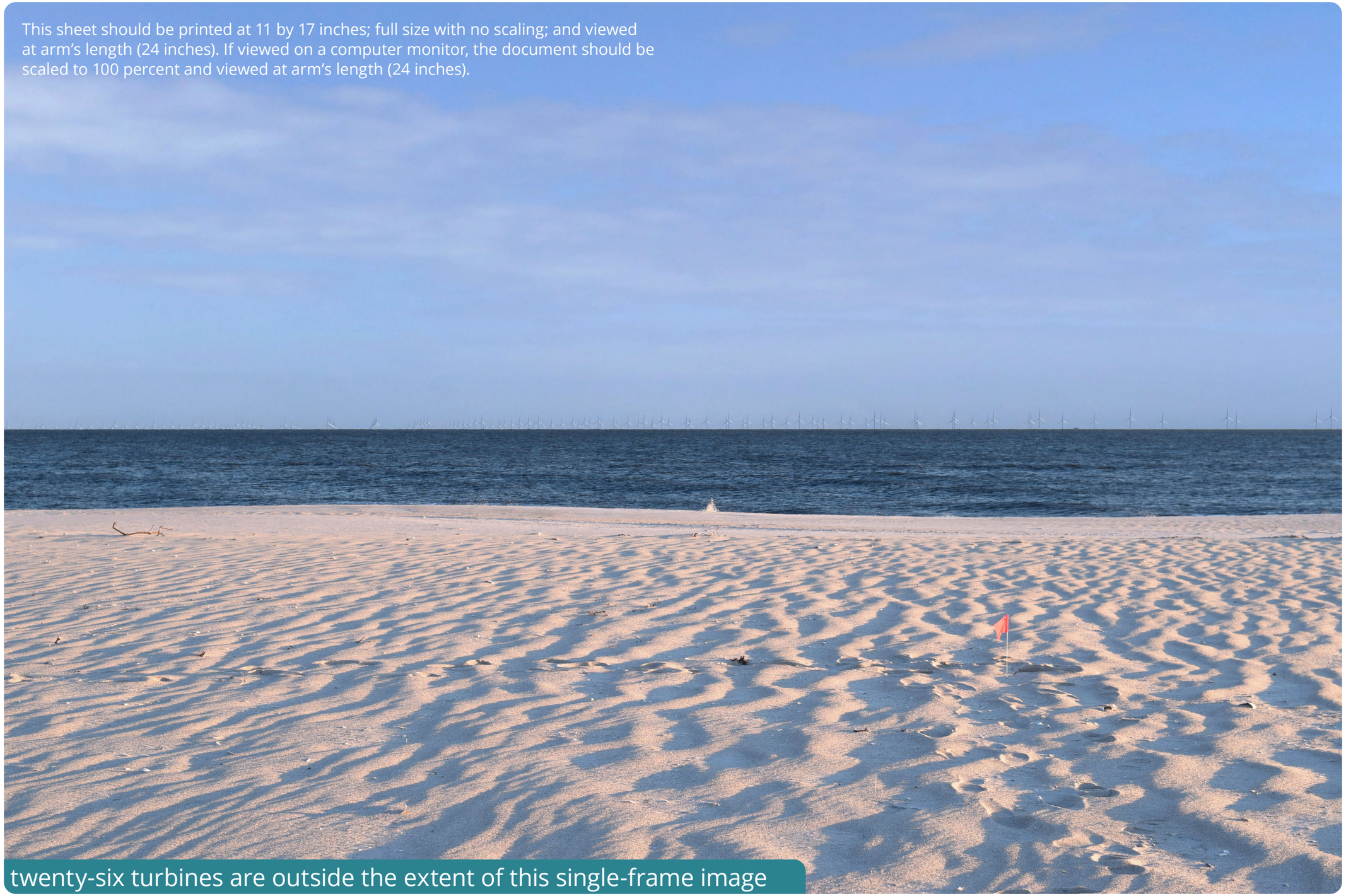


twenty-six turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) | Short Beach at Jones Beach State Park

Computer Generated Side-Lit Conditions

equinor

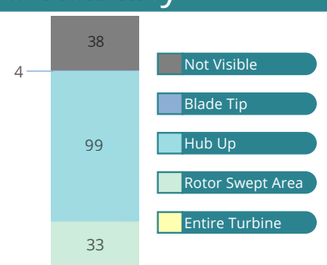
## Panoramic Photograph


## Vicinity Maps

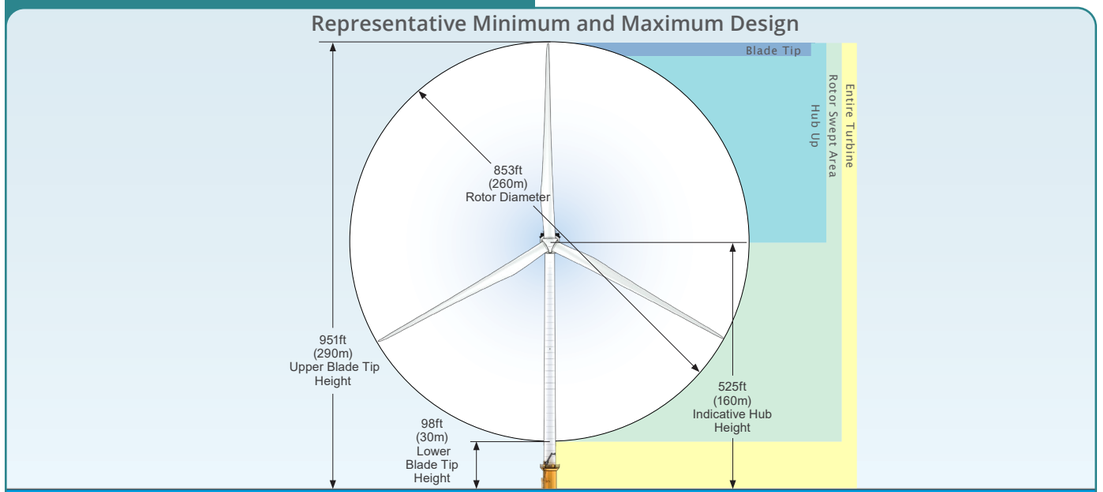

## Photograph Information

| | |
|---|---|
| Viewpoint Location: | Ocean Grove Beach |
| Date of Photograph: | November 11, 2018 |
| Time of Photograph: | 2:35 PM (EDT) |
| Weather Condition: | Clear |
| Latitude: | 40.211317° N |
| Longitude: | -74.002595° W |
| Viewing Direction: | Northeast |
| Ground Elevation + Tripod Height: | 15 feet |

## Turbine Visibility




## Turbine Data




**Representative Wind Turbine**

| Viewpoint Visibility | |
|---|---|
| Closest Visible Turbine | 25.4 miles |
| Farthest Visible Turbine | 48.5 miles |
| Structures Potentially Visible | 136 of 174 total |

*Fewer turbines may be visible in the simulation due to screening from topography or vegetation



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This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).

zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) | Ocean Grove Beach

Computer Generated Back-Lit Conditions

equinor

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zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) | Ocean Grove Beach

Computer Generated Front-Lit Conditions

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zero turbines are outside the extent of this single-frame image

Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) | Ocean Grove Beach

Computer Generated Side-Lit Conditions

equinor

# ATTACHMENT AA-5 24-HOUR TIME-LAPSE VIDEO SIMULATIONS

- Jones Beach, NY
- Ocean Grove Beach, NJ

# ATTACHMENT AA-6 VISUAL IMPACT ASSESSMENT BY KEY OBSERVATION POINT

# Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

# Visual Impact Assessment
# by
# Key Observation Point

Prepared for
Empire Offshore Wind LLC


Prepared by
Tetra Tech, Inc.


March 2023

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## LIST OF FIGURES



## LIST OF TABLES

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| Empire | Empire Offshore Wind LLC |
| ft | foot |
| HAT | Highest Astronomical Tide |
| km | kilometer |
| KOP | Key Observation Point |
| Lease Area | designated Renewable Energy Lease Area OCS-A 0512 |
| m | meter |
| mi | mile |
| NPS | National Park Service |
| NRHP | U.S National Register of Historic Places |
| POI | Point of Interconnection |
| Project | The offshore wind project for OCS A-0512 proposed by Empire Offshore Wind LLC consisting of Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2) |
| Project Area | The area associated with the build out of the entire Lease Area, submarine export cable routes, interarray cables, and all onshore Project facilities. |
| VIA | Visual Impact Assessment |

## AA-6.1 Introduction

Empire Offshore Wind LLC (Empire) proposes to construct and operate the Project located in the designated Renewable Energy Lease Area OCS-A 0512. The Visual Impact Assessment (VIA) for the Project is based on evaluation of existing conditions and expected conditions with the proposed Project at representative Key Observation Points (KOPs). The assessment covers 15 KOPs distributed throughout the Visual Offshore Study Area, including 10 in New York and 5 in New Jersey, and 11 KOPs identified within the Visual Onshore Study Area. KOPs within the Visual Offshore Study Area are shown in **Figure AA-6-1**. The Visual Onshore Study Area for the EW 1 and O&M Base, EW 2 Onshore Substation A and Onshore Substation C, and the cable bridge sites are shown in **Figure AA-6-2, Figure AA-6-3,** and **Figure AA-6-4,** respectively. As discussed in Section AA.4.3.3 of the VIA, analysis for each KOP included the following components:

- Characterizing the existing landscape and visual resource conditions at the KOP,
- Determining the expected or potential visibility of Project facilities from the KOP, and
- Rating the degree of visual contrast created by the Project for the representative wind turbine as seen from the KOP.

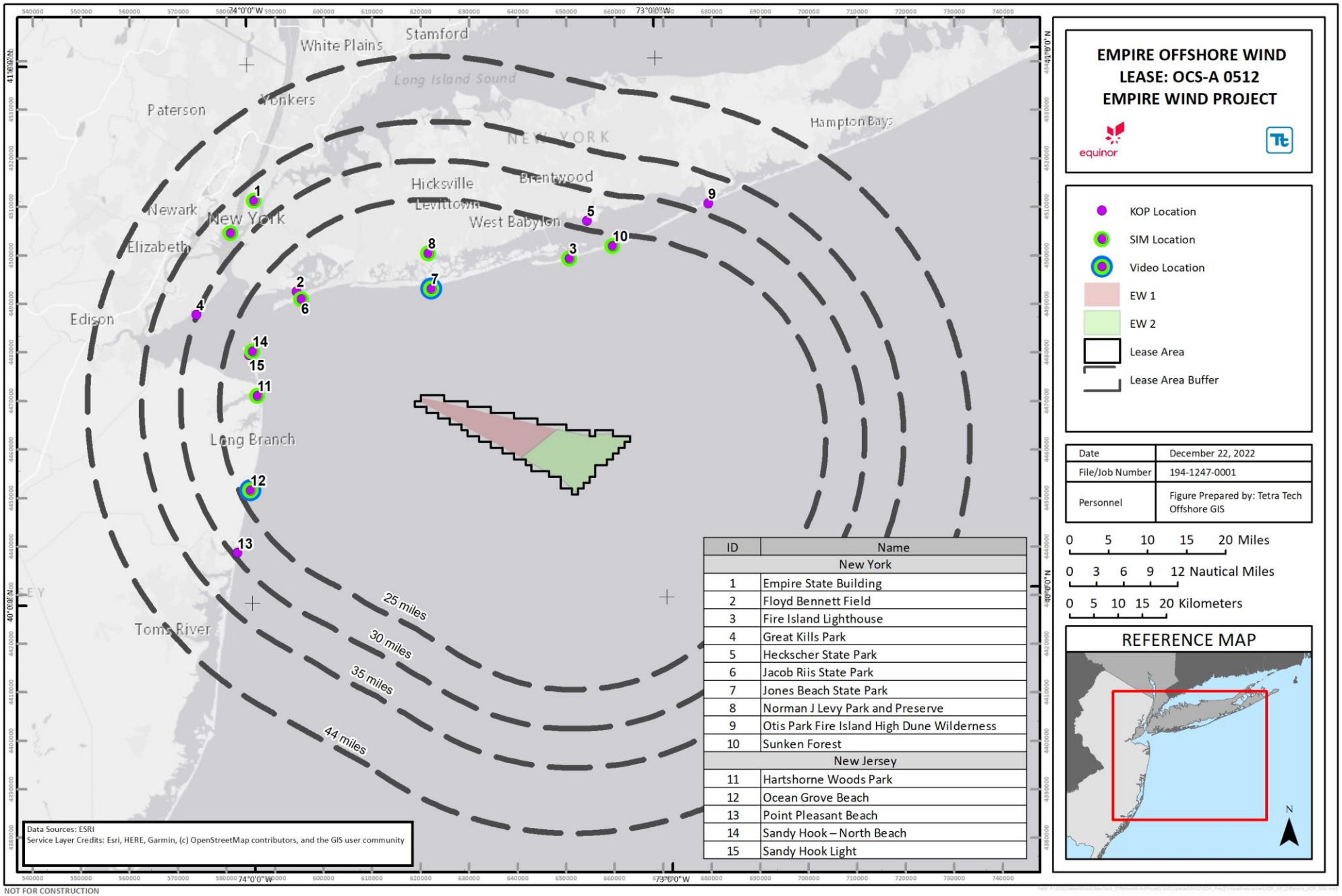
This attachment presents the results of this site-specific impact evaluation process. Descriptions are based on field conditions, noting that visibility may be reduced under varying atmospheric conditions such as haze or fog. The documentation includes assessment information for all KOPs applicable to the offshore Project components. The content for each KOP includes a brief introduction identifying the KOP location and setting; a description of the existing landscape conditions; and a summary of the with-Project conditions for the representative wind turbine (visibility, contrast rating, and viewer response components). Fifteen KOPs identified within the Visual Offshore Study Area are discussed in Section AA-6.2; 14 KOPs identified within the Visual Onshore Study Area are discussed in Section AA-6.3.

**Attachments AA-1, AA-2,** and **AA-3** of the VIA provide supporting documentation for the KOP-specific assessments. **Attachment AA-1** includes photographs of existing conditions, **Attachment AA-2** includes contrast rating worksheets for each KOP, and **Attachment AA-3** includes photo simulations for a subset of the KOPs.

## AA-6.2 Offshore Facilities

The Project includes the construction of up to 174 wind turbines, two offshore substations, and foundations for the wind turbines and substations within the identified Lease Area[1]. The wind turbines will be connected via interarray cables to the offshore substations. The offshore substations will collect the electricity generated by the wind turbines and transmit the electricity to the Project's onshore substations via submarine export cables. The onshore substations will be used to connect the submarine export cables to the Points of Interconnection (POIs) identified in New York. An overview of the offshore Project facility locations is provided in **Appendix AA, Figure AA-1**. The interarray cables and export cables will be entirely submerged underwater and buried underground and will have minimal effects; therefore, these Project components were not evaluated in detail as part of this assessment.

[1] As noted in Section AA.1 of the VIA, the export cables, interarray cables and interconnection cables will be entirely submarine; therefore, these Project components were not discussed in detail in this VIA.




| ID | Name |
|---|---|
| | New York |
| 1 | Empire State Building |
| 2 | Floyd Bennett Field |
| 3 | Fire Island Lighthouse |
| 4 | Great Kills Park |
| 5 | Heckscher State Park |
| 6 | Jacob Riis State Park |
| 7 | Jones Beach State Park |
| 8 | Norman J Levy Park and Preserve |
| 9 | Otis Park Fire Island High Dune Wilderness |
| 10 | Sunken Forest |
| | New Jersey |
| 11 | Hartshorne Woods Park |
| 12 | Ocean Grove Beach |
| 13 | Point Pleasant Beach |
| 14 | Sandy Hook – North Beach |
| 15 | Sandy Hook Light |

**Figure AA-6-1 Key Observation Points within the Visual Offshore Study Area**

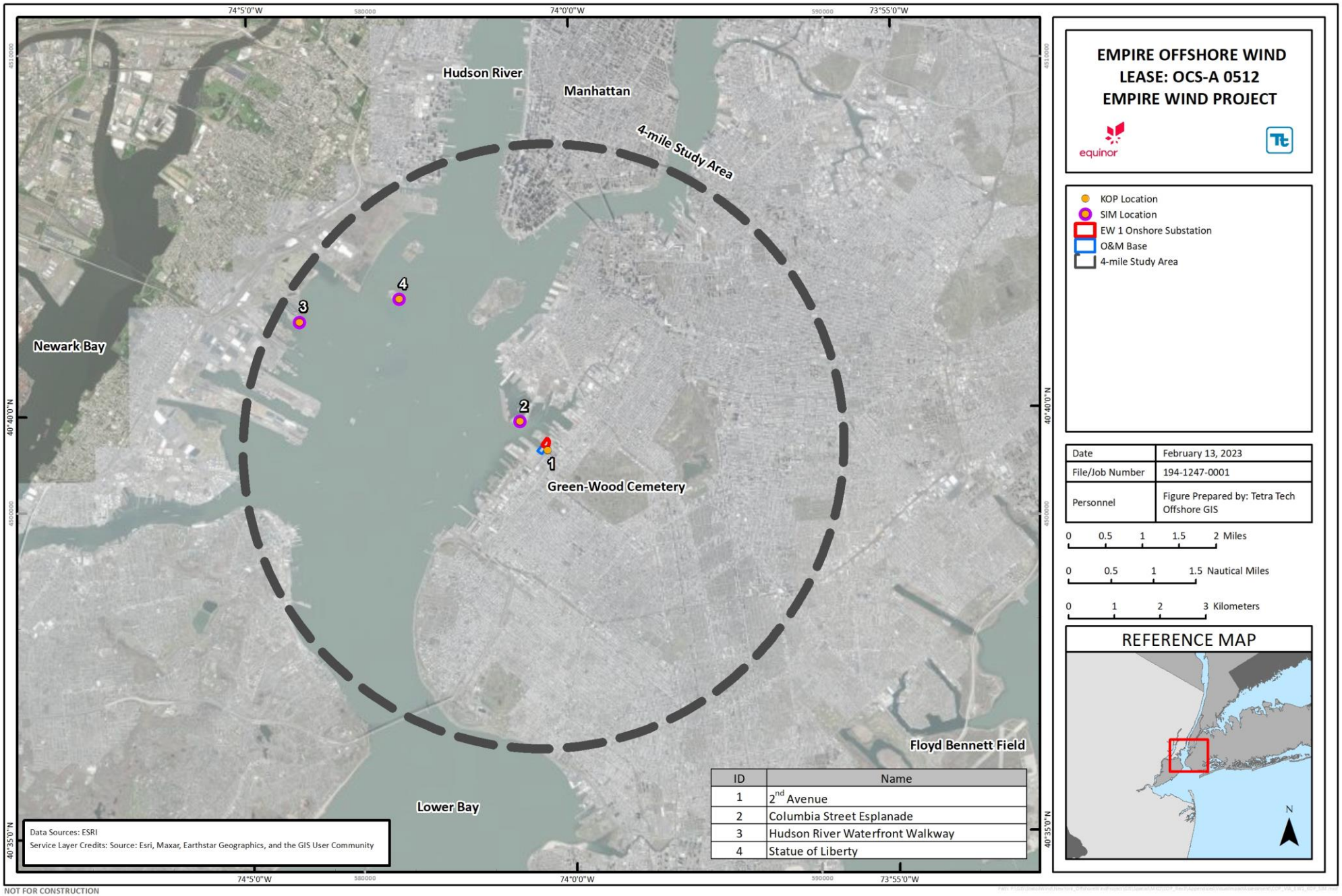



**Figure AA-6-2 Key Observation Points within the EW 1 and O&M Base Visual Onshore Study Area**

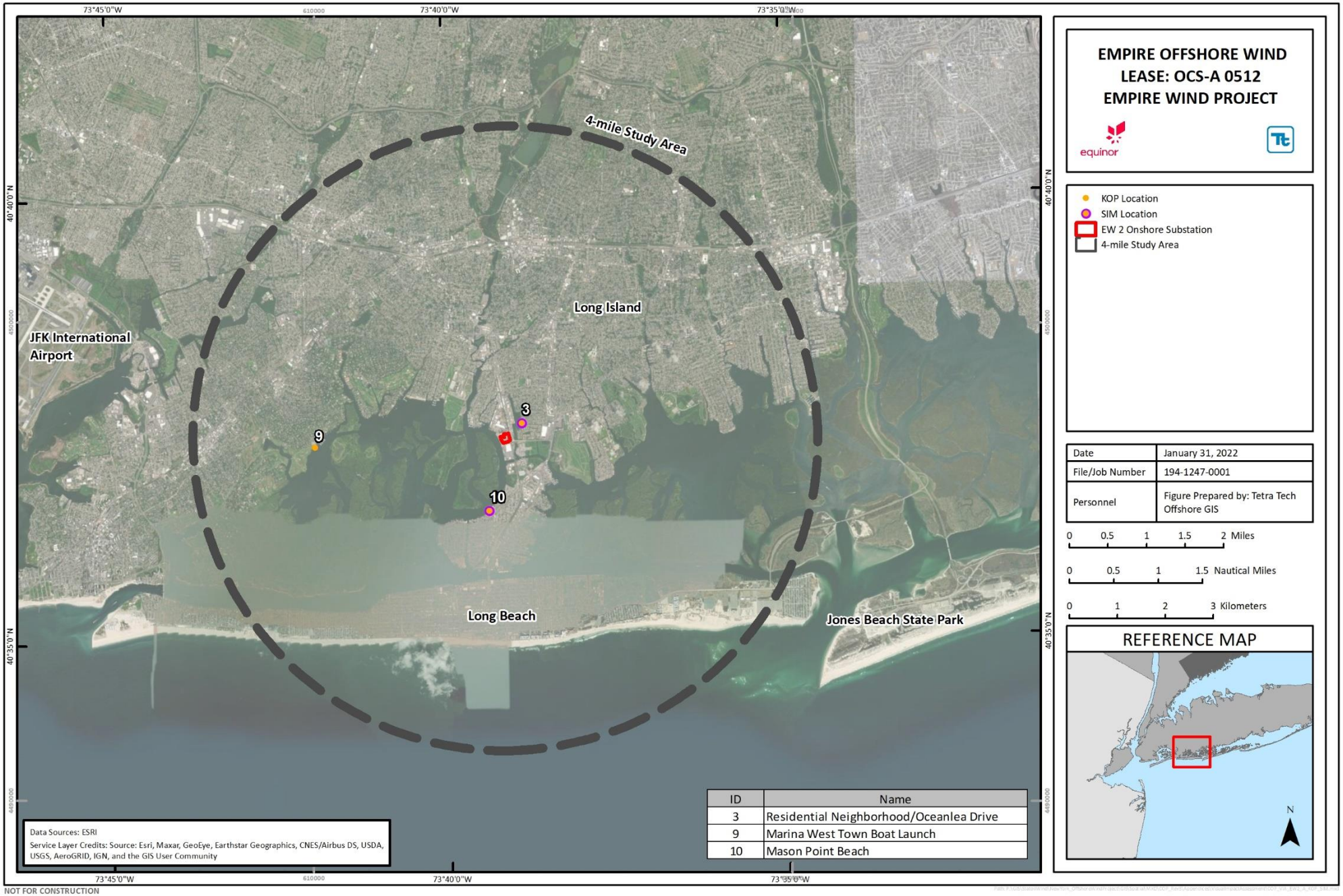



**Figure AA-6-3 Key Observation Points within the EW 2 Onshore Substation A Visual Study Area**

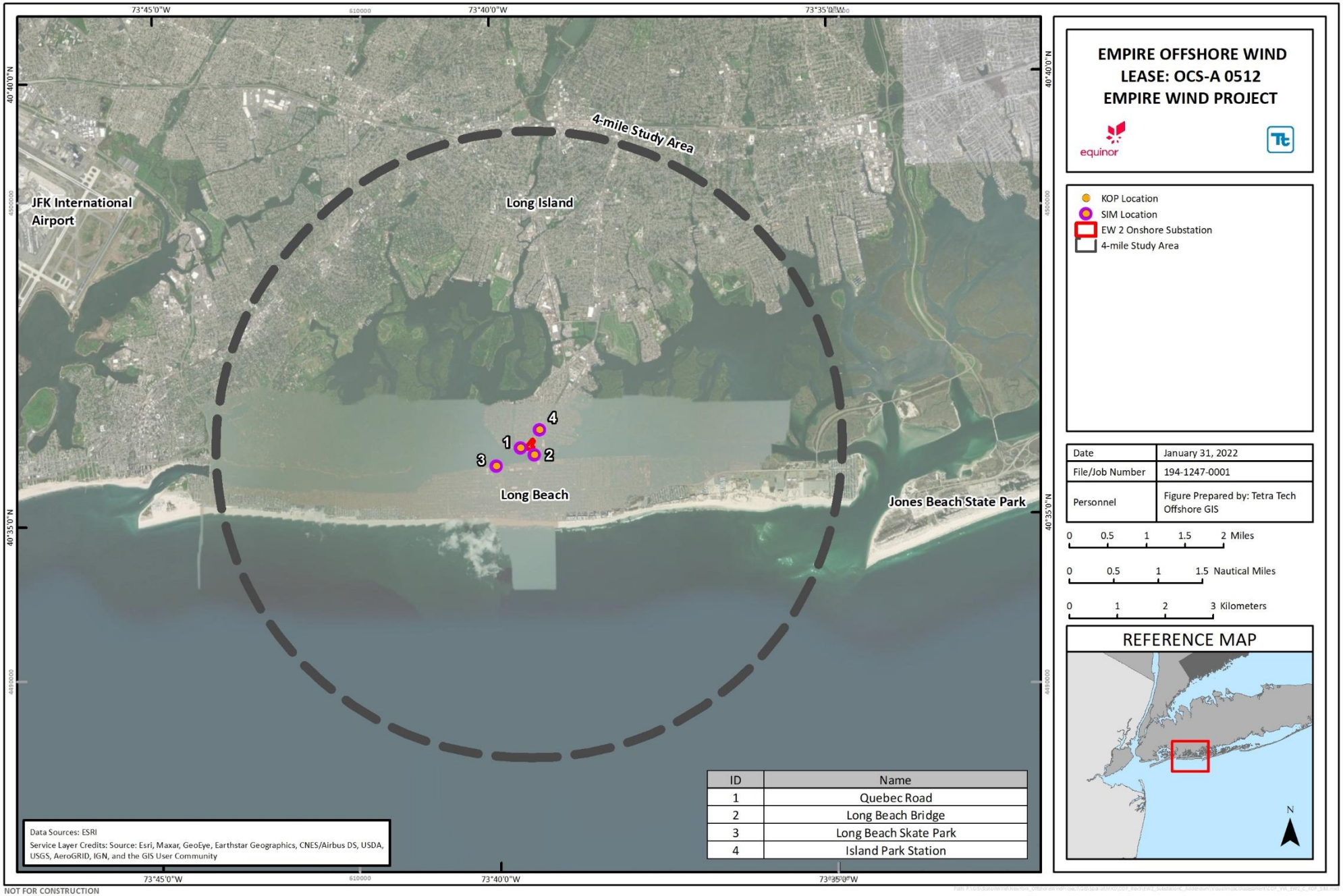



**Figure AA-6-4 Key Observation Points within the EW 2 Onshore Substation C Visual Study Area**

Empire is proposing to develop the Lease Area into two wind farms, known as Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2). EW 1 and EW 2 will be electrically isolated and independent of each other. Each wind farm will connect via offshore substations to separate Points of Interconnection at onshore locations by way of export cable routes and onshore substations. This assessment includes both EW 1 and EW 2 of the Project Design Envelope, as required by federal regulations (see Section AA.3 of the VIA).

The wind turbines installed for the Project will be three-bladed, horizontal-axis machines. The rotor will be attached to a nacelle containing the electrical generator and other equipment. The nacelle will sit on top of a tubular support tower. Wind energy causes the blades on a wind turbine to rotate, which turns a generator in order to transform the kinetic energy of the wind into electricity.

The make, model, and generating capacity of the wind turbines will be selected during the procurement process; the Project is expected to employ the most technologically advanced and efficient model available at the time each phase is constructed. **Table AA-6-1** provides a summary of the parameters for the representative wind turbines.

**Table AA-6-1 Summary of Parameters for the Representative Wind Turbines**

| Parameter | EW I/EW 2 |
|---|---|
| Total Number | EW 1=71; EW 2=103 |
| Hub Height above Highest Astronomical Tide (HAT) | 525 ft (160 m) |
| Upper Blade Tip above HAT | 951 ft (290 m) |
| Lower Blade Tip above HAT | 98 ft (30 m) |
| Rotor Diameter | 853 ft (260 m) |

Within the Offshore Study Area, 15 KOPs were selected (10 KOPs in New York and 5 KOPs in New Jersey) to represent the range of viewing conditions applicable to Project offshore facilities. The set of KOPs includes locations from which Project offshore facilities will be visible or potentially visible, and it provides coverage of views from developed areas and recreation areas (i.e., open space). Existing (i.e., without-Project) and with-Project conditions for the selected KOPs are presented below, organized by geographic location. It should be noted that the with-Project conditions (and the contrast ratings) take into consideration the wind turbines only. With-Project descriptions note if the offshore substations are visible. However, since the offshore substations will appear as small, grayish blocks on the horizon and will be seen in the context of the wind turbines and other large marine vessels, it is anticipated that the offshore substations will result in weak to no visual contrast from coastal vantage points. Therefore, the offshore substations are not addressed further in this analysis.

### AA-6.2.1 New York

**Table AA-6-2** provides a summary of the level of contrast (strong, moderate, weak, none) for each KOP in the New York part of the Offshore Study Area. Contrast Rating Worksheets for each KOP are located in **Attachment AA-2**. The assessment results describing views with the Project implemented for each KOP are then presented.

**Table AA-6-2 Summary of Contrast Rating of Key Observation Points in New York for Offshore Project Components**

| Map ID # a/ | KOP Name | Location | Distance to Nearest Project Component, mi (km) | Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| | | | Representative Wind Turbine | Representative Wind Turbine | |
| 1 | Empire State Building | Manhattan | 34.2 (55) | Moderate | Yes |
| 2 | Floyd Bennett Field | Brooklyn | 22.1 (35.6) | Weak | - |
| 3 | Fire Island Lighthouse | Suffolk | 21.7 (34.9) | Strong | Yes |
| 4 | Great Kills Park | Staten Island | 32 (51.5) | None | - |
| 5 | Heckscher State Park | Suffolk | 26.9 (43.3) | Moderate | - |
| 6 | Jacob Riis Park | Queens | 21 (33.8) | Weak | Yes |
| 7 | Jones Beach State Park | Nassau | 14.2 (22.9) | Strong | Yes |
| 8 | Norman J Levy Park and Preserve | Merrick | 18.8 (30.3) | Moderate | Yes |
| 9 | Otis Pike Fire Island High Dune Wilderness | Suffolk | 32 (51.5) | None | - |
| 10 | Sunken Forest | Suffolk | 34.1 (54.8) | Moderate | Yes |
| - e/ | Statue of Liberty | Hudson | 33.5 (53.9) | None | Yes |

Notes:
a/ Map ID numbers correspond to the map shown in **Figure AA-6-1**.
b/ Visual Contrast Rating Worksheets for each KOP is included in **Attachment AA-2**. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in this table.
c/ Visual simulations are included in **Attachment AA-3**.
d/ Where no simulation was prepared, analysis for the contrast rating forms included referencing other simulations, field photography, Google Earth and maps.
e/ Due to no visibility, the Statue of Liberty was not chosen as a KOP for the offshore Project components, however, a simulation was created. The Statue of Liberty is a KOP for EW 1 Onshore Substation and O&M Base.

**Empire State Building**

The Empire State Building is a 102-story building located in midtown Manhattan, New York City. The building stands approximately 1,454 feet (ft; 443.2 meter [m]) tall, including its antenna. The Empire State Building is owned by Empire State Realty Trust[2] and was listed on the National Register of Historic Places (NRHP) in November 1982 and granted National Historic Landmark status in June 1986 (NPS 2019a). The land surrounding the Empire State Building consists of dense urban development associated with midtown Manhattan.

*Existing View*

The Empire State Building is within the New England Coastal Plains and Hills ecoregion. The landscape surrounding this location is characterized by dense urban development. Views from the Empire State Building's observation deck on the 86th floor consist of 360-degree unobstructed views of New York City and beyond. Vegetation is limited primarily to rooftop gardens and urban parks. From this location, human-made modifications are prominent in the foreground and middleground and include dense urban development associated with Manhattan, Brooklyn, and Queens. The Atlantic Ocean is visible in the background and seldom seen distance zones, as are recreational and commercial vessels primarily traveling to and from New York Harbor. This KOP provides unobstructed, elevated views southeast toward the Lease Area that are dominated by the dense urban development in the foreground and middleground distances zones.

*View with the Project*

The Empire State Building is a popular tourist attraction and this KOP primarily represents views of tourists. From the observation deck, views towards the Project are unobstructed as the building profiles in the foreground/middleground within Manhattan and Brooklyn are much lower than the Empire State Building. From this elevated vantage point, the entire wind turbine structure of the representative wind turbines will appear above the horizon for the majority of the wind turbines. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 34.2 miles (mi, 55 kilometers [km]) or greater from the viewer. Similar to other elevated viewpoints such as the Fire Island Lighthouse (located approximately 37 mi [60 km] east of this viewpoint), viewers are looking toward the broad side of the Lease Area. Although at a distance of more than 10 miles farther, from this location the wind turbines appear as a thin dark line above the southern coast of Long Island separated by open ocean. The separation or gap between the wind turbines and the land mass creates contrast as the thin dark line of the wind turbines appear to be floating out on the ocean, thereby drawing the viewers' attention. Although the wind turbines will be seen in the context of the cityscape, the separation of wind turbines from the land mass will draw the viewers' attention and will appear as a co-dominant feature in the landscape setting. As such, the Project will create moderate visual contrast at this KOP.

**Floyd Bennett Field**

Floyd Bennett Field is an airfield located in southeast Brooklyn, New York, along the north side of Jamaica Bay. The field was used as a municipal airport in the 1930s and as a naval air station in the 1940s. The field was deactivated in 1971 and was soon after made part of the Gateway National Recreation Area (NPS 2018a) administered by the National Park Service (NPS). Floyd Bennet Field is part of the Jamaica Bay unit, one of three geographic units that comprise the Gateway National Recreation Area. The property includes several recreational opportunities such as sports fields, a golf driving range, military history, playground, hiking trails, remote control aircraft field, and camping. The field was listed on the NRHP in April 1980. The area

[2] http://www.empirestaterealtytrust.com/properties/office/empire-state-building1

surrounding this location includes Jamaica Bay to the southwest, south, east, and northeast, and channels and dense residential development to the north-northwest.

*Existing View*
Floyd Bennett Field is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of the ecoregion and is characterized by coastal bays and level plains. Views toward the Project are primarily limited to the southern portion of the recreation area along the channel between Lower Bay and Jamaica Bay. Views from within the recreation area are screened by existing vegetation and structures. Views to the south from the southern portion of the Floyd Bennet Field property consist of Jamaica Bay, which includes open water and small islands, in the foreground and Rockaway Peninsula in the middleground distance zone. The Marine Parkway Bridge connecting the mainland to the barrier island is also visible in the foreground distance zone. Vegetation includes dense shrubs, short grasses and scattered stands of trees along the southern coast of the Floyd Bennet Field property, and on the uninhabited islands within the bay. Some vegetation is also visible along the northern edge of the Rockaway Peninsula. Human-made features evident along the Rockaway Peninsula include residential development, the Jacob Riis Park bathhouse, the Marine Parkway Bridge, and several small marine vessels. From this location, views southeast toward the Atlantic Ocean and the Lease Area are obstructed by development associated with the Rockaway Peninsula.

*View with the Project*
This location represents tourists and recreationists associated with the Floyd Bennet Field recreation area. From this KOP, the portion of the representative wind turbine visible above the horizon includes approximately from the hub up. Views are oriented toward the narrow end of the Lease Area at distance of approximately 22.1 mi (35.6 km) or more and approximately one-third of the wind turbines fall completely below the horizon. The wind turbines that would be visible occupy a small area of the horizon. Similar to the Jacob Riis Park viewpoint (located approximately 1 mi [2 km] south of this viewpoint), viewers are looking toward the narrow end of the Lease Area. Although views toward the Project are obstructed by development along the Rockaway Peninsula located about 1 mi (1.6 km) south of this viewpoint. Portions of the wind turbine blades that extend above the Rockaway Peninsula will be seen in the context of several vertical elements including several light poles, homes, and the bathhouse and Neponsit Beach Hospital[3] located within Jacob Riis Park. The presence of other vertical elements along the horizon and the dark, blocky shape of the buildings will lessen the scale and color contrast presented by the Project. The limited number and the portion of the wind turbines potentially visible will appear as subordinate features within the landscape. The development located along the horizon in the foreground will remain the focal points in the view. As such, Project will create weak visual contrast.

**Fire Island Lighthouse**

The Fire Island Lighthouse is a 168 ft (51.2 m) tall lighthouse located on the southwestern end of Fire Island, New York. A two-story keepers house is located adjacent to the lighthouse. The lighthouse is part of the Fire Island National Seashore, which is managed by the NPS and was listed on the NRHP in September 1981 (NPS 2019b). Visitor services at the site are operated by the Fire Island Lighthouse Preservation Society under a cooperating agreement with the NPS (NPS 2019b). The landscape surrounding the lighthouse consists of sandy dunes to the southwest and northeast, the Atlantic Ocean to the southeast and the Great South Bay to the north. The southern coast of the New York mainland is located approximately 5 mi (8 km) to the north.

*Existing View*
The Fire Island Lighthouse is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is characterized by coastal dunes, beaches, and water bodies to the north and south. The lighthouse

[3] The Neponsit Beach Hospital was closed in 1998 and is currently vacant.

provides 360-degree unobstructed views. To the south, views consist of rolling coastal dunes and level beaches extending to the northeast and southwest in the foreground and the Atlantic Ocean in the middle, background and seldom seen distance zones. Vegetation is limited to short dense shrubs, scattered trees including oak and pitch pine which typically vary in height from 30 to 40 feet, and short grasses along the dunes. Human-made modifications include a boardwalk, gravel access drive, paved roads, parking lot, the water tower near Robert Moses State Park, and a radio tower. Commercial and recreational vessels are also visible in the background/seldom seen distance zones. Views south toward the Lease Area are from an elevated location, are unobstructed and are dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

*View with the Project*
This location represents tourists viewing the Project from the observation deck of the Fire Island Lighthouse. At a distance of approximately 21.7 mi (34.9 km) or more from the nearest representative wind turbine within the Lease Area and elevated viewing conditions (approximately 160 ft [48.8 m] above mean sea level), the entire rotor blade and the majority of the tower structure will extend above the horizon. Viewers at this location will be looking toward the broad side of the Lease Area. The Project will introduce several vertical elements into the landscape setting. Although a few vertical elements that extend above the horizon exist within the view, the Project will introduce greater contrast in size and scale due to the number of wind turbines concentrated along the horizon. The distance of the wind turbines from the viewer will help to reduce their prominence within the landscape setting. Given the number of wind turbines visible and the horizontal spread across the horizon, the wind turbines will draw viewers' attention and serve as a focal point within the viewscape. As such, the Project will introduce strong visual contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Great Kills Park**

Great Kills Park is a 523-ac (212 ha) public park located along approximately 2 mi (3.2 km) of Staten Island's southeastern shore. The park is also part of the Gateway National Recreation Area, which is owned by the federal government and managed by the NPS. Great Kills Park is part of the Staten Island unit, one of three geographic units that comprise the Gateway National Recreation Area. The park includes several beaches, a multi-use path, hiking and biking trails, and a marina and boat launch.

*Existing View*
Great Kills Park is within the Glaciated Triassic Lowlands ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by low hills, ridges, and irregular plains to the west. Views from this location consist of sandy beaches to the northeast and southwest and Lower Bay to the east. Brooklyn is visible to the northeast and parts of New Jersey, including the Sandy Hook Peninsula, are visible across Raritan Bay. Vegetation is limited to grasses and shrubs along the dunes and beaches on the coast of Staten Island. Some vegetation is visible across the bay along the coastline. Human-made modifications include urban development associated with Brooklyn and New Jersey, and commercial and recreational vessels traveling to and from New York Harbor. From this location, views southeast toward the Lease Area are unobstructed. Development associated with New York City and the horizon line of the Atlantic Ocean are co-dominant focal points in the background distance zone.

*View with the Project*
This location represents recreational users associated with the beach, such as sunbathers, anglers and people moving along the beach. Similar to the Sandy Hook – North Beach viewpoint (located approximately 7 mi [11

km] west of this viewpoint), from this location, viewers would be looking toward the narrow side of the Lease Area. At a distance of approximately 32 mi (51.5 km) or more, the majority of the wind turbines will fall below the horizon. Portions of wind turbines that extend above the horizon include from the hub up. It is anticipated that the thin lines created by the blades will not be noticeable or perceived by recreational users on the beach at this distance.

**Heckscher State Park**

Heckscher State Park is a 1,600-ac (647 ha) park located on the south shore of Long Island and the north side of the Great South Bay, approximately 3.5 mi (5.6 km) north of Fire Island (NYSPRHP 2019a). The park is owned and managed by the State of New York. The park includes several amenities including trails, playgrounds, playfields, beaches, pavilions, cottages and boat launches. The landscape surrounding this location includes the Great South Bay to the south, a golf course to the east, and residential development to the north.

*Existing View*

Heckscher State Park is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by bays, inlets, and level plains. Views toward the Project are primarily limited to the southern portion of the recreation area along the north side of Great South Bay. Views from within the recreation area are screened by existing vegetation. Views from this location consist of sandy beaches and dunes to the west and east, and the Great South Bay to the south. Fire Island is visible in the distance and creates a long, thin dark line along the horizon. Vegetation is limited to grasses and shrubs along the dunes and beaches. Human-made modifications include the Robert Moses Causeway bridge over the Great South Bay and development along Fire Island, including several vertical structures such as radio towers, Fire Island Lighthouse, and the water tower near Robert Moses State Park that are visible in the background. Recreational vessels are also visible in the bay. From this location, views southwest towards the Atlantic Ocean and the Lease Area are obstructed by Fire Island.

*View with the Project*

This location represents recreationists associated with the park including hikers, beachgoers, bikers, anglers and people using one of the many playgrounds or ballfields. Similar to the Fire Island Lighthouse viewpoint (located approximately 3.5 mi [5.6 km] south of this viewpoint), viewers are looking toward the broad side of the Lease Area at a distance of approximately 26.9 mi (43.3 km) or greater. From this viewpoint, the portion of the representative wind turbine extending above the horizon includes approximately from the hub up[4] (wind turbines closest to the KOP). From this location, views toward the Project are partially obstructed by Fire Island, located approximately 3.5 mi (5.6 km) south/southwest of this viewpoint. It is anticipated that Fire Island will screen lower portions of the wind turbines and only the upper portion of the rotor blades may be visible as they pass over the horizon. The presence of other vertical features that punctuate the skyline, including Fire Island Lighthouse, the water tower near Robert Moses State Park, a radio tower, and the Robert Moses Causeway bridge, reduce the line and scale contrast presented by the Project. Although there are other human-made vertical features in the view, the number of wind turbines visible and the motion of the rotor blades are not likely to be overlooked and may appear as a co-dominant feature. As such, the Project will create moderate visual contrast.

**Jacob Riis Park**

Jacob Riis Park is a seaside park located at the southwestern end of Rockaway Peninsula of Queens, New York. The park is part of the Gateway National Recreation Area, which is owned by the federal government and

[4] This includes the hub up and a small portion of the wind turbine structure just below the hub but does not include the entire rotor diameter.

managed by the NPS. Jacob Riis Park is part of the Jamaica Bay unit, one of three geographic units that comprise the Gateway National Recreation Area. The park includes an art deco bathhouse which is home to a variety of ranger-led programs and history exhibits, as well as boardwalks, ball courts, pitch and putt golf course, food concessions, and playgrounds. Visitors come to this park for a range of opportunities from moving along the boardwalk, to enjoying the multiple activities offered, to sunbathing during the summer and enjoying the ocean views. The landscape surrounding this location includes long sandy beaches along the coastline and the Atlantic Ocean to the south, the Neponsit residential neighborhood to the east, Jamaica Bay to the north, and Fort Tilden (also a part of the Gateway National Recreation Area) to the west.

*Existing View*

Jacob Riis Park is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by beaches and level plains. Views from this location consist of flat, sandy beaches along the coastline to the northeast and southwest, and the Atlantic Ocean to the south. Vegetation within the park is limited and primarily landscaped areas associated with the pitch and putt golf course, parking lot islands, and mowed grassy areas adjacent to roadways and sidewalks. Human-made modifications in this area include a large, paved parking area to the northwest, features associated with the Jacob Riis promenade, including railings, pedestrian lights, showers, and receptacles (along the boardwalk); and commercial and recreational vessels (visible from the beach). For viewers closer to the ocean, city skyline views can be seen in the distance. From this location, views south-southeast toward the Lease Area are mostly unobstructed and include views of the open Atlantic Ocean, with the horizon line as a main focal point. For boardwalk viewers, ocean views may occasionally be obstructed by showers, light poles, and sand barriers located along the promenade and beach area. Views from the promenade may also include the railing that separates the paved promenade walkway and the sandy beach, the ball courts, pitch and putt golf course, playgrounds, and the large parking lot that line the promenade from the northeast to the southwest.. Because the boardwalk is parallel to the beach, boardwalk viewers would see the ocean in the periphery whereas beachgoers would see the ocean directly but in the context of other development (city skyline) in the distance. Boardwalk viewers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

*View with the Project*

This viewpoint represents recreational users associated with Jacob Riis Park, including the sports amenities, playgrounds, beachgoers, anglers, and people moving along the boardwalk and beach. Views toward the Project will range from obstructed (behind the beach house), to partially obstructed (travel ways, sport amenity areas, parking lot) to unobstructed (beach). The portion of the representative wind turbines that are closest to the viewer and visible above the horizon include the entire rotor blade. Wind turbines located farther from the viewer begin to fall below the horizon. From this location, viewers are looking toward the narrow end of the Lease Area at a distance of 21 mi (33.8 km) or more and approximately 25 of the 174 wind turbines fall completely below the horizon. The remaining wind turbines occupy a small area along the horizon. Along the boardwalk where the simulation was completed, several elements compete for the viewer's attention at this location, including the railing and light poles along the boardwalk in the immediate foreground, along with benches, the horizon, and buildings and other development along the eastern shore of the Rockaway Peninsula and Long Beach. Beachgoers will have more open views of the ocean but in the context of other development in the distance. Most viewers, except beachgoers using the park purely to view the ocean, will be focused on other activities within the park. Given the small area along the horizon occupied by the Project and apparent scale of the wind turbines at a distance of over 21 mi (33.8 km), the Project will appear as subordinate to other features that appear larger in the foreground, including buildings and equipment associated with park activities, and dominate the existing view. The horizon line is interrupted by the city skyline to the northeast, marine

vessel traffic in the ocean across the viewscape, and park elements close to the viewer. As such the Project will create weak contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Jones Beach State Park/Short Beach**

Jones Beach State Park is located at the southern end of Jones Island, a barrier island south of Long Island, New York. The park was listed on the NRHP in 2005 (NPS 2019c). The park is owned and maintained by the New York State Office of Parks, Recreation and Historic Preservation. The park is comprised of approximately 6 miles of beaches along the Atlantic Ocean and includes a boardwalk, playgrounds, miniature golf, ball courts, several concession stands, a concert hall, and Jones Beach Nature Center (NYSPRHP 2019b). The landscape surrounding this location includes long sandy beaches along the coastline to the northeast and southwest, the Atlantic Ocean to the south, and several small islands to the north between Jones Island and Long Island.

*Existing View*
Jones Beach State Park is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by beaches, dunes, coastal bays, and tidal flats. Views from this location consist of flat, sandy beaches along the coastline to the northeast and southwest, and the Atlantic Ocean to the south. There is no vegetation apparent from this location. Human-made modifications include features associated with the Jones Beach boardwalk, including railings, benches, pedestrian lights, and receptacles; and commercial and recreational vessels. From this location, views south toward the Lease Area are unobstructed and dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

*View with the Project*
This viewpoint represents recreational users associated with Short Beach, located at the western end of Jones Beach State Park. At a distance of approximately 14.2 mi (22.9 km) from the nearest representative wind turbine within the Lease Area, the entire rotor blade and the majority of the tower structure (not including the foundations) will extend above the horizon. The Project will introduce several new vertical elements into the viewscape that will appear as thin objects on the horizon. From this viewpoint, beachgoers will have views toward the broad side of the Lease Area. Therefore, the wind turbines will appear spread out over a longer distance. Given the proximity of the representative wind turbines and the portion of the wind turbines visible, the introduction of vertical elements into a primarily horizontal landscape setting, the motion of the blades, and the spatial dominance within the landscape setting will cause the Project to attract attention and become a focal point within the view. Although marine vessels can be seen traveling to and from New York Harbor currently, the Project will introduce strong visual contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Norman J Levy Park and Preserve**

Norman J Levy Park and Preserve is a 52-acre park located along the east side of Meadowbrook Parkway and approximately 3 mi (4.8 km) north, and inland, of Jones Beach Island. The site was formerly used as a landfill (Merrick Landfill) and was converted into a park and preserve in early 2000. The park includes approximately three miles of hiking and jogging trails, exercise stations, wildlife viewing, a fishing pier, and a kayak launch (offered during the summer months). The preserve's highest point is approximately 115 ft (35.1 m) and provides views of the Jones Beach Tower, the New York City skyline and other coastal features (Town of Hempstead

2019). The park is owned and managed by the Town of Hempstead, New York. The landscape surrounding this location includes a golf course to the east; Town of Hempstead recycling and sanitation facilities to the north; residential, commercial, and industrial development to the west; and Merrick Bay to the south.

*Existing View*

Norman J Levy Park and preserve is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by coastal bays and inlets. Generally, views of the ocean from the park are mostly obscured by vegetation, which surrounds the perimeter, and include vertical structures such as a windmill, aqua-colored vent pipes, and fencing throughout the area. Elevated views from within the park looking south toward the Project are more open, consisting of water with several small, flat islands. Jones Beach Island is visible in the background, with the Atlantic Ocean just visible beyond the island. Vegetation consists of short grasses and scattered trees standing 30 to 40 feet in height throughout the preserve and low grasses on the small islands located in Merrick Bay. Modifications to the natural landscape visible from within the park include boats, small residential structures on the bay islands, a windmill, multiple vent pipes, and development along Jones Beach Island. Jones Beach Tower and Jones Beach Theater are vertical structures that create focal points on the horizon as well as multiple water and communication towers, and other development located between the park and the open ocean. Scattered trees and tall shrubs surround this view in the foreground and may intermittently break up views towards the horizon. From this location, views south toward the Lease Area are mostly unobstructed and dominated by the islands located in Merrick Bay and surrounding residential development.

*View with the Project*

This location represents recreationists from an overlook at the top of the Norman J Levy Park preserve. At a distance of approximately 18.8 mi (30.3 km) or more the nearest representative wind turbine within the Lease Area, and from an elevated viewing condition (approximately 115 ft [35.1 m] above mean sea level), the entire wind turbine (including a portion of the foundation) will extend above the horizon. From this location, the viewer is looking down the broad side of the Lease Area. Therefore, the wind turbines in the western portion of the Lease Area (the closest to the viewpoint) will appear larger than turbines in the eastern portion (the farthest to the viewpoint). Although the Project will introduce several new vertical elements into the viewscape that will appear as thin objects on the horizon, the strong horizontal line of the horizon is already disrupted by existing development along Jones Beach Island, including the Jones Beach Tower and the Nikon Theater, water towers and communications facilities. The wind turbines will be similar in scale to other features along the horizon, but due to the number of turbines visible, they will be more spatially dominant across the horizon. The thin form and lighter color of the wind turbines will contrast less than the dark colors of the other features along the horizon. From this viewpoint, there are several elements competing for the viewer's attention. They include vegetation and park amenities in the immediate foreground, residential development along the north side of Merrick Bay and several low vegetated islands within East Bay in the middleground, and Jones Beach Tower and the Nikon Theater in the background. The distance of the wind turbines from the viewer and the existence of other human-made features within the view will help to reduce their prominence within the landscape setting. Therefore, the Project will appear as a co-dominant feature with the other elements and will introduce moderate visual contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Otis Pike Fire Island High Dune Wilderness**

Otis Pike Fire Island High Dune Wilderness is on a barrier island located south of Long Island and adjacent to Smith Point County Park that stretches approximately 7 mi (11.2 km) southwest to Robert Moses State Park.

This wilderness area is the only federally designated wilderness in the State of New York and is managed by the NPS (NPS 2019d). Activities in the wilderness include hiking, backcountry camping, fishing and wildlife viewing. The landscape surrounding this location includes barrier islands to the northeast and southwest, Great South Bay to the north and the Atlantic Ocean to the south.

*Existing View*
Otis Pike Fire Island High Dune Wilderness is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by beaches, dunes, coastal bays, and tidal flats. Views from this location consist of flat, sandy beaches along the coastline to the northeast and southwest and the Atlantic Ocean to the south. Vegetation consists primarily of grasses along the dunes. Human-made modifications are limited to commercial and recreational vessels on the Atlantic. From this location, views south toward the Lease Area are unobstructed and dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

*View with the Project*
This location represents recreational users associated with the beach, such as sunbathers, anglers and people walking along the beach, and users within the inland part of the wilderness. From this location, viewers would look toward the broad side of the Lease Area. Similar to the Fire Island Lighthouse viewpoint (located approximately 19 mi [30 km] west of this viewpoint), viewers are looking toward the Lease Area but from a ground-level vantage point. However, at a distance of approximately 32 mi (51.5 km) or greater, portions of the wind turbines that are visible include from the hub up (wind turbines closest to the viewpoint) and the tip of the rotor blades (wind turbines located farther from the viewpoint). The thin lines created by the blades will likely not be noticeable or perceived by recreational users at the beach. As such, the Project will create no visual contrast.

**Sunken Forest**

The Sunken Forest includes an approximately 50-ac (20-ha) tract of beach, dunes and ancient holly forest that is part of the Fire Island National Seashore in New York (NPS 2019e). The forest is located between the Cherry Grove and Point O' Woods communities on Fire Island and includes a visitor center and boardwalk. The Sunken Forest was officially designated as the Sunken Forest Preserve in 1960 and the property was donated in 1964 to the NPS, which maintains the property. The landscape surrounding this location includes long sandy beaches along the coastline to the east and west, low-density residential communities to the east and west, the Great South Bay to the north, and the Atlantic to the south.

*Existing View*
Sunken Forest is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by beaches, dunes, and coastal bays. Views from this location include grassy dunes, flat sandy beaches and the Atlantic Ocean to the south. Vegetation consists of primarily of short dune grasses and some scattered shrubs along the dunes. Human-made features are limited to the boardwalk near the beach and recreational and commercial marine vessels on the Atlantic. From this location, views south toward the Lease Area are unobstructed and dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

*View with the Project*
This location represents recreational users associated with the beach, such as sunbathers, anglers and people walking along the beach. At a distance of approximately 34.1 mi (54.9 km) or greater, portions of the representative wind turbines that extend above the horizon include the entire rotor. Viewers at this location would be looking toward the broad side of the Lease Area and the wind turbines will be spread out along a

portion of the horizon. Views toward the Project do not include many human-made features except for marine vessels such as fishing boats that may be seen scattered on the water. The overall view is largely natural, as development is not very apparent from this secluded portion of Fire Island. Portions of the wind turbines extending above the horizon include the entire rotor. From this viewpoint, there are a few elements competing for the viewer's attention, including the horizon along the Atlantic Ocean and the shoreline and dunes along the coast. The distance of the wind turbines from the viewer will help to reduce their prominence within the landscape setting and the Project will appear as a co-dominant feature with the other elements. As such, the Project will introduce moderate visual contrast. The onshore substations will not be apparent from this location.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Statue of Liberty**

This is not a KOP for the offshore wind components; however, it is discussed due to its associated simulation. The Statue of Liberty, 305 ft (92.9 m) tall when including the pedestal and foundation, is located on Liberty Island in New York Harbor in New York City. The Statue of Liberty is a copper statue that was a gift from the people of France to the people of the United States. The statue was dedicated on October 28, 1886. The statue is part of the Statue of Liberty National Monument, which is composed of the statue, Liberty Island, and Ellis Island. The statue is owned and operated by the NPS and was listed on the NRHP in September 2017. The statue is also designated as a UNESCO World Heritage Site, U.S. National Monument, NJNRHP, and NYC Landmark. The landscape surrounding this location includes open water with dense urban development along the mainland of new York and New Jersey.

*Existing View*
The Statue of Liberty is within the New England Coastal Plains and Hills ecoregion. The landscape surrounding this location is characterized by dense urban development. Views from the Statue of Liberty's crown, 265 ft above ground, consist of 360-degree unobstructed views of New York City and beyond. The landscape surrounding this location is characterized by open water and dense urban development. Expansive views of the water and the New York and New Jersey skyline can be seen from Liberty Island. Vegetation is limited to parks and vegetation along the waterfront. From this location, human-made modifications are prominent in the foreground and middleground and include dense urban development associated with New York City. The Atlantic Ocean is not visible in the background and seldom seen distance zones due to foreground terrain and vegetation. This simulation provides entirely obscured, elevated views toward the Lease Area that are dominated by the dense urban development in the foreground and middleground distances zones.

*View with the Project*
From this location, the view of simulated structures within the Lease Area is entirely obscured by foreground terrain and existing vegetation.

## New Jersey

**Table AA-6-3** provides a summary of the level of contrast (i.e., strong, moderate, weak, none) for each KOP in the New Jersey part of the Offshore Study Area. Contrast Rating Worksheets for each KOP are located in **Attachment AA-2**. The assessment results describing views with the Project implemented for each KOP is presented below.

**Table AA-6-3 Summary of Contrast Rating of Key Observation Points in New Jersey for Offshore Project Components**

| Map ID # a/ | KOP Name | Location | Distance to Nearest Project Component (Representative Wind Turbine) mi (km) | Representative Wind Turbine Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| 11 | Hartshorne Woods Park | Monmouth | 22.3 (35.9) | Weak | Yes |
| 12 | Ocean Grove Beach | Monmouth | 25.4 (40.9) | Moderate | Yes |
| 13 | Point Pleasant Beach | Ocean County | 31 (49.9) | None | - |
| 14 | Sandy Hook–North Beach | Monmouth | 23.7 (38.1) | Weak | Yes |
| 15 | Sandy Hook Light | Monmouth | 24 (38.6) | Weak | - |

Notes:
a/ Map ID numbers are a continuation from **Table AA-6-2** and correspond to the map shown in **Figure AA-6-1**.
b/ Visual Contrast Rating Worksheets for each KOP is included in **Attachment AA-2**. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in **Table AA-6-2**.
c/ Visual simulations are included in **Attachment AA-3**.
d/ Where no simulation was prepared, analysis for the contrast rating forms included referencing other simulations, field photography, Google Earth and maps.

### Hartshorne Woods Park – Overlook

Hartshorne Woods Park is a hilly, forested 794-ac (321-ha) site overlooking the Navesink River in northern Monmouth County, New Jersey (Monmouth County 2019). The park is owned and maintained by the Monmouth County Park System. The park includes one of the highest elevations along the Atlantic Coast, reaching up to approximately 250 ft (76.2 m). The park includes trails, camping, cabins, hiking, biking, horseback riding, and scenic overlooks. In addition, the park includes several military installations such as World War II-era bunkers and the Battery Lewis battlement. The 224-ac (91-ha) Navesink Military Reservation Historic District, which is located in the eastern portion of the park, was listed on the NRHP in October 2015 (NPS 2019f).

*Existing View*

Hartshorne Woods Park is within the Inner Coastal Plains ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by moderately to steep rolling hills. Views from this location consist of moderately rolling hills to the north and south, residential and commercial/retail development to the north, east and south, and a barrier island (including residential development), a lagoon and the Atlantic Ocean to the east-southeast. View from within the park are often obscured due to the dense stands of trees that cover most of the park area. Along some trails a small portion of the Atlantic Ocean is visible and is framed by tree and shrub vegetation along the hilly terrain in the immediate foreground. Areas outside of the park but closer to the ocean along the barrier island have more open views at an elevated level (second story buildings),

however, at ground level views are obstructed by a seawall which parallels the road. Human-made modifications include residences, piers, and paved roads along the barrier island east of the park in the foreground and commercial and recreational vessels on the Atlantic. Views from this location toward the Atlantic Ocean are mostly obstructed and framed by vegetation, meaning only a portion of the ocean is within view. Views to the east toward the Lease Area are dominated by vegetation immediately in front of the viewer and residential development along the barrier island in the foreground and the horizon line of the Atlantic in the background distance zone. Visitors to the park engage in a variety of activities (horseback riding, hiking in the trees, camping, biking) with a focus on the area immediately within the park and not on the ocean beyond.

*View with the Project*

Although the majority of the park is screened from views towards the ocean, this particular location represents views of recreational users and tourists from the scenic overlook near the southeastern boundary of the park. Views toward the Project from this location will be partially obstructed and the portion of the representative wind turbines that are closest to the viewer and extend above the horizon include the entire rotor blade and the tower structures. Wind turbines located farther from the viewer begin to fall below the horizon and will not be seen in their entirety. From this location, the viewer is looking down the narrow end of the Lease Area. Therefore, the wind turbines in the western portion of the Lease Area (the closest to the viewpoint) appear larger and those in the eastern portion (the farthest from the viewpoint) appear smaller or fall below the horizon. The turbines will occupy a small portion of the view from this location and are not expansive across the horizon. Although the Project will introduce several new vertical elements into the viewscape and will appear as thin objects on the horizon, the strong horizontal line of the horizon is already interrupted by existing vegetation in the immediate foreground. The vertical breaks in the horizon from the existing vegetation will appear similar to that of the turbines in the distance with the vegetation being a more dominant and larger presence than the smaller turbines in the distance. The lighter color of the wind turbines against the light blue color of the sky somewhat mutes the color contrast, therefore creating less contrast than the darker colors of the vegetation backdropped by the sky. While the color contrast with the sky is not significant during clear skies, when the angle of the sun is low and the turbines are backlit (i.e., during morning hours), contrast against the sky would most likely increase. From few areas within the park, the wind turbines can be seen but in the context of residential structures and other human-made features along the coastline in the immediate foreground. Due to the distance of the wind turbines, vegetation in the foreground creating a break in the horizon line, marine vessel traffic moving across the open water, and the moderately developed context in which the wind turbines will be seen, the wind turbines will appear as subordinate features. Development in and around this viewpoint interrupts the horizon line which detracts from the view. As such, the Project will create weak visual contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Ocean Grove Beach**

Ocean Grove Beach is one of several beaches located along the eastern New Jersey shoreline and is located between Asbury Park to the north and Bradley Beach to the south. The property is owned and operated by the Ocean Grove Camp Meeting Association (Ocean Grove Camp Meeting Association 2019). The landscape surrounding this location includes flat, sandy beaches to the north and south, the Ocean Avenue Boardwalk along the western boundary, and the Atlantic Ocean to the east. The Ocean Grove Camp Meeting Association Historic District was listed in the NRHP in 1976.

*Existing View*

Ocean Grove Beach is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by beaches and dunes. Views from this location consist

of flat, sandy beaches and dunes along the coastline to the north and south and the Atlantic Ocean to the east. Vegetation is limited to grasses along the dunes. Human-made modifications include piers and rock structures that extend out into the ocean, lifeguard stations, lights along the boardwalk and the upper stories of homes and commercial buildings that extend above the dunes, and commercial and recreational vessels on the Atlantic. From this location, views toward the Lease Area are unobstructed and dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

*View with the Project*

This location represents recreational users associated with the beach, such as sunbathers, anglers and people walking along the beach. Views from this location are generally oriented with the long axis of the Lease Area. The wind turbines in the western portion of the Lease Area (the closest to the viewpoint) appear larger and begin to appear smaller in the eastern portion (the farthest to the viewpoint). At a distance of approximately 25.4 mi (40.9 km) or more, the entire rotor blade and a portion of the tower structure (not including the foundations) of the representative wind turbine will extend above the horizon. The Project will introduce several new vertical elements into the viewscape that will appear as thin objects on the horizon. Other human-made features, such as commercial and recreational vessels, are seen spread out along the coast. The scale of the wind turbines is similar to vessels visible along the horizon and closer to shore. The arrangement of the wind turbines in rows oriented from northwest to southeast may attract viewers' attention, as viewers would be looking down the rows of turbines in the north and central portion of the Lease Area and the wind turbines will appear ordered and uniform. The uniform rows would contrast with the strong horizon line. In addition, the rows of wind turbines tend to increase the color contrast as the concentration of white/light colored wind turbines tend to stand out more against the light blue sky and darker blue water. The groupings of wind turbines and the size and rotation of the rotor blades (specifically wind turbines closest to the viewpoint) may attract attention from the casual observer along the beach. From this viewpoint, there are few elements competing for the viewer's attention, including the horizon along the Atlantic Ocean. The distance of the wind turbines from the viewer will help to reduce their prominence within the landscape setting and the Project will appear as a co-dominant feature with the horizon line. As such, the Project will introduce moderate visual contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Point Pleasant Beach**

Point Pleasant Beach is one of several beaches located along the eastern New Jersey shoreline. It is situated on the Barnegat Peninsula between Manasquan Inlet to the north and Osborne Avenue. The beach is owned and maintained by the Borough of Point Pleasant Beach. The landscape surrounding this location includes flat, sandy beaches to the north and south, the Beach Front Boardwalk along the western boundary, and residential development located just beyond the boardwalk to the west. Jenkinson's Boardwalk and other commercial and tourist attractions are located along the west side of the boardwalk. The Atlantic Ocean is to the east.

*Existing View*

Point Pleasant Beach is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized primarily by beaches. Views from this location consist of flat, sandy beaches along the coastline to the north and south and the Atlantic Ocean to the east. Vegetation is not visible from this location. Human-made modifications include piers, Jenkinson's Boardwalk and other tourist and residential development along the boardwalk, and commercial and recreational vessels on the Atlantic. From this location, views toward the Lease Area are unobstructed and dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

*View with the Project*
This location represents recreational users associated with the beach, such as sunbathers, anglers and people walking along the beach. From this location, viewers would be looking toward the broad side of the Lease Area. At a distance of approximately 31 mi (49.9 km) or greater, approximately half of the representative wind turbines will fall below the horizon. The portion of the wind turbines that may be visible include the hub up (wind turbines closest to the viewpoint) and the tip of the rotor blades (wind turbines located farther from the viewpoint). It is anticipated that the thin lines created by the blades will not be noticeable or perceived by recreational users at the beach. As such, the Project will create no visual contrast.

**Sandy Hook – North Beach**

This viewpoint is located on a beach at the northern end of the Sandy Hook peninsula on the central New Jersey coast. The beach is located in the Sandy Hook unit, one of three geographic units that comprise the Gateway National Recreation Area, and as such is owned by the federal government and managed by NPS. The Sandy Hook peninsula includes several recreational facilities, including a campground, a lighthouse, Fort Hancock Post Museum, a multi-use path, and several historic military structures. Ranger-led tours are offered. The landscape surrounding this location includes flat, sandy beaches to the north and south, Sandy Hook Bay to the west and the Atlantic Ocean to the east.

*Existing View*
Sandy Hook is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by beaches, dunes, coastal bays and inlets. Views from this location consist of flat, sandy beaches to the north and south, with the Lower Bay in the distance to the north; the southern coastline of New York, including the western end of the Rockaway peninsula, to the northeast; and the Atlantic Ocean to the east. Vegetation in this area is sparse and generally includes areas of low growing dune grasses. Human-made modifications include urban development along the southern coast of New York and the Rockaway peninsula, and commercial and recreational vessels in the Atlantic Ocean. The city skyline extends across the horizon line in the distance and marine navigation aids/markers, and large marine vessel traffic are present closer to the viewer but also pierce the horizon line across the viewscape.

*View with the Project*
This location represents recreational users associated with Sandy Hook – North Beach, such as sunbathers, anglers, and people moving along the beach. From this location, viewers are looking toward the narrow end of the Lease Area at a distance of 23.7 mi (38.1 km) or more and more than one-third of the wind turbines will fall completely below the horizon. Views toward the Project will be unobstructed and the portion of the representative wind turbines that will be visible and are closest to the viewer and above the horizon include will be primarily the upper blade, with limited views of the entire rotor blade. Wind turbines located farther from the viewer will begin to fall below the horizon. The remainder of the wind turbines that are visible occupy a small area of the horizon and will be similar in scale to existing vertical objects that pierce the horizon line, such as buildings along the southern coast of Long Beach and Rockaway Peninsula in New York, and large vessels and channel markers and buoys in the Atlantic. The thin form of the wind turbines will create less contrast than the dark blocky shapes of the existing vertical elements that currently appear along the horizon. Views from this location also include objects in motion such as vessels as they traverse across the water and several buoys used for maritime navigation. The motion of the turbine blades will be seen in context with other animate objects. Under clear conditions, the wind turbines appear light gray and contrast with the light blue sky. While the color contrast with the sky is not significant during clear skies, when the angle of the sun is low and the turbines are backlit (i.e., during morning hours), contrast against the sky would most likely increase. However, the color of the turbines is similar to other vertical elements visible along the horizon. The wind turbines will also be seen in the context of the southern coast of Long Island, New York and at this distance, the turbines

appear to be an extension of the city skyline. As noted above, Long Beach and Rockaway Peninsula are visible along the horizon from this viewpoint and the development along the coast tends to draw the viewers' attention. Due to the distance of the wind turbines, the limited number of wind turbines visible, and the presence of other human-made features along the horizon in the existing view, the wind turbines will appear as subordinate features. As such, the Project will create weak visual contrast.

Simulations representing views of the representative turbines from this location are included in **Attachment AA-3**.

**Sandy Hook Light**

Sandy Hook Light (station) is a 103-ft (31.4 m) lighthouse located at the northern end of the Sandy Hook peninsula on the central New Jersey coast; it began operation in 1764 is the oldest continuously operating lighthouse in the United States (NPS 2019g). The lighthouse is in the Sandy Hook unit, one of three geographic units that comprise the Gateway National Recreation Area, which is owned and managed by NPS. The lighthouse was listed on the NRHP in June 1964 (NPS 2018b.). The landscape surrounding this location includes forested areas, military housing and historic military buildings, and beaches along the coast of the peninsula. Sandy Hook Bay is located to the west and the Atlantic Ocean to the east.

*Existing View*

The Sandy Hook Light is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is characterized by forested areas, coastal dunes, beaches, and water bodies to the west, north, east and south. The lighthouse provides 360-degree unobstructed views. Views east toward the Project consist of rolling forested terrain, dunes and level beaches extending to the north and south in the foreground and the Atlantic Ocean in the middle and background, with the southern coast of New York also visible in the background and seldom seen distance zones. Vegetation consists of forested areas that consist of American holly, black cherry, hackberry and serviceberry, and grasses along the dunes and beaches. Human-made modifications include paved roads, parking lots, historic military structures, buoys, commercial and recreational vessels, and urban development, including in Manhattan and along the Rockaway peninsula. From this location, views south towards the Lease Area are from an elevated location and are unobstructed. Because of the view of the New York coastline along the horizon, there is not one focal point from this location.

*View with the Project*

This location represents tourists using the observation deck of the Sandy Hook Light. At a distance of approximately 24 mi (38.6 km) or more from the nearest representative wind turbine within the Lease Area, and from an elevated viewing condition (approximately 103 ft [31.4 m]) above mean sea level), the entire rotor blade and the majority of the tower structure (not including the foundation) will be above the horizon. Similar to the Sandy Hook – North Beach viewpoint (located approximately 0.5 mi [0.8 km] east of the lighthouse), viewers are looking toward the narrow end of the Lease Area. Although more wind turbines will be above the horizon from this viewpoint, due to the elevated viewing conditions, the wind turbines that are visible will occupy a small area of the horizon and will be seen in the context of the existing vertical objects that pierce the horizon line, such as buildings along the southern coast of Long Beach and Rockaway Peninsula in New York. Several elements compete for the viewer's attention, including the large massing of vegetation and strong horizontal line created by the eastern shore of the Sandy Hook Peninsula in the foreground, and the horizon line of the Atlantic Ocean and development along the southern coast of New York in the background and seldom seen distance zones. Although the wind turbines will be visible, due to the distance of the wind turbines, the limited number of wind turbines visible, and the presence of other human-made features along the horizon in the existing view, the wind turbines will appear as subordinate features. As such, the Project will create weak visual contrast.

## AA-6.3 Onshore Facilities

Empire proposes to develop the entire Lease Area in two wind farms, EW 1 and EW 2. The Project will be connected to two onshore locations in New York, where the renewable energy generated will be transmitted to the electric grid. The transition from offshore submarine cable to onshore land cable will occur at an export cable landfall location. Export cable landfall at EW 1 is proposed to be located at the South Brooklyn Marine Terminal in Brooklyn, New York at the EW 1 Onshore Substation and O&M Base site. Export cable landfall at EW 2 is proposed to be located in up to two of four potential locations in Long Beach and Lido Beach, New York. In addition, an O&M Base is proposed to be located in Brooklyn, New York, adjacent to the EW 1 Onshore Substation.

At each of these locations, export cable landfall of the submarine export cables may be accomplished using open-cut trenching or horizontal directional drilling. Both the onshore export cables and the interconnection cables will be housed in duct banks and will be buried beneath the surface primarily along existing roadways for EW 1 and EW 2. The roadways will be repaired and repaved post construction. Unless paving of the entire roadway occurs, contrast in color (new vs. old paving) may be noticeable. Joint pits (manholes) will be located approximately every 500 ft (152 m), to provide access to the onshore export and interconnection cables. Because the duct banks, joint pits, and onshore cables will be located underground for EW 1 and EW 2, and will not be a major visible component of the Project once installed, these facilities were not evaluated in detail as part of this assessment. As noted in Section AA.2.3 and Section AA.2.4 of the VIA, the onshore facilities will be located at the South Brooklyn Marine Terminal for EW 1[5] and either the EW 2 Onshore Substation A, or Onshore Substation C site.

The onshore substations and O&M Base will be designed to comply with all applicable state and federal building codes, electrical standards, and environmental conditions to the extent practicable[6]. The final configuration of each proposed substation and O&M Base will be developed as part of the New York state permitting process. However, for the purposes of this VIA, conceptual onshore substation and O&M Base layouts and designs were developed. Empire is considering the development of gas-insulated substations, which are typically designed to house some electrical substation equipment within buildings. The designs of the onshore substations that are evaluated in this VIA are based on conservative assumptions intended to result in the analysis of the largest and tallest buildings situated on site, so the buildings are closest to potential visual receptors. Based on these conservative design assumptions, the onshore substations would generally be comprised of the following components:

- Buildings will be a combination of cladded steel frame and concrete buildings, designed to match the style and visual character of the surrounding urban landscape, and are proposed to be painted a light gray or white color. Empire will continue to work with local stakeholders throughout the permitting process and will submit final building architectural design details in the Environmental Management and Construction Plan as part of the New York state approval process for the Project;
- The onshore substations will contain enclosed buildings and/or walled structures that will contain various equipment, such as switchgears, control equipment, batteries, reactive compensation

[5] While the O&M Base will serve both EW 1 and EW 2, the facility will be located at SBMT, adjacent to the EW 1 Onshore Substation, and will therefore be included within the EW 1 Onshore Study Area for the purposes of this analysis.
[6] In the event that certain standards cannot be met, variances will be sought through the appropriate regulatory mechanisms.

equipment and harmonic filters, and a designated outside area to house outdoor equipment like transformers and reactors:
  - The EW 1 Onshore Substation will be constructed within an approximately 4.8-ac (1.9-ha) portion of the property, with a maximum main building height of 49 ft (15 m); and
  - The EW 2 Onshore Substation A will be constructed within an approximately 6.4-ac (2.6-ha) portion of the property, with a maximum main building height of 60 ft (18 m); or
  - The EW 2 Onshore Substation C will be constructed within an approximately 5.2-ac (2.1-ha) portion of the property, with a maximum main building height of 60 ft (18 m);
- Outside electrical equipment including shunt reactors and transformers;
- Static masts;
- A 10-ft (3-m) high perimeter chain link security fence with a 2-ft (0.6-m) tall barbed wire extension for a total height of 12 ft (3.7 m). Other types of fencing materials are being discussed and may include, but are not limited to, mesh security fencing, anti-scalable vertical rail fencing;
- A gravel maintenance road encircling the facility just inside the perimeter fence; and
- A minimum of one drive-through gate and one walk-through gate providing access to each site.

Based on these conservative design assumptions, the O&M Base will be constructed within an approximately 4.5-ac (1.8-ha) portion of the property, with a maximum main building height of 30 ft (9 m).

A total of 14 KOPs were selected to represent views of the onshore substations and O&M Base from residential areas, travel ways, and recreation areas. **Table AA-6-4** provides a summary of the level of contrast (i.e., strong, moderate, weak, none) for each KOP. Contrast Rating Worksheets for each KOP are located in **Attachment AA-2**. The assessment results describing views with the Project implemented for each KOP are presented below.

**Table AA-6-4 Summary of Contrast Rating of Key Observation Points for Onshore Project Components**

| Map ID # a/ | Name | Location | Distance to Project Site mi (km) | Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| **EW 1 Onshore Substation and O&M Base** | | | | | |
| 1 | 2nd Avenue | Brooklyn, NY | 100 ft (31 m) | Strong | - |
| 2 | Columbia Street Esplanade | Brooklyn, NY | 0.4 (0.6) | Weak | Yes |
| 3 | Hudson River Waterfront Walkway | Jersey City, NJ | 3.7 (6.0) | Weak | Yes |
| 4 | Statue of Liberty | New York, NY | 2.8 (4.5) | None | - |
| **EW 2 Onshore Substation A** | | | | | |
| 1 | Residential Neighborhood/ Oceanlea Drive | Oceanside, NY | 0.2 (0.3) | Moderate | Yes |
| 2 | Woodmere Docks/Residential Neighborhood | Hewlett Neck, NY | 2.25 (3.6) | Weak | -- |
| 3 | Masone Point Beach/Residential Neighborhood | Oceanside, NY | 1 (1.6) | Weak | Yes |

| Map ID # a/ | Name | Location | Distance to Project Site mi (km) | Contrast Rating b/ | Simulation Created for KOP c/ d/ |
|---|---|---|---|---|---|
| **EW 2 Onshore Substation C** | | | | | |
| 1 | Quebec Road/Residential Neighborhood | Island Park, NY | 0.07 (0.11) | Weak d/ | Yes |
| 2 | Long Beach Bridge | Island Park, NY | 0.09 (0.15) | Strong | Yes |
| 3 | Long Beach Skate Park | Long Beach, NY | 0.43 (0.69) | Moderate | Yes |
| 4 | Island Park Station | Island Park, NY | 0.19 (0.31) | Moderate | Yes |

Notes:
a/ Map ID numbers correspond to the maps shown in **Figure AA-6-2** (EW 1 site), **Figure AA-6-3** (EW 2 A site), and **Figure AA-6-4** (EW 2 C site).
b/ Visual Contrast Rating Worksheets for each KOP is included in **Attachment AA-2**. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in this table.
c/ Visual simulations are included in **Attachment AA-3**.
d/ Where no simulation was prepared, analysis for the contrast rating forms included referencing other simulations, field photography, Google Earth and maps.
e/ Viewpoint is not visible from the public right-of-way (see simulations in **Attachment AA-3**); however, there may be partial views from residences adjacent to the substation.

### AA-6.3.1 EW 1 Onshore Substation and O&M Base

#### 2nd Avenue

This KOP is located on the corner of 2nd Avenue and 32nd Street in Brooklyn, New York within the commercial/industrial area directly east of the EW 1 Onshore Substation and O&M Base. 2nd Avenue begins just north of 28th Street and extends south-southwest approximately 2 mi (3.2 km) to the Belt Parkway and provides access to several commercial and industrial developments along the waterfront. The landscape surrounding this local road is densely urban and includes heavy industrial and commercial development. Upper Bay is located approximately 0.6 mi (1 km) to the west.

*Existing View*
This KOP is within the New England Coastal Plains and Hills ecoregion. The landscape surrounding this location is characterized by dense urban development. Views from this location toward the Project include industrial buildings, a recycling center, a parking lot and associated lighting, a perimeter chain-link fence and a wind turbine in the foreground, with peek-a-boo views of the Upper Bay and buildings in lower Manhattan in the background. Vegetation is limited to scattered trees ranging from 20 to 30 feet within the South Brooklyn Marine Terminal.

*View with the Project*
This location represents drivers along 2nd Avenue and viewers in adjacent buildings.[7] Views towards the EW 1 Onshore Substation and O&M Base from this location are unobstructed. Similar to the Columbia Street Esplanade viewpoint (located approximately 0.5 mi [0.8 km] north of this viewpoint), the onshore substation and O&M Base will be seen in the context of other existing development including a recycling center, parking

[7] This view represents viewers at the ground level of adjacent buildings, it does not represent views from upper stories of nearby buildings.

lot, warehouse, an onshore wind turbine, and lighting associated with parking areas. Although the surrounding area is heavily developed, the area within the South Brooklyn Marine Terminal primarily includes paved areas with one warehouse located south of the EW 1 Onshore Substation and O&M Base. The proposed buildings associated with the EW 1 Onshore Substation and O&M Base will be larger than the existing warehouse to the south. Furthermore, the proposed onshore substation and O&M Base will be seen in front of the recycling center and closer to potential viewers on 2nd Avenue. Due to the proximity of the proposed onshore substation and O&M Base to the road (approximately 100 ft (31 m) and the size of the proposed buildings, the EW 1 Onshore Substation and O&M Base will attract attention and dominate the view. As such, the Project will introduce strong visual contrast.

**Columbia Street Esplanade**

Columbia Street Esplanade is located at the end of Columbia Street in Brooklyn, New York. The esplanade is a walkway that runs along the east side of a pier that extends out into Gowanus Bay. Amenities include benches, lighting, and a bikeway. The esplanade is privately owned and maintained but is open and accessible to the public (NYC 2019). The landscape surrounding the esplanade includes warehouses along the pier to the west and north and Gowanus Bay and east and south, with the South Brooklyn Marine Terminal located on the eastern side of the bay.

*Existing View*
This KOP is within the New England Coastal Plains and Hills ecoregion. The landscape surrounding this location is characterized by open water and dense urban development. Because of the dense development along the eastern side of Gowanus Bay, views from the esplanade are limited primarily to buildings and other development in the foreground. However, the Green-Wood Cemetery, Sunset Park, and some taller buildings can be seen in the middleground rising above some of the development along the coast. Vegetation includes trees and shrubs scattered along the shoreline of the bay and trees associated with Green-Wood Cemetery and Sunset Park. From this KOP views toward the EW 1 Onshore Substation and O&M Base are partially screened by development.

*View with the Project*
This location represents recreational viewers associated with the esplanade. Views toward the EW 1 Onshore Substation and O&M Base from this location are partially screened by the existing recycling center that is located directly west of the site. Portions of the proposed buildings that rise above or extend beyond the recycling center will be visible. The light color and rectangular form of the buildings within the EW 1 Onshore Substation and O&M Base will be similar in form and color to several other warehouses and commercial buildings along the coast. The scale of the proposed buildings will also be similar to several of the existing buildings. The outdoor electrical equipment will mostly be screened by the recycling center and portions that are visible will not be noticeable or perceived. Onshore substation and O&M Base facilities that are visible will be seen in the context of the recycling center, which is a prominent feature in the view, and other commercial and industrial development along the western shoreline of Brooklyn, New York. At a distance of 0.4 mi (0.6 km), although the onshore substation buildings will attract attention the recycling center located closer to the viewer will remain a dominant feature. As such, the Project will create weak visual contrast.

A simulation representing the view of the onshore substation and O&M Base buildings from this location is included in **Attachment AA-3**.

**Hudson River Waterfront Walkway**

This KOP is located along the Hudson River Waterfront Walkway, specifically at the eastern end of Chapel Avenue in New Jersey. The Hudson River Waterfront Walkway is a 30-ft (9.1-m)-wide, paved pathway that

extends 18.5 mi (29.8 km) along the western shore of the Upper Bay and Hudson River from Bayonne, New Jersey to the George Washington Bridge. The walkway follows the general contour of the shoreline and traverses residential, commercial, and industrial development, including re-developed piers, and wetlands. The walkway was developed to provide connectivity between municipalities and to provide public access to the water's edge. There are several parking areas and points of interest along the walkway route. According to the Hudson River Waterfront Conservancy[8] "The walkway was adopted into New Jersey Administrative law in 1988. It requires the construction and maintenance of the Walkway by the owner of the waterfront land. It also requires free, unobstructed access to the Walkway 24 hours a day. An easement conveys the conservation restriction to the NJ Department of Environmental Protection which is responsible for the enforcement of the regulation." (HRWC 2019). The landscape surrounding the walkway includes the Upper Bay and Hudson River to the east and a variety of land uses to the west, including industrial, residential, and commercial.

*Existing View*

This KOP is within the New England Coastal Plains and Hills ecoregion. The landscape surrounding this location is characterized by open water and dense urban development. Expansive views of the water and the skyline of New York, including Brooklyn, can be seen from the walkway. From this KOP views toward the EW 1 Onshore Substation and O&M Base are primarily unobstructed. However, the bay is heavily traveled by large marine vessels, including cargo ships, cruise ships and ferries, and the eastern shoreline is sometimes screened by passing ships.

*View with the Project*

This location represents viewers associated with the walkway, such as pedestrians, bikers and anglers. Views across the Upper Bay toward the Project are unobstructed. However, the northern portion of the EW 1 Onshore Substation and O&M Base will be partially screened by the recycling center located directly west of the site. Portions of the EW 1 Onshore Substation and O&M Base that are visible include the outdoor electrical equipment area and buildings to be located near the southern portion of the site. The large light color and rectangular form of the buildings within the EW 1 Onshore Substation and O&M Base will be similar in form and color to several warehouses and commercial buildings along the coast. The scale of the proposed buildings will also be similar to several of the existing buildings. The outdoor electrical equipment, which will consist of transformers and shunt reactors, will most likely be surrounded by fire walls that will screen most of the equipment itself. The firewalls will be gray and appear rectangular in form and will be smaller in size than the proposed buildings. Onshore substation and O&M Base facilities that are visible will be seen in the context of other commercial and industrial development along the western shoreline of Brooklyn, New York. At a distance of approximately 4 mi (6.4 km), the onshore substation and O&M Base facilities will blend into the existing landscape setting. Due to the distance of the EW 1 Onshore Substation and O&M Base and the densely developed industrial/commercial coastline, the onshore substation and O&M Base may attract attention but would appear as a subordinate feature in the heavily developed landscape setting and will not change the characteristic of the view. As such, the Project will introduce weak visual contrast. Marine vessels, including cargo and cruise ships, may also temporarily screen the EW 1 Onshore Substation and O&M Base as they travel to and from port.

A simulation representing the view of the onshore substation and O&M Base buildings from this location is included in **Attachment AA-3**.

[8] The Hudson River Waterfront Conservancy is a non-profit organization that works with the New Jersey Department of Environmental Protection to monitor the construction, maintenance and usage of the walkway.

**Statue of Liberty**

This KOP is located on the southeast side of the Statue of Liberty, which is on Liberty Island within New York Harbor. The Statue of Liberty is a copper statue that was a gift from the people of France to the people of the United States. The statue was dedicated on October 28, 1886. The statue is part of the Statue of Liberty National Monument, which is comprised of the statue and Ellis Island. The statue is owned and operated by the National Park Service and was listed on the NRHP in September 2017 (NPS 2017). The statue is also designated as a UNESCO World Heritage Site, U.S. National Monument, NJNRHP, and New York City Landmark. The landscape surrounding this location includes open water with dense urban development along the mainland of New York and New Jersey.

*Existing View*
This KOP is within the New England Coastal Plains and Hills ecoregion. The landscape surrounding this location is characterized by open water and dense urban development. Expansive views of the water and the New York and New Jersey skyline can be seen from Liberty Island. Vegetation is limited to parks and vegetation along the waterfront. From this KOP views toward the EW 1 Onshore Substation and O&M Base are partially obstructed by piers and other development along the southern coast of Brooklyn.

*View with the Project*
This location represents tourists visiting a widely known and highly popular landmark. Similar to the Hudson River Waterfront Walkway viewpoint (located approximately 1 mi [2 km] west of this viewpoint), views from this location across Upper Bay toward the Project are partially obstructed. A pier that extends out into the water is located between the Liberty Island and the Project. The New York Police Department Erie Auto Pound is located on the pier, as is the Columbia Street Esplanade. There is also an existing recycling center located directly west of the site EW 1 Onshore Substation and O&M Base that will partially screen the proposed onshore substation and O&M Base buildings. Portions of the proposed buildings that rise above or extend beyond the recycling center will be visible. The light color and rectangular form of the buildings within the EW 1 Onshore Substation and O&M Base will be similar in form, scale and color to several warehouses and commercial buildings along the coast. The outdoor electrical equipment will be mostly screened by the recycling center and portions that are visible will not be noticeable or perceived. Onshore substation and O&M Base facilities that are visible will be seen in the context of other commercial and industrial development along the western shoreline of Brooklyn, New York. At a distance of approximately 2.8 mi (4.5 km) the onshore substation facilities will blend into the existing landscape setting. Due to the distance of the EW 1 Onshore Substation and O&M Base from the viewer and screening by existing development, the onshore substation and O&M Base will not attract attention or be perceived. Therefore, the Project will not change the characteristic of the view. As such, the Project will introduce no visual contrast.

### AA-6.3.2 EW 2 Onshore Substation A

**Residential Neighborhood/Oceanlea Drive**

This KOP is located on Oceanlea Drive, just north of Harris Drive in the Hamlet of Oceanside, Nassau County, New York. This residential neighborhood is located approximately 0.2 mi (0.32 km) east of the EW 2 Onshore Substation A site (at its closest point) and is bounded by the Oceanside Cove residential community to the south, a commercial strip mall to the east, commercial and residential development to the north, and the Oceanside Grand Canal and Simonson Channel to the west. Beyond the canal to the west is commercial and industrial development where this onshore substation is proposed.

*Existing View*
This KOP is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by coastal bays and inlets. Views from this location primarily include residential development in the foreground, with the stacks associated with the Oceanside POI and a high-voltage transmission line extending above vegetation in the foreground/middleground, as well as commercial and industrial development to the west. Vegetation consists of shrubs and grasses along the canal and landscaping, including lawns and trees associated with residential development. Human-made modifications include residences, paved roads, the Oceanside POI, transmission lines, and streetlights. The onshore substation site currently includes structures such as large industrial tents that are white in color and a tall, green, storage building.

*View with the Project*
This location represents residential areas and roadways. Views toward the EW 2 Onshore Substation A site from this location are partially screened by vegetation and industrial buildings. The large rectangular forms and light color of the proposed building will be similar to the white and grey tones of the existing buildings and tents on site and nearby. The texture of the proposed building contrasts in texture as the proposed building appears smooth compared to the rougher texture of the existing buildings. The onshore substation will be seen in the context of other industrial buildings but will be more obvious as the onshore substation building may be taller than the existing buildings immediately in front of the onshore substation in the foreground. Although existing development and utilities are visible in the view, due to the close viewing distance and the large scale of the facility it is anticipated that the Project will introduce moderate visual contrast at this KOP.

A simulation representing the view of the onshore substation from this location is included in **Attachment AA-3**.

**Woodmere Docks/Residential Neighborhood**

This KOP is located at the Woodmere Docks located on the eastern end of Hewlett Bay. This location is approximately 2.25 mi (3.6 km) west of the EW 2 Onshore Substation A site and is bounded by Hewlett Bay to the east, residential development to the north and west, and natural area to the south.

*Existing View*
This KOP is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by coastal bays and inlets. Views from this location include Hewlett Bay and several small flat islands in the foreground and development along the shoreline and surrounding this location in the foreground/middleground; developed features include marinas and residential and commercial development along the bay. Vegetation includes low grasses on the small islands, trees associated with residential development, and lawn or short grass covering the parks and commercial/industrial development.

*View with the Project*
This location represents recreational viewers associated with the dock and residential areas surrounding the dock. Similar to the Masone Point Beach viewpoint (located approximately 2 mi [3 km] east of this viewpoint), The upper portion of the proposed onshore substation buildings may be visible; if so, it will be seen in the context of existing commercial and industrial development, including the Costco building and power lines. The onshore substation buildings will be comparable in height to the existing cylinder-shaped buildings in the middleground. At a distance of 1 mi (1.6 km), the onshore substation buildings at the EW 2 Onshore Substation A site will appear subordinate to other features. As such, the Project will introduce weak visual contrast at this KOP.

**Masone Point Beach/Residential Neighborhood**

This KOP is located at the Masone Point Beach located along the Island Park Harbor and Hog Island Channel west of Austin Boulevard. This location is approximately 1 mi (1.6 km) south of the EW 2 Onshore Substation A site and is bounded by Island Park Harbor to the west, residential and industrial/commercial development to the north, east, and south.

*Existing View*
This KOP is within the Barrier Islands/Coastal Marshes ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by coastal bays and inlets. Views from this location include Island Park Harbor and Hog Island Channel and several small flat islands in the foreground and development along the shoreline and surrounding this location in the foreground/middleground; developed features include the Oceanside POI, cell phone towers, and residential and commercial development along the harbor. Vegetation includes low grasses on the small islands, trees associated with residential development, and lawn or short grass covering the parks and commercial/industrial development.

*View with the Project*
This location represents recreational viewers associated with the park/beach and residential areas surrounding the park. Views toward the EW 2 Onshore Substation A site are partially screened by existing industrial buildings along the shoreline near the onshore substation site. The upper portion of the proposed onshore substation buildings will be visible but will be seen in the context of existing commercial and industrial development, including the Costco building and power lines. The onshore substation buildings will be comparable in height to the existing cylinder-shaped buildings in the middleground. At a distance of 1 mi (1.6 km), the onshore substation buildings at the EW 2 Onshore Substation A site will appear subordinate to other features. As such, the Project will introduce weak visual contrast at this KOP.

A simulation representing the view of the onshore substation buildings from this location is included in **Attachment AA-3**.

### AA-6.3.3 EW 2 Onshore Substation C

**Quebec Road/Residential Neighborhood**

This KOP is located at a dead end along Quebec Road in the Village of Island Park, Nassau County, New York. This residential neighborhood is located approximately 0.07 mi (0.11 km) west of the EW 2 Onshore Substation C site (at its closest point) and is bounded by the Wreck Lead Channel to the south, Long Island Railroad, and Pop's Seafood Shack and Grill to the east, and residential development to the north and west.

*Existing View*
This KOP is within the Atlantic Coastal Pine Barrens ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by gently undulating low-elevation coastal plain with sandy, droughty, infertile soils with extensive pine-oak woodlands. Views from this location primarily include residential development in the foreground, with residential power lines extending above vegetation and fencing crisscrossing the ground. Vegetation consists of landscaping shrubs and grasses, including lawns and trees associated with residential development. Human-made modifications include residences, paved roads, and power lines. From this KOP, views east toward the EW 2 Onshore Substation C site are completely screened by foreground vegetation and topography.

*View with the Project*
This location represents residential neighborhoods and travel ways. Views toward the EW 2 Onshore Substation C site from this location are mostly to completely screened by vegetation and residential development. From Quebec Road, views will be screened by existing development and vegetation which block views towards the proposed substation (see simulation in **Attachment AA-3**). Based on review of aerial imagery, from residential backyards adjacent to LIRR and the substation, views are anticipated to be mostly screened by vegetation. For residential backyard viewers, the upper portions of the substation building may be visible above existing vegetation. However, the portion of the potential building that is visible will be seen in the context of residential development, power lines, and a commuter railroad line that splits the two areas. The substation at the EW 2 Onshore Substation C site will appear as a subordinate feature in the landscape setting. As such, the Project will introduce none to weak visual contrast in this area. Views toward the EW 2 Onshore Substation C site from residences farther west and north in the residential neighborhood are anticipated to be completely screened by residential development and will experience no visual contrast at this KOP.

A simulation representing the view of the onshore substation buildings from this location is included in **Attachment AA-3**.

**Long Beach Bridge**

This KOP is located along Long Beach Boulevard at the Long Beach Bridge, which crosses the Wreck Lead Channel. This location is approximately 0.09 mi (0.15 km) east of the EW 2 Onshore Substation C site and is bounded by the Channel on the east and west, Island Park, New York to the north, and Long Beach, New York to the south.

*Existing View*
This KOP is within the Atlantic Coastal Pine Barrens ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by gently undulating low-elevation coastal plain with sandy, droughty, infertile soils with extensive pine-oak woodlands. Views from this location include Wreck Lead Channel and commercial, industrial, and residential development along the shoreline of Island Park and Long Beach in the foreground/middleground; developed features include marinas, parks, and residential and commercial development along the channel. Vegetation includes low grasses, dispersed trees mainly associated with residential development, and lawn or short grass covering the parks and commercial/industrial development.

*View with the Project*
This location represents travelers along Long Beach Boulevard the bridge. Views toward the EW 2 Onshore Substation C site are open. The large rectangular form and light color of the proposed building will contrast with the dark green, irregular forms of the exiting vegetation. The onshore substation will be seen in the context of exiting streetlights and utility lines in the foreground. Although existing structures and utilities are visible in the view, the Project will be a dominant feature in the view due to the proximity of the EW 2 onshore substation to the viewpoint and the large scale and light color of the building. As such, it is anticipated that the Project will introduce strong visual contrast in views from the southeast.

A simulation representing the view of the onshore substation buildings from this location is included in **Attachment AA-3**.

**Long Beach Skate Park**

This KOP is located at the skate park in the Long Beach Park Area located adjacent to the Wreck Lead Channel west of Long Beach Boulevard in Long Beach, New York. This location is approximately 0.43 mi (0.69 km)

southwest of the EW 2 Onshore Substation C site and is bounded by Wreck Lead Channel to the north and recreation, residential, and industrial/commercial development to the south, east, and west.

*Existing View*
This KOP is within the Atlantic Coastal Pine Barrens ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by gently undulating low-elevation coastal plain with sandy, droughty, infertile soils with extensive pine-oak woodlands. Views from this location include Island Park and Wreck Lead Channel in the foreground and development along the shoreline and surrounding this location in the foreground/middleground; developed features include residential, park, and commercial development. Vegetation includes low grasses, trees associated with residential development and lined along streets, and lawn or short grass covering the parks and commercial/industrial development.

*View with the Project*
This location represents recreational viewers associated with the skate park and other park facilities in this area, including the residential areas surrounding the park. Views toward the EW 2 Onshore Substation C site are partially screened by the existing train bridge along the Wreck Lead Channel. The upper portion of the proposed onshore substation building will be visible but will be seen in the context of existing development, including the train bridge and power lines. The onshore substation building will be comparable in height to the existing train bridge in the foreground. At a distance of 0.43 mi (0.69 km), the onshore substation buildings at the EW 2 Onshore Substation C site will appear as a co-dominant feature. As such, the Project will introduce moderate visual contrast at this KOP.

A simulation representing the view of the onshore substation buildings from this location is included in **Attachment AA-3**.

**Island Park Station**

This KOP is located at the Island Park Train Station in Island Park, New York located between Long Beach Road and Austin Boulevard. This location is approximately 0.19 mi (0.31 km) south of the EW 2 Onshore Substation C site and is bounded by residential homes to the north and recreation, residential, and industrial/commercial development to the south, east, and west.

*Existing View*
This KOP is within the Atlantic Coastal Pine Barrens ecoregion. The landscape surrounding this location is typical of this ecoregion and is characterized by gently undulating low-elevation coastal plain with sandy, droughty, infertile soils with extensive pine-oak woodlands. Views from this location include Island Park in the foreground; developed features include residential and commercial development. Vegetation includes low sparse grasses and trees associated with commercial and residential development and lined along streets.

*View with the Project*
This location represents travelers and residential viewers associated with the train station and nearby residences. Views toward the EW 2 Onshore Substation C site are partially screened by existing buildings. The upper portion of the proposed onshore substation building will be visible but will be seen in the context of existing development, including the existing buildings and power lines. The onshore substation building will be somewhat taller than the existing buildings in the foreground. At a distance of 0.19 mi (0.31 km), the onshore substation buildings at the EW 2 Onshore Substation C site will appear as a co-dominant feature. As such, the Project will introduce moderate visual contrast at this KOP.

A simulation representing the view of the onshore substation buildings from this location is included in **Attachment AA-3**.

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# ATTACHMENT AA-7 ANCHORAGE AREA VISUAL EFFECTS

# Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2)

# Anchorage Area Visual Effects

# Supplement to Visual Impact Assessment

# Attachment AA-7

Prepared for
Empire Offshore Wind LLC


Prepared by
Tetra Tech, Inc.


March 2023

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AIS | Automatic Identification System |
| BOEM | Bureau of Ocean Energy Management |
| Empire | Empire Offshore Wind LLC |
| km | kilometer |
| KOP | Key Observation Point |
| Lease Area | designated Renewable Energy Lease Area OCS-A 0512 |
| m | meter |
| mi | mile |
| MMSI | Maritime Mobile Service Identity |
| nm | nautical mile |
| NOAA | National Oceanic and Atmospheric Administration |
| Project | The offshore wind project for OCS A-0512 proposed by Empire Offshore Wind LLC consisting of Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2) |
| USCG | United States Coast Guard |
| VIA | Visual Impact Assessment |

## AA-7.1 Introduction

Empire Offshore Wind LLC (Empire) has developed this supplement to describe the official and unofficial (overflow) anchorage grounds located offshore Long Island, New York and to supplement the existing conditions discussion in the Visual Impact Assessment (VIA) (**COP Appendix AA**). The offshore anchorage grounds are used by ships awaiting access to inshore anchorages and are located in federal waters immediately adjacent to New York state waters, approximately 3 nautical miles (nm) south of Long Island, New York. The U.S. Bureau of Ocean Energy Management (BOEM) Renewable Energy Lease Area Outer Continental Shelf (OCS)-A 0512 (Lease Area) proposed for development of the Empire Wind Project (Project) is located approximately 14 statute miles (mi; 12 nautical miles [nm], 23 kilometers [km])[1] south of Long Island, New York and beyond these anchorage grounds.

As described in the Project VIA (**COP Appendix AA** Section AA.4.3.1), existing human-made visual intrusions that are evident near offshore Project components include marine vessel traffic coming and going from New York harbor, including barges, container ships, cruise ships, commercial and recreational fishing, recreational boating, and ferry transportation. This supplement discusses recent findings regarding existing vessel traffic in federal waters.

## AA-7.2 Shipping Data and Vessel Patterns

Marine vessel traffic is common along the Atlantic Coast as stated in the VIA (Section AA.5.2.1). To help identify vessel traffic and anchoring patterns in the area, an area south of Long Island used by large commercial vessels for anchoring was split into three separate regions for analysis. These analysis areas lie between the northern limit of the Traffic Separation Scheme and the state/federal waters boundary. The westernmost area is based on the United States Coast Guard (USCG)-Proposed Ambrose Anchorage Ground, which was then expanded to include the region between the state waters line to the north, the charted Precautionary Area boundary to the west, and the traffic separation scheme boundary to the south. An additional area to the east of the USCG Proposed Ambrose Anchorage Ground has ad-hoc, "unofficial" anchoring occurring regularly as an "overflow" for the USCG-Proposed Ambrose Anchorage Ground. For the purposes of this study, the ad-hoc anchoring has been split into the Unofficial Anchorage Area A and Unofficial Anchorage Area B anchoring regions, from west to east, respectively. **Figure AA-7-1** provides an overview of these three areas in relation to the Project and nearby Key Observation Points (KOPs) identified in the VIA (Section AA.4.3.3.). The photos in **Figure AA-7-2** and **Figure AA-7-3** include views of vessels taken from the Long Beach shore near the EW 2 Landfall E location facing south towards the Project. These photos were taken on September 7, 2022 at 10:00 a.m. and show the proximity of the vessels to shore. The Project would be in the background beyond these vessels.

Automatic Identification System (AIS) data is collected by the USCG to identify, monitor, and record the location and characteristics of vessels in U.S. and international waters. BOEM, the National Oceanic and Atmospheric Administration (NOAA), and the USCG Navigation Center have worked jointly to repurpose and make available some of this data via the MarineCadastre.gov portal for further use and analysis in geospatial software and analytical workflows. The AccessAIS web tool from MarineCadastre.com aims to make these datasets more accessible by extracting AIS data for user-defined areas and dates.

The AIS data for the study area was downloaded for the most recent 12-month period available: July 2021 through June 2022. The data was queried to identify only vessels with a speed of less than or equal to 2 knots,

[1] Distances throughout the VIA are provided as statute miles (mi) or nautical miles (nm) as appropriate, with kilometers in parentheses. For reference, 1 mi equals approximately 0.87 nm or 1.6 km.

representing those vessels at anchor or maneuvering slowly to anchor or otherwise standing by in the anchorage areas. The AIS data were further queried for those vessels greater than 30 meters (m) in overall length, to exclude smaller less-noticeable vessels such as fishing vessels or pilot boats. The AIS points were then selected by geographic location to isolate those within each of the study analysis areas identified above, and then exported as tabulated data for further analysis in Microsoft Excel using a "data model" to access the several million data points representing the 12 months of filtered AIS signals. Utilizing pivot tables, the number of unique vessels per day within each anchoring area was calculated. See **Figure AA-7-4** through **Figure AA-7-9** for maps and pivot tables for each anchoring area.

As identified in the pivot tables, the USCG-Proposed Ambrose Anchorage Ground extended area alone held between 6.6 and 15.3 vessels on any given day during the analysis period from July 2021 through June 2022. There is a notable increase in the "overflow" of vessels from the extended Ambrose Anchorage area to the eastern unofficial anchorage areas starting in early 2022 and increasing through the end of the dataset in the middle of 2022. This led to the observed increase in Unofficial Anchorage Area A and Unofficial Anchorage Area B use in 2022, with vessels in the area ranging from 0.7 to 5 vessels per day and 0 to 4.1 vessels per day, respectively.

The top 10 vessels by length observed in each analysis area ranged on average from 238 to 327 m (**Table AA-7-1**) in length. Vessels with AIS ping counts in the USCG Proposed Ambrose Anchorage Ground extended area have been sorted and photos have been provided below in **Figure AA-7-10**.

**Table AA-7-1 Average and Maximum Vessel Length in Each Area**

| Anchorage Area | Average Length (m) | Maximum Length (m) |
|---|---|---|
| Ambrose Extended | 238.0 | 368.0 |
| Unofficial Anchorage Area A | 278.1 | 368.0 |
| Unofficial Anchorage Area B | 327.1 | 367.0 |

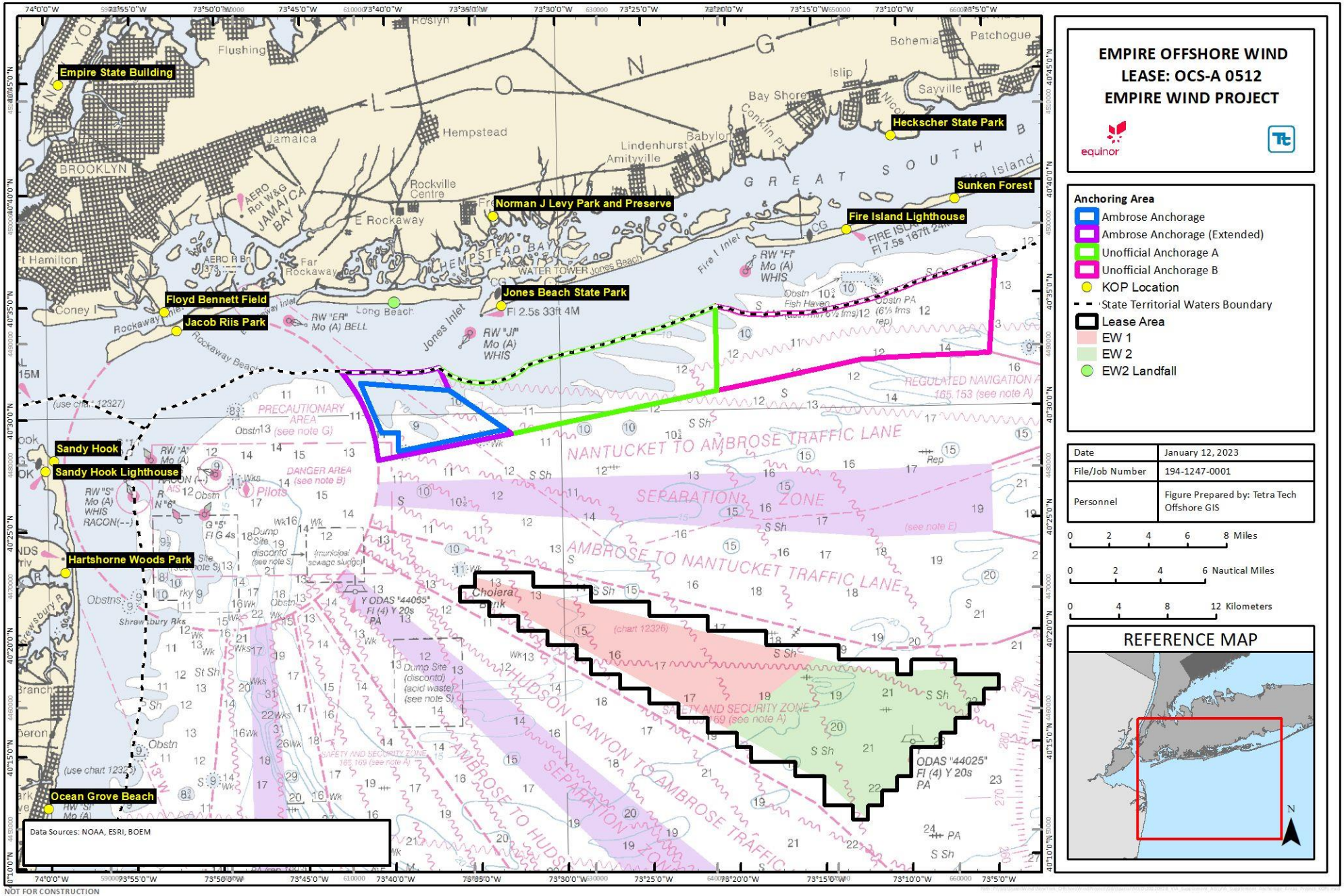


**Figure AA-7-1 Project Area and Nearby KOPs in Relation to Marine Vessel Areas Assessed**

**Figure AA-7-2 Photograph taken from Long Beach on September 7, 2022 at 10:00am.**

**Figure AA-7-3 Photograph taken from Long Beach on September 7, 2022 at 10:00 a.m.**

| Distinct Count of MMSI | Column Labels | 2021 | 2022 | | | | | | | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row Labels | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | |
| Day Of the Month | 1 | | 10 | 11 | 10 | 9 | 7 | 8 | 11 | 11 | 12 | 7 | 17 | 14 | 114 |
| | 2 | | 10 | 7 | 6 | 10 | 9 | 7 | 13 | 13 | 12 | 8 | 19 | 14 | 115 |
| | 3 | | 6 | 9 | 4 | 10 | 7 | 7 | 14 | 12 | 13 | 5 | 17 | 18 | 112 |
| | 4 | | 6 | 8 | 5 | 9 | 7 | 4 | 13 | 11 | 10 | 3 | 11 | 21 | 103 |
| | 5 | | 6 | 8 | 9 | 11 | 7 | | 14 | 8 | 10 | 5 | 15 | 17 | 104 |
| | 6 | | 11 | 8 | 14 | 10 | 8 | 10 | 13 | 13 | 8 | 6 | 17 | 19 | 128 |
| | 7 | | 6 | 9 | 15 | 9 | 11 | 12 | 13 | 14 | 5 | 3 | 15 | 16 | 119 |
| | 8 | | 6 | 9 | 16 | 8 | 7 | 11 | 16 | 8 | 6 | 7 | 15 | 17 | 114 |
| | 9 | | 6 | 7 | 18 | 9 | 5 | 13 | 16 | 12 | 6 | 10 | 14 | 22 | 123 |
| | 10 | | 9 | 9 | 18 | 9 | 3 | 15 | 12 | 12 | 5 | 11 | 15 | 20 | 126 |
| | 11 | | 7 | 12 | 18 | 8 | 7 | 10 | 10 | 15 | 6 | 9 | 14 | 17 | 122 |
| | 12 | | 7 | 10 | 14 | 3 | 7 | 8 | 9 | 12 | 8 | 11 | 12 | | 95 |
| | 13 | | 6 | 17 | 15 | 5 | 9 | 9 | 9 | 13 | 11 | 13 | 13 | 18 | 129 |
| | 14 | | 9 | 19 | 13 | 11 | 2 | 12 | 9 | 13 | 11 | 9 | 14 | 18 | 130 |
| | 15 | | 13 | 14 | 13 | 13 | 6 | 9 | 7 | 16 | 10 | 11 | 10 | 22 | 135 |
| | 16 | | 11 | 13 | 10 | 11 | 8 | 9 | 6 | 16 | 13 | 10 | 13 | 18 | 129 |
| | 17 | | 8 | 10 | 13 | 12 | 7 | 7 | 4 | 11 | 14 | 11 | 14 | 14 | 116 |
| | 18 | | 7 | 8 | 8 | 16 | 5 | 10 | 5 | 13 | 15 | 12 | 11 | 13 | 114 |
| | 19 | | 8 | 6 | 9 | 16 | 5 | 8 | 4 | 12 | 14 | 9 | 14 | 12 | 108 |
| | 20 | | 4 | 13 | 6 | 9 | 8 | 9 | 5 | 9 | 12 | 10 | 10 | 13 | 101 |
| | 21 | | 3 | 11 | 12 | 13 | 9 | 10 | 7 | 10 | 9 | 11 | 10 | 12 | 108 |
| | 22 | | 5 | 10 | 16 | 12 | 6 | 11 | 8 | 12 | 8 | 13 | 11 | 12 | 113 |
| | 23 | | 2 | 16 | 12 | | 10 | 11 | 7 | 16 | 9 | 8 | 12 | 13 | 106 |
| | 24 | | | 13 | 16 | 8 | 6 | 14 | 6 | 19 | 9 | 8 | 11 | 12 | 110 |
| | 25 | | 2 | 14 | 18 | 9 | 11 | 13 | 8 | 18 | 10 | 10 | 8 | 11 | 119 |
| | 26 | | 2 | 14 | 19 | 7 | 14 | 15 | 7 | 15 | 12 | 13 | 10 | 9 | 126 |
| | 27 | | 5 | 15 | 20 | 8 | 11 | 13 | 8 | 18 | 9 | 10 | 12 | 9 | 125 |
| | 28 | | 6 | 12 | 18 | 9 | 12 | 8 | 11 | 17 | 10 | 11 | 9 | 16 | 127 |
| | 29 | | 4 | 10 | 14 | 5 | 11 | 8 | 11 | | 11 | 16 | 9 | 14 | 108 |
| | 30 | 10 | 8 | 9 | 10 | 3 | 11 | 12 | 11 | | 8 | 17 | 11 | 13 | 112 |
| | 31 | | 5 | 9 | | | | 11 | 10 | | 5 | | 12 | | 49 |
| Grand Total | | 10 | 66 | 96 | 110 | 77 | 81 | 88 | 68 | 74 | 75 | 76 | 93 | 88 | 710 |
| Average Unique Vessels per Day | | | 6.6 | 11.0 | 13.0 | 9.4 | 7.9 | 10.1 | 9.6 | 13.2 | 9.7 | 9.6 | 12.7 | 15.3 | |

**Figure AA-7-4 USCG-Proposed Ambrose Anchorage Ground Extended Area[2]**

[2] Figure includes the number of unique vessels per day within the Ambrose Anchorage Extended Area. The Maritime Mobile Service Identity (MMSI) is a unique 9-digit number assigned to a Digital Selective Calling Radio or an AIS unit. The information provided when obtaining an MMSI number is transferred into the USCG's national distress database for use in emergency situations.

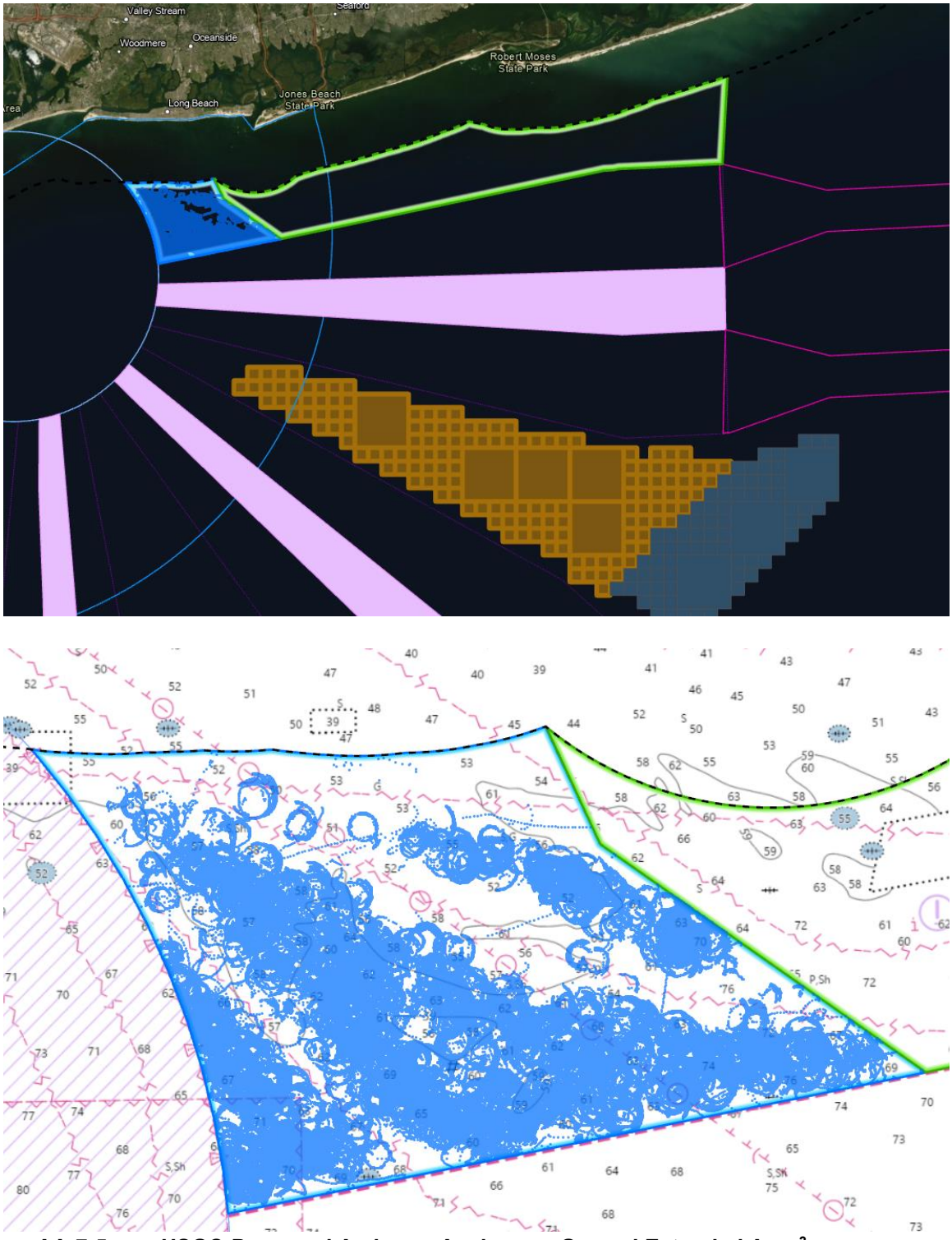


**Figure AA-7-5 USGC-Proposed Ambrose Anchorage Ground Extended Area[3]**

[3]Maps show more detail of the Ambrose Anchorage Ground and Extended Area, including individual AIS data points of slow moving, large vessels for the full 12-month period.

| Distinct Count of MMSI | Column Labels | 2021 | 2022 | | | | | | | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Row Labe | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | |
| Day Of the Month | 1 | | | 4 | 1 | 5 | 1 | | 6 | 1 | 4 | 3 | 3 | 4 | 27 |
| | 2 | | | 3 | 3 | 4 | | | 8 | 2 | 5 | 4 | 3 | 4 | 29 |
| | 3 | | 1 | 4 | 2 | 2 | | | 5 | 2 | 4 | 3 | 4 | 4 | 26 |
| | 4 | | 2 | 4 | 2 | 2 | 1 | 1 | 4 | 2 | 2 | 2 | 3 | 5 | 25 |
| | 5 | | 2 | 4 | 2 | 2 | 1 | | 5 | 2 | 4 | 2 | 5 | 6 | 28 |
| | 6 | | 2 | 5 | 3 | 3 | | 2 | 3 | 2 | 5 | 2 | 5 | 5 | 31 |
| | 7 | | 2 | 4 | 5 | 2 | 2 | 3 | 4 | 4 | 4 | 1 | 3 | 6 | 33 |
| | 8 | | 2 | 5 | 5 | 1 | 2 | 2 | 4 | 5 | 3 | | 2 | 8 | 36 |
| | 9 | | 1 | 2 | 5 | 2 | | 2 | 4 | 4 | 2 | | 2 | 8 | 30 |
| | 10 | | 1 | 3 | 4 | 1 | | 4 | 3 | 5 | 2 | 3 | 3 | 7 | 33 |
| | 11 | | | 3 | 4 | 1 | 1 | 4 | 2 | 4 | 2 | 3 | 5 | 5 | 32 |
| | 12 | | | 4 | 4 | 2 | | 1 | 3 | 2 | 3 | 3 | 6 | | 25 |
| | 13 | | | 3 | 2 | 2 | 2 | 1 | 3 | 1 | 3 | 3 | 6 | 5 | 30 |
| | 14 | | | 3 | 3 | 1 | | 1 | 4 | | 3 | 2 | 6 | 7 | 27 |
| | 15 | | | 5 | 4 | 1 | 1 | | 3 | 1 | 4 | 1 | 9 | 8 | 34 |
| | 16 | | | 4 | 2 | 1 | 1 | | 4 | 2 | 1 | 1 | 7 | 6 | 27 |
| | 17 | | | 3 | 4 | 1 | | | 1 | 3 | 1 | 2 | 7 | 7 | 25 |
| | 18 | | | 2 | 4 | | | | | 3 | 1 | 2 | 5 | 5 | 20 |
| | 19 | | 1 | 3 | 4 | 1 | 1 | | | 2 | | 4 | 4 | 5 | 23 |
| | 20 | | | 3 | 4 | 1 | 2 | | | 3 | | 5 | 5 | 6 | 26 |
| | 21 | | | 3 | 4 | 1 | 2 | | 1 | 3 | 2 | 4 | 3 | 6 | 27 |
| | 22 | | | 3 | 4 | 3 | 2 | | 1 | 2 | 1 | 5 | 5 | 5 | 28 |
| | 23 | | | 2 | 5 | | 1 | | 3 | 2 | 1 | 2 | 4 | 4 | 21 |
| | 24 | | | 3 | 8 | 2 | | | 1 | 2 | | 2 | 4 | 4 | 25 |
| | 25 | | | 2 | 6 | 3 | | 2 | 2 | 2 | | 3 | 2 | 3 | 23 |
| | 26 | | | 4 | 4 | 1 | 1 | 2 | 2 | 4 | | 3 | 2 | 3 | 22 |
| | 27 | | | 4 | 3 | 1 | | 2 | 1 | 5 | | 3 | 3 | 3 | 22 |
| | 28 | | 1 | 3 | 5 | 1 | 2 | 2 | 1 | 4 | 1 | 2 | 3 | 4 | 24 |
| | 29 | | 2 | 4 | 5 | 1 | 2 | 2 | 1 | | 3 | 1 | 4 | 6 | 26 |
| | 30 | 1 | 3 | 4 | 6 | 1 | 1 | 2 | 1 | | 3 | 2 | 3 | 5 | 28 |
| | 31 | | 3 | 3 | | | | 3 | 2 | | 4 | | 4 | | 17 |
| | Grand Total | 1 | 6 | 23 | 27 | 13 | 13 | 9 | 25 | 14 | 22 | 17 | 26 | 28 | 156 |
| Average* Unique Vessels per Day | | | 0.7 | 3.4 | 3.8 | 1.6 | 0.8 | 1.2 | 2.6 | 2.4 | 2.2 | 2.4 | 4.2 | 5.0 | |

*Averaging in empty cells as zero

**Figure AA-7-6 Unofficial Anchorage Area A (Western Portion, see Figure AA-7-7)[4]**

[4] Figure includes the number of unique vessels per day within the Unofficial Anchorage Area A (Western Portion). The MMSI is a unique 9-digit number assigned to a Digital Selective Calling Radio or an AIS unit. The information provided when obtaining an MMSI number is transferred into the USCG's national distress database for use in emergency situations.

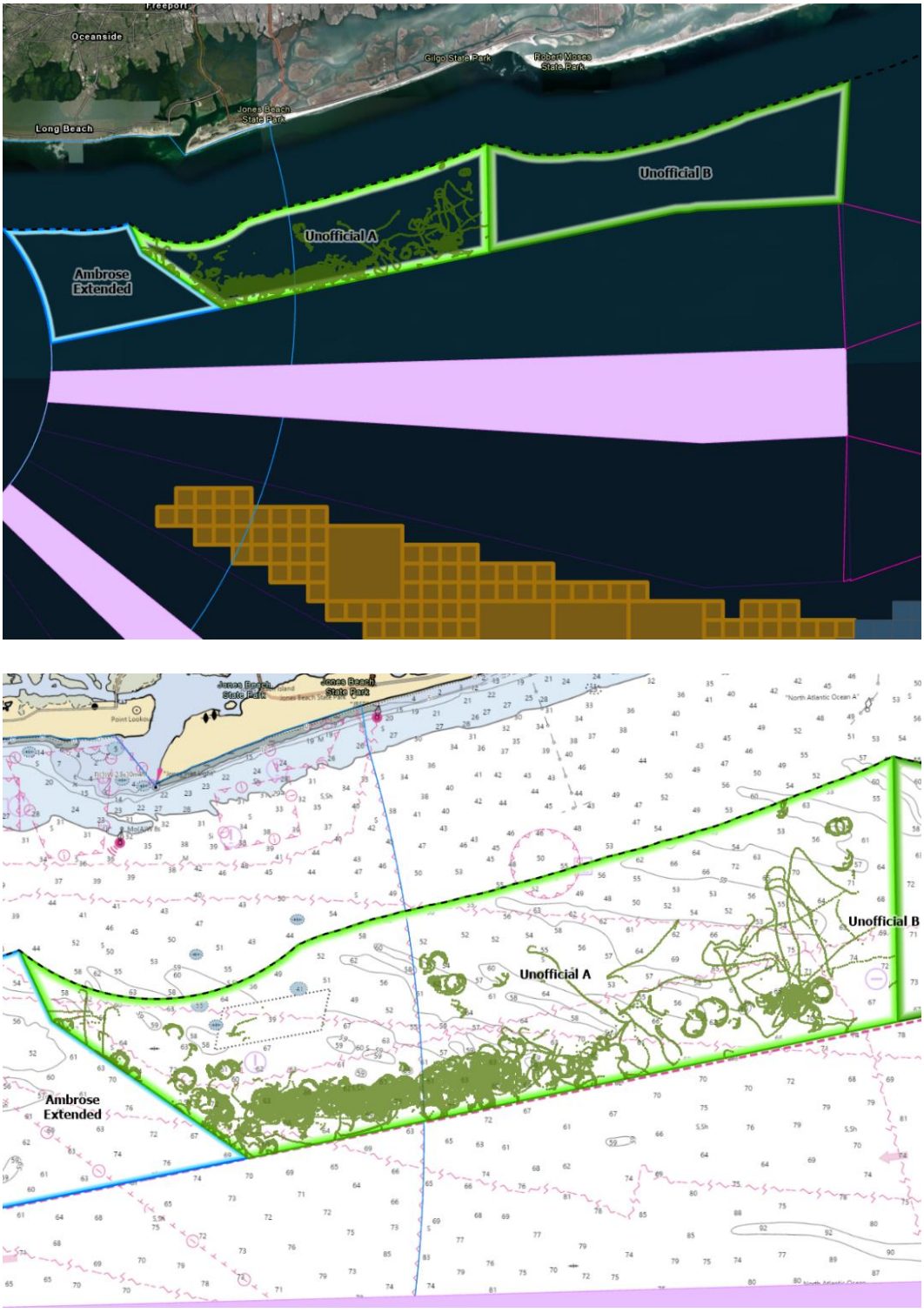


**Figure AA-7-7 Unofficial Anchorage Area A (Western Portion)[5]**

[5] Maps show more detail of the Unofficial Anchorage Area A, including individual AIS data points of slow moving, large vessels for the full 12-month period.

| Distinct Count of MMSI | Column Label | 2021 | | | | | | 2022 | | | | | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day Of the Month | Row La | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | |
| | 1 | | | | 2 | | 1 | | 1 | | 2 | 1 | 5 | 12 |
| | 2 | | | | 1 | | | | 2 | 1 | 2 | 2 | 4 | 12 |
| | 3 | 1 | | | 1 | | | | 2 | 1 | 2 | 2 | 3 | 12 |
| | 4 | 1 | | 1 | 1 | | | | 3 | 2 | 2 | 2 | 5 | 17 |
| | 5 | | | 1 | | | | | 3 | 2 | 2 | 2 | 6 | 16 |
| | 6 | | | 1 | | | | | 1 | 2 | 1 | 4 | 7 | 16 |
| | 7 | | | 1 | | 1 | | | 1 | 2 | 1 | 2 | 5 | 12 |
| | 8 | | | 1 | | 1 | | | 1 | 2 | 1 | | 5 | 10 |
| | 9 | | | 1 | | | | | 1 | 2 | 1 | | 6 | 10 |
| | 10 | 1 | | | | | | | 1 | 2 | 1 | 1 | 6 | 11 |
| | 11 | | | | 1 | | 1 | | 1 | 2 | 1 | | 7 | 12 |
| | 12 | | | | | | | | 1 | 4 | 1 | 3 | | 9 |
| | 13 | | | | | | | | 1 | 3 | 1 | 2 | 4 | 10 |
| | 14 | | | | | | 1 | | 1 | 4 | 1 | 4 | 4 | 14 |
| | 15 | | | | | | | | | 4 | 1 | 5 | 3 | 12 |
| | 16 | | | | 1 | | | | | 3 | | 3 | 3 | 10 |
| | 17 | | | | 1 | | | | | 3 | | 3 | 4 | 11 |
| | 18 | | | 1 | | | | | | 2 | | 2 | 4 | 9 |
| | 19 | | | 1 | | | | | | 3 | | 2 | 3 | 9 |
| | 20 | | | 1 | | | | | 1 | 3 | | 1 | 4 | 10 |
| | 21 | | | 1 | | | | 1 | 1 | 3 | | 3 | 4 | 13 |
| | 22 | | | 1 | | | | | 1 | 4 | | 4 | 4 | 14 |
| | 23 | | | 1 | | | | 1 | | 4 | | 4 | 4 | 14 |
| | 24 | | | 1 | | | | | 1 | 3 | | 3 | 3 | 11 |
| | 25 | | | 2 | | | | 1 | 1 | 2 | | 4 | 3 | 13 |
| | 26 | | | 2 | | | | 1 | 1 | 2 | 1 | 4 | 4 | 15 |
| | 27 | | 1 | 2 | | | | 1 | 1 | 2 | 1 | 3 | 3 | 14 |
| | 28 | | | 1 | | | | 1 | 1 | 2 | 1 | 3 | 5 | 14 |
| | 29 | | | 2 | | | | 1 | | 2 | | 2 | 6 | 12 |
| | 30 | | | 2 | | 1 | | 1 | | 2 | | 2 | 4 | 11 |
| | 31 | | | | | | | 1 | | 2 | | 5 | | 8 |
| | Grand Tota | 2 | 1 | 4 | 4 | 2 | 3 | 3 | 5 | 9 | 3 | 18 | 21 | 59 |
| Average* Unique Vessels | | 0.1 | 0.0 | 0.8 | 0.3 | 0.1 | 0.1 | 0.3 | 0.9 | 2.4 | 0.7 | 2.5 | 4.1 | |

*Averaging in empty cells as zero

**Figure AA-7-8 Unofficial Anchorage Area B (Eastern Portion, see Figure AA-7-9)[6]**

[6] Figure includes the number of unique vessels per day within the Unofficial Anchorage Area B (Eastern Portion). The MMSI is a unique 9-digit number assigned to a Digital Selective Calling Radio or an AIS unit. The information provided when obtaining an MMSI number is transferred into the USCG's national distress database for use in emergency situations.

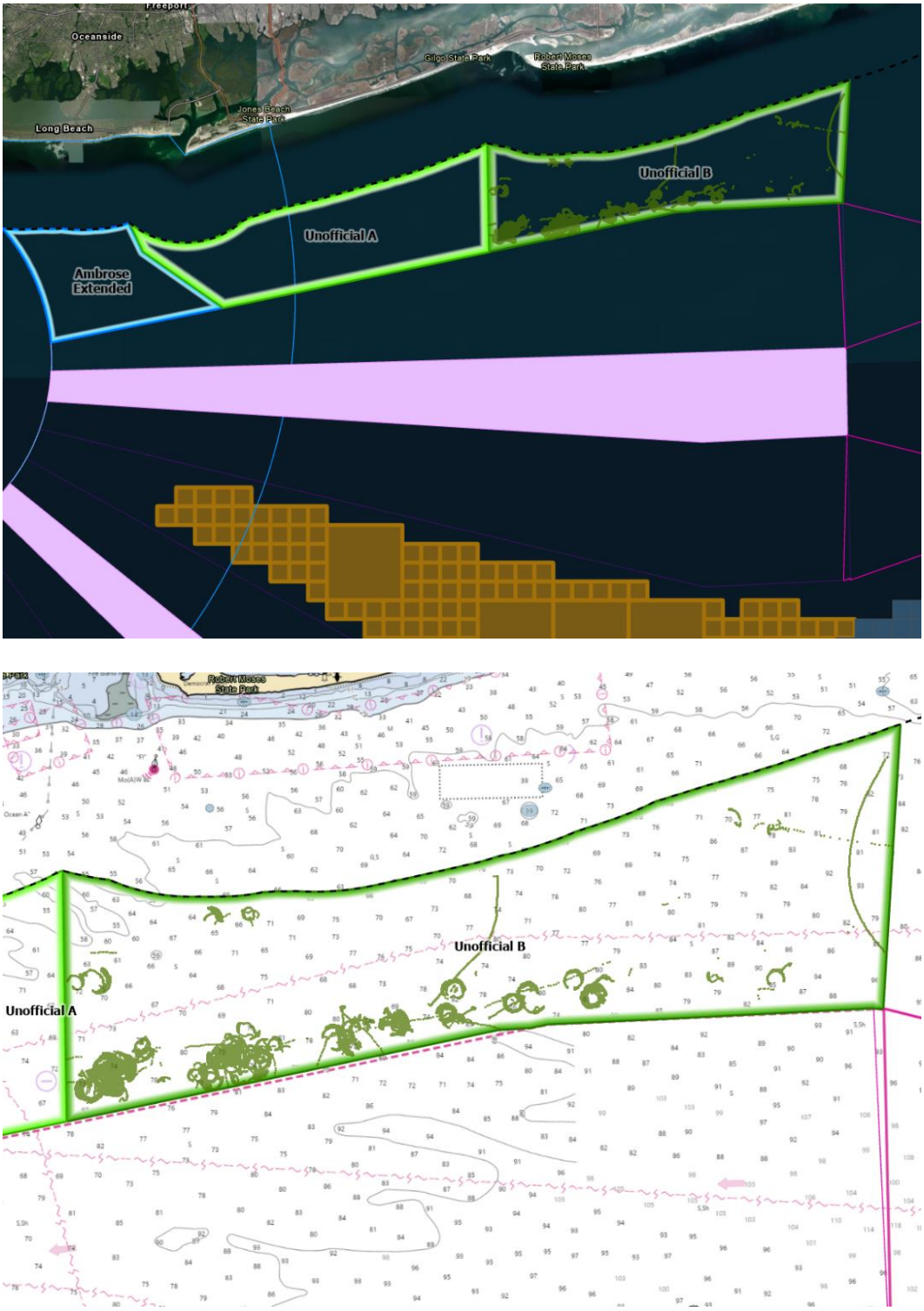


**Figure AA-7-9 Unofficial Anchorage Area B (Western Portion)[7]**

[7] Maps show more detail of the Unofficial Anchorage Area B, including individual AIS data points of slow moving, large vessels for the full 12-month period.


**Figure AA-7-10 Examples of Vessels Recorded Using the USCG Proposed Ambrose Anchorage Ground Extended Area**

### AA-7.2.1 Conclusion

This supplement to the VIA was prepared due to the increase in vessel traffic in recent years and to account for the number of large vessels consistently present offshore that have an effect on the visual environment. Viewers within the Visual Offshore Study Area discussed in the Project VIA (**Appendix AA**, Section AA.4.1.1) will be able to observe marine traffic from viewing locations along the southern shore of Long Island. Vessels are noticeable on a daily basis along the southwestern coast of Long Island, New York, where vessels will be seen in the foreground to middleground (0 to 5 mi [8 km]). The vessels are located between the viewer and the Project, and because they are much closer to the shore than the Project, the vessels interrupt the strong horizon line and can obscure views in the background near the Project, particularly from KOPs facing south towards the Project (e.g., Jones Beach State Park, Norman J. Levy Park and Preserve, Fire Island Lighthouse, Heckscher State Park, and Sunken Forest). The large blocky and vertical structures of the vessels break up the horizon. The degree of change will be less for vessels farther away from shore. This supplement does not change the KOP analysis or worksheets (**COP Appendix AA Attachments AA-2 and AA-6**); rather, it is meant to illustrate the volume of vessel traffic continuously present near the Long Island shore. Because vessels are often anchored overnight (up to a week in some cases), nighttime lighting on these vessels may be visible from shore. These visual elements are part of the existing environment.

## AA-7.3 References

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