Appendix M. Seascape, Landscape, and Visual Impact Assessment

M.1. Introduction

This appendix describes the SLVIA methodology and key findings that BOEM used to identify the potential impacts of offshore wind structures (WTGs and OSS) on scenic and visual resources within the geographic analysis area. This SLVIA methodology applies to any offshore wind energy development proposed for the OCS and incorporates by reference the detailed description of the methodology described in the *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States* (BOEM 2021). Section M.2, *Method of Analysis*, describes the specific methodology used to apply the SLVIA methodology to the COP and Section M.3, *Results,* summarizes the wind farm distances, FOVs, noticeable elements, visual contrasts, scale of change, and prominence that contributed to the determination of impact levels for each KOP under the Proposed Action and each of the action alternatives that include modifications to WTG array layouts (Alternatives B, E, and F). Visual simulations of the Proposed Action alone, other planned offshore wind projects without the Proposed Action, and other offshore wind projects in combination with the Proposed Action are included in Attachment M-1, *Cumulative Visual Simulations*. A nighttime simulation of the Proposed Action is included as Attachment M-2, *Nighttime Visual Simulation.*

The demarcation line between seascape and open ocean is the U.S. states jurisdictional boundary, 3 nm (3.45 statute miles) (5.5 kilometers) seaward from the coastline (US Congress Submerged Lands Act, 1953). This line coincides with shoreline visibility toward the ocean surface. The line defining the separation of seascape and landscape is based on the juxtaposition of seacoast and landward landscape elements, including topography, water (bays and estuaries), vegetation, and structures.

M.2. Method of Analysis

The SLVIA has two separate but linked parts: seascape, open ocean, and landscape impact assessment (SLIA) and VIA. SLIA analyzes and evaluates resource sensitivity, susceptibility, and magnitude of change in the consideration of impacts on both the physical elements and features that make up a landscape, seascape, or open ocean; and the aesthetic, perceptual, and experiential aspects of the landscape, seascape, or open ocean that make it distinctive. These impacts affect the "feel," "character," or "sense of place" of an area of landscape, seascape, or open ocean, rather than the composition of a view from a particular place. In SLIA, the impact receptors (the entities that are potentially affected by the proposed Projects) are the seascape/open ocean/landscape itself and its components, both its physical features and its distinctive character. VIA analyzes and evaluates the impacts on people of adding the proposed development to views from selected viewpoints. VIA evaluates the change to the composition of the view itself and assesses how the people who are likely to be at that viewpoint may be affected by the change to the view. Enjoyment of a particular view is dependent on the viewer and, in VIA, the impact receptors are people. The inclusion of both SLIA and VIA in the BOEM SLVIA methodology is consistent with NEPA's objective of providing Americans with aesthetically and culturally pleasing surroundings and its requirement to consider all potentially significant impacts of development.

The magnitude of effect (change) in a seascape, open ocean, landscape, or view depends on the nature, scale, prominence, and visual contrast of the change and its experiential duration. The SLVIA offshore geographic analysis area consists of the extent of the zone of theoretical visibility and zones of visual influence (COP Volume 3, Appendix AA; Empire 2023), as follows:

- Offshore turbine array area where the WTGs and OSS would be located plus a 40-mile (64.4-kilometer) radius area. This distance is the maximum extent within which a seascape, landscape, or visual effect could occur, given visibility of the maximum height of the WTG rotor (951 feet [276.1 meters]) and OSS (200 feet [61 meters]).

WTG visibility would be variable through the day depending on many factors. View angle, sun angle, and atmospheric conditions would affect the WTG visibility. Visual contrast of WTGs would vary throughout the day depending on the visual character of the horizon's backdrop and whether the WTGs are backlit, side-lit, or front-lit. If less visual contrast is apparent in the morning hours, then it is likely that the visual contrast may be more pronounced in the afternoon. The inverse is possible, as well. These effects are also influenced by varying atmospheric conditions, direction of view, distance between the viewer and the WTGs, and elevation of the viewer.

At closer distances, approximately 12 miles or closer, the form of the WTG may be the dominant visual element creating the visual contrast regardless of color. At greater distances, color may become the dominant visual element creating visual contrast under certain visual conditions that gives visual definition to the WTG's form and line.

Mathematical calculation of EC over the ocean's surface defines the physical structure height(s) at which the Projects' WTGs and OSS are visible from offshore and onshore view receptors. Consideration of the height(s) of receptor(s) eye level(s) above the topography or ocean surface results in precise definition of WTG and OSS visibility. As the elevation of the viewer increases, the visible extent of individual WTGs and OSS increases.

The geographic analysis area shorelines have prevailing eastward and southward viewing directions. All cardinal directions are conceivable when viewing from a water vessel while at sea. When viewing from onshore and scanning across the ocean's horizon, the color of the horizon backdrop will often vary, including as the sun arcs across the sky from sunrise to sunset. Depending on sun angle, the backdrop sky color may have various intensities of white to gray and sky blue to pale blue to dark blue-gray. Blue sky, partly cloudy, overcast, fog, and haze conditions will influence the color make-up of the horizon's backdrop. The sunrise and sunset have varying degrees of light blue to dark blue, light and dark purples intermixed with oranges, yellows, and reds. Partly cloudy skies may increase the remarkable color effects during the sunset and sunrise periods of the day.

When placing WTGs offshore, the visual interplay and contrasting elements in form, line, color, and texture may vary with the ever-changing character of the backdrop. Front-lit WTGs may have strong color contrast against a darker gray sky, giving definition to the WTG vertical form and line contrast to the ocean's horizontal character and the line where the sea meets sky, or visually dissipate against a whiter backdrop created by high levels of evaporative atmospheric moisture during clear sunny days. Partly cloudy skies may create varying degrees of sunlight reflecting off the white color wind turbines, placing some WTGs in the shadow and making them appear darker gray and less conspicuous while highlighting others with a bright white color contrast. The level of noticeability would be directly proportional to the scale of change and prominence in the view and the degree of visual contrast between the WTGs, OSS, and the corresponding backdrop.

These variations through the course of the day may result in periods of moderate to major visual effect while at other times of day would have minor or negligible effect.

The SLVIA methodology and parameters assessed consider local stakeholders' identity, culture, values, and issues and the understanding of baseline maritime conditions. Project activities for all stages of the Project life cycle (construction and installation, O&M, and decommissioning) are assessed against the environmental baseline to identify the potential interactions between the Projects and the seascape,

landscape, and viewers. The onshore geographic analysis area includes landfalls, buried onshore export cables, onshore substations, and transmission connections to the electric grid. The visual impacts of onshore components are discussed and summarized in Section 3.20, *Scenic and Visual Resources*.

Potential impacts are assessed to determine an impact level consistent with the definitions in Table M-1.

Table M-1 Definitions of Potential Adverse Impact Levels

Impact Level	Historic Properties under Section 106 of the NHPA	Visual Resources
Negligible	No historic properties affected, as defined at 36 CFR 800.4(d)(1).	SLIA: Very little or no effect on seascape/landscape unit character, features, elements, or key qualities either because unit lacks distinctive character, features, elements, or key qualities; values for these are low; or Project visibility would be minimal. VIA: Very little or no effect on viewers' visual experience because view value is low, viewers are relatively insensitive to view changes, or Project visibility would be minimal.
Minor	No adverse effects on historic properties could occur, as defined at 36 CFR 800.5(b).	SLIA: The Projects would introduce features that may have low to medium levels of visual prominence within the geographic area of an ocean/seascape/landscape character unit. The Project features may introduce a visual character that is slightly inconsistent with the character of the unit, which may have minor to medium negative effects on the unit's features, elements, or key qualities, but the unit's features, elements, or key qualities have low susceptibility or value. VIA: The visibility of the Projects would introduce a small but noticeable to medium level of change to the view's character, have a low to medium level of visual prominence that attracts but may or may not hold the viewer's attention, and have a small to medium effect on the viewer's experience. The viewer receptor sensitivity/ susceptibility/value is low. If the value, susceptibility, and viewer concern for change are medium or high, the nature of the sensitivity is evaluated to determine if elevating the impact to the next level is justified. For instance, a KOP with a low magnitude of change but a high level of viewer concern (combination of susceptibility/value) may justify adjusting to a moderate level of impact.

Impact Level	Historic Properties under Section 106 of the NHPA	Visual Resources
Moderate	Adverse effects on historic properties as defined at 36 CFR 800.5(a)(1) could occur but would be avoided or minimized using a less-impactful scenario contemplated under the PDE.	SLIA: The Projects would introduce features that would have medium to large levels of visual prominence within the geographic area of an ocean/seascape/landscape character unit. The Projects would introduce a visual character that is inconsistent with the character of the unit, which may have a moderate negative effect on the unit's features, elements, or key qualities. In areas affected by large magnitudes of change, the unit's features, elements, or key qualities have low susceptibility or value. VIA: The visibility of the Projects would introduce a moderate to large level of change to the view's character, may have moderate to large levels of visual prominence that attracts and holds but may or may not dominate the viewer's attention, and has a moderate effect on the viewer's visual experience. The viewer receptor sensitivity/susceptibility/value is medium to low. Moderate impacts are typically associated with medium viewer receptor sensitivity (combination of susceptibility/value) in areas where the view's character has medium levels of change, or low viewer receptor sensitivity (combination of susceptibility/value) in areas where the view's character has large changes to the character. If the value, susceptibility, and viewer concern for change are high, the nature of the sensitivity is evaluated to determine if elevating the impact to the next level is justified.
Major	Adverse effects on historic properties as defined at 36 CFR 800.5(a)(1) could occur; at least some would require mitigation to resolve.	SLIA: The Projects would introduce features that would have dominant levels of visual prominence within the geographic area of an ocean/seascape/landscape character unit. The Projects would introduce a visual character that is inconsistent with the character of the unit, which may have a major negative effect on the unit's features, elements, or key qualities. The concern for change (combination of susceptibility/value) to the character unit is high. VIA: The visibility of the Projects would introduce a major level of character change to the view; attract, hold, and dominate the viewer's attention; and have a moderate to major effect on the viewer's visual experience. The viewer receptor sensitivity/ susceptibility/value is medium to high. If the magnitude of change to the view's character is medium but the susceptibility or value at the KOP is high, the nature of the sensitivity is evaluated to determine if elevating the impact to major is justified. If the sensitivity (combination of susceptibility/value) at the KOP is low in an area where the magnitude of change is large, the nature of the sensitivity is evaluated to determine if lowering the impact to moderate is justified.

M.3. Results

M.3.1 Impacts of Proposed Action on Scenic and Visual Resources

Atmospheric conditions offshore and near the shoreline limit views more than the typically drier-air conditions in inland areas. Visual simulations from representative viewpoints included as Appendix D to the *Empire Wind Visual Impact Assessment Report* (COP Volume 3, Appendix AA; Empire 2023) indicate that daytime and nighttime visibility of WTGs and OSS would be noticeable to the casual observer from beach and landward viewpoints. Distances to the Proposed Action WTG and OSS array from designated KOPs would range from:

- 32.3 miles (52 kilometers) from KOP-9 (Otis Park Fire Island High Dune Wilderness) on the northeastern extent of the geographic analysis area;
- 14.1 miles (22.7 kilometers) from KOP-7 (Jones Beach State Park), the closest KOP to the WTG array; and
- 32 miles (51.5 kilometers) from KOP-13 (Point Pleasant Beach) on the southern beach of the geographic analysis area.

The noticeable daytime and nighttime elements of the Projects' WTGs and substations and their viewshed distances are listed in Table M-2. Each WTG would have two L-864 flashing red obstruction lights on the top of the nacelle, one of which is required to be lit (BOEM 2021). WTGs would have additional intermediate lighting on the tower utilizing low-intensity red flashing (L-810) obstruction lighting (see Section 2.1.1.2, *Offshore Activities and Facilities*). Line-of-sight calculations for onshore viewers (5-foot [1.5-meter] eye level) are based on intervening EC screening (7.98 inches [20.3 centimeters] height per mile). Heights of WTG and substation components are stated relative to MLLW and highest astronomical tide.

Table M-3 and Table M-4 indicate the Proposed Action's effects based on horizontal FOV and vertical FOV, respectively, defined as the extent of the observable landscape seen at any given moment, usually measured in degrees (BOEM 2021). The horizontal FOV for each KOP is listed in Appendix D to COP Volume 3, Appendix AA (Empire 2023). FOVs are valid and reliable indicators of the magnitude of view occupation by Proposed Action facilities. Typical human perception extends to 124° in the horizontal axis and 55° in the vertical axis. The nearest shoreline viewers would be 14.1 miles (25.9 kilometers) from the Wind Farm Development Area. EC, at this distance, reduces the observable height above the horizon of the nearest WTG by 86.1 feet (26.2 kilometers), from 951 feet (289.9 meters) MLLW to 864.9 feet (263.6 meters), resulting in occupation of 0.7°, 1.3 percent of the vertical view. Remaining WTGs would further diminish in perceived size with distance and EC.

Table M-2 Heights of Noticeable[1] WTG Elements and Substations and Visible Distances[2]

Noticeable Element	Height in Feet (meters)	Visible Distance[2] in Miles (kilometers)
Rotor Blade Tip	951 (290) MLLW	0–40.5 (65.2)
Navigation Light	544 (165.8) MLLW	0–31.3 (50.4)
Nacelle	534 (162.8) MLLW	0–31.1 (50.1)
Hub	525 (160) MLLW	0–30.8 (49.6)
Mid-tower Light	263 (78) MLLW[1]	0–22.6 (36.4)

[1] Empire indicated in its response to a request for information that the mid-tower lights would be located approximately halfway from the highest nacelle point and lowest astronomical tide above sea level.

Noticeable Element	Height in Feet (meters)	Visible Distance[2] in Miles (kilometers)
OSS	200 (61) HAT	0–20.1 (32.3)
Yellow Tower Base Color	68.9 (21) HAT	0–11.4 (18.3)

[1] Perception of Project elements, from 5 feet (1.5 meters) human eye-level while standing at mean sea level, involves static distance-related sizes, forms, lines, colors, and textures; variable daytime lighting conditions; variable nighttime light conditions; and variable meteorological conditions.
[2] Based on intervening EC and clear-day conditions.
HAT = highest astronomical tide

Table M-3 Horizontal FOV Occupied by the Proposed Action

Noticeable Element	Width[1] miles (kilometers)	Distance[2] miles (kilometers)	Horizontal FOV	Human FOV	Percent of FOV
Wind Farm	25.6 (41.2)	14.1 (22.7)	61.1°	124°	49%

[1] Maximum extent of the wind farm array.
[2] Nearest onshore distance to the wind farm array.

Table M-4 Vertical FOV Occupied by the Proposed Action

Noticeable Element	Height feet (miles)	Distance miles (kilometers)	Height Above Horizon[1] feet (meters)	Vertical FOV	Human FOV	Percent of FOV
Rotor Blade Tip	951 (276.1) MLLW	14.1 (22.7)	864 (263.3)	0.7°	55°	1.3%

[1] Based on intervening EC, clear-day, and clear-night conditions.

Table M-5 lists the wind farm's distances, horizontal FOVs, noticeable features based on their heights and EC, and visual contrasts. The analysis considers the introduction of WTGs and OSS to an open ocean baseline. The scale, size, contrast, and prominence of change focuses on the:

- Arrangement of WTGs and OSS in the view;
- Horizontal FOV and vertical FOV scale of the wind farm array, based on WTG and OSS size and number;
- Position of the array in the open ocean;
- Position of the array in the view; and
- Array's distance from the viewer.

Visibility, character-changing effects, scale, prominence, and visual contrasts reduce steadily with distance from the observation point. Visibility, character-changing effects, scale, prominence, and visual contrasts increase with elevated observer positions in comparison with the wind farm. Distance and observer elevation considerations are informed by the COP VIA simulations (COP Volume 3, Appendix D to Appendix AA; Empire 2023), EC calculations, horizontal FOV, and vertical FOV in undeveloped open ocean. The wind farm's nearest WTGs and OSS would be:

- Unavoidably dominant features (WTG yellow tower base and above) in the view between 0 and 12 miles (0 and 19.3 kilometers) distance;
- Strongly pervasive features (OSS, WTG mid-tower, mid-tower light, and above) between 12 and 20 miles (19.3 and 32.2 kilometers) distance;

- Clearly visible features (OSS lights, WTG tower, and above) between 20 and 28 miles (32.2 and 45.1 kilometers) distance;
- Low on the horizon, but persistent features (WTG hub, nacelle, navigation light, and rotor) in the view between 28 and 31 miles (45.1 and 49.9 kilometers) distance;
- Intermittently noticed features (WTG rotor) between 31 and 39.6 miles (49.9 and 63.7 kilometers) distance; and
- Below the horizon beyond 39.6 miles (63.7 kilometers) distance.

The prominence of offshore turbines is rated on a scale of 1 to 6, based on typical viewers' acuity (NAEP 2012).

- Visibility Level 1: Visible only after extended, close viewing; otherwise not visible.
- Visibility Level 2: Visible when scanning in general direction of study subject; otherwise likely to be missed by casual observer.
- Visibility Level 3: Visible after brief glance in general direction of study subject and unlikely to be missed by casual observer.
- Visibility Level 4: Plainly visible, could not be missed by casual observer, but does not strongly attract visual attention, or dominate view because of apparent size, for views in general direction of study subject.
- Visibility Level 5: Strongly attracts visual attention of views in general direction of study subject. Attention may be drawn by strong contrast in form, line, color, texture, luminance, or motion.
- Visibility Level 6: Dominates view because study subject fills most of visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.

Visual contrast determinations involve comparisons of characteristics of the seascape, open ocean, and landscape before and after Project implementation. The range of potential contrasts includes strong, moderate, weak, and none (BOEM 2021). The strongest daytime contrasts would result from tranquil and flat seas combined with sunlit WTG towers, nacelles, rotating rotors, flickering rotors, and a yellow tower base color against a dark background sky and an undifferentiated foreground. There would be daily variation in WTG color contrast as sun angles change from backlit to front-lit (sunrise to sunset) and the backdrop would vary under different lighting and atmospheric conditions. The weakest daytime contrasts would result from turbulent seas combined with overcast daylight conditions on WTG towers, nacelles, and rotors against an overcast background sky and a foreground modulated by varied landscape elements. The strongest nighttime contrasts would result from dark skies (absent moonlight) combined with navigation lights, activated lighting on the OSS, mid-tower lights, and Project lighting reflections on low clouds and active (non-reflective) surf, and the dark-sky light dome. The weakest nighttime contrasts would result from moonlit, cloudless skies; tranquil (reflective) seas; ADLS activation; and only mid-tower lights.

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Table M-5 Wind Farm Distances, FOVs, Noticeable Elements, Visual Contrasts, Scale of Change, and Prominence

KOP[1]	Distance in miles (kilometers)					Proposed Action FOV Degrees (% of 124°)	Noticeable Elements[2] & Impact Level	Contrast, Scale of Change, and Prominence							
	Proposed Action	Alternative B	Alternative E	Alternative F	Alternatives C, D, G, & H			Proposed Action Form	Proposed Action Line	Proposed Action Color	Proposed Action Texture	Proposed Action Scale	Proposed Action Prominence[3]	Alternatives B, E, and F	Alternatives C, D, G, & H
KOP-1[4]	33.9 (54.6)	35.9 (57.8)	33.9 (54.6)	35.2 (56.6)	33.9 (54.6)	17° (14%)	R, NL, N, H, M, O, Y **Moderate**	Moderate	Weak	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
KOP-2	22.6 (36.4)	24.6 (39.6)	22.6 (36.4)	23.9 (38.5)	22.6 (36.4)	16° (13%)	R, NL, N, H, M **Moderate**	Moderate	Weak	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
KOP-3[4]	21.8 (35.1)	21.8 (35.1)	21.8 (35.1)	21.8 (35.1)	21.8 (35.1)	49° (40%)	R, NL, N, H, M, O **Major**	Strong	Moderate	Strong	Moderate	Large	6	Same as Proposed Action	Same as Proposed Action
KOP-4	32.1 (51.7)	34.4 (55.4)	32.1 (51.7)	33.2 (53.4)	32.1 (51.7)	10° (8%)	R, NL **Minor**	Weak	Weak	Weak	Weak	Small	1	Same as Proposed Action	Same as Proposed Action
KOP-5	27.0 (43.5)	27.0 (43.5)	27.0 (43.5)	27.0 (43.5)	27.0 (43.5)	43° (35%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
KOP-6	21.0 (33.8)	23.2 (37.3)	21.0 (33.8)	22.5 (36.2)	21.0 (33.8)	17° (14%)	R, NL, N, H, M **Moderate**	Moderate	Weak	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
KOP-7	14.1 (22.7)	14.7 (23.7)	14.1 (22.7)	14.4 (23.2)	14.1 (22.7)	42° (34%)	R, NL, N, H, M, O **Major**	Strong	Moderate	Strong	Moderate	Medium	6	Same as Proposed Action	Same as Proposed Action
KOP-8	18.1 (29.1)	19.0 (30.6)	18.1 (29.1)	18.7 (30.1)	18.1 (29.1)	41° (33%)	R, NL, N, H, M **Moderate**	Moderate	Moderate	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
KOP-9	32.1 (51.7)	32.1 (51.7)	32.1 (51.7)	32.1 (51.7)	32.1 (51.7)	57° (46%)	R, NL **Minor**	Weak	Weak	Weak	Weak	Small	2	Same as Proposed Action	Same as Proposed Action
KOP-10	24.3 (39.1)	24.3 (39.1)	24.3 (39.1)	24.3 (39.1)	24.3 (39.1)	50° (40%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
KOP-11	21.7 (34.9)	24.0 (38.6)	21.7 (34.9)	22.5 (36.2)	21.7 (34.9)	15° (12%)	R, NL, N, H, M **Moderate**	Moderate	Weak	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
KOP-12	25.4 (40.9)	26.9 (43.3)	25.4 (40.9)	25.8 (41.5)	25.4 (40.9)	25° (20%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
KOP-13	30.7 (49.4)	31.7 (51.0)	30.7 (49.4)	30.9 (49.7)	30.7 (49.4)	26° (21%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
KOP-14	24.2 (25.6)	26.4 (42.5)	24.2 (25.6)	25.2 (40.6)	24.2 (25.6)	10° (8%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
KOP-15[4]	24.5 (38.9)	26.8 (43.1)	24.5 (38.9)	25.5 (41.0)	24.5 (38.9)	10° (8%)	R, NL, N, H, M **Major**	Strong	Moderate	Strong	Moderate	Large	6	Same as Proposed Action	Same as Proposed Action
KOP-16	0–40 (0–64)	0–40 (0–64)	0–40 (0–64)	0–40 (0–64)	0–40 (0–64)	124° (100%) to 13° (10%)	R, NL, N, H, M, O, Y **Major**	Strong	Strong	Strong	Strong	Large	6	Same as Proposed Action	Same as Proposed Action
KOP-17	0–40 (0–64)	0–40 (0–64)	0–40 (0–64)	0–40 (0–64)	0–40 (0–64)	58° (47%) to 28° (22%)	R, NL, N, H, O, M, Y **Major**	Strong	Strong	Strong	Strong	Large	6	Same as Proposed Action	Same as Proposed Action
EW1 KOP-1	0.02 (0.03)	NA	NA	NA	0.02 (0.03)	NA	NA	Weak	Weak	Weak	Weak	Small	1	Same as Proposed Action	Same as Proposed Action
EW1 KOP-2	0.4 (0.6)	NA	NA	NA	0.4 (0.6)	NA	NA	Weak	Weak	Weak	Weak	Small	1	Same as Proposed Action	Same as Proposed Action
EW1 KOP-3	3.7 (6.0)	NA	NA	NA	3.7 (6.0)	NA	NA	Weak	Weak	Weak	Weak	Small	2	Same as Proposed Action	Same as Proposed Action

KOP[1]	Distance in miles (kilometers)					Proposed Action FOV Degrees (% of 124°)	Noticeable Elements[2] & Impact Level	Contrast, Scale of Change, and Prominence							
	Proposed Action	Alternative B	Alternative E	Alternative F	Alternatives C, D, G, & H			Proposed Action Form	Proposed Action Line	Proposed Action Color	Proposed Action Texture	Proposed Action Scale	Proposed Action Prominence[3]	Alternatives B, E, and F	Alternatives C, D, G, & H
EW1 KOP-4[4]	2.8 (4.5)	NA	NA	NA	2.8 (4.5)	NA	NA	Weak	Weak	Weak	Weak	Small	1	Same as Proposed Action	Same as Proposed Action
EW2A KOP-1	0.2 (0.3)	NA	NA	NA	0.2 (0.3)	NA	NA	Weak	Weak	Weak	Weak	Small	1	Same as Proposed Action	Same as Proposed Action
EW2A KOP-2	2.5 (3.6)	NA	NA	NA	2.5 (3.6)	NA	NA	Weak	Weak	Weak	Weak	Small	2	Same as Proposed Action	Same as Proposed Action
EW2A KOP-3	1.0 (1.6)	NA	NA	NA	1.0 (1.6)	NA	NA	Weak	Weak	Weak	Weak	Small	2	Same as Proposed Action	Same as Proposed Action
EW2C KOP-1	0.07 (0.11)	NA	NA	NA	0.07 (0.11)	NA	NA	Weak	Weak	Weak	Weak	Small	2	Same as Proposed Action	Same as Proposed Action
EW2C KOP-2	0.09 (0.15)	NA	NA	NA	0.09 (0.15)	NA	NA	Strong	Moderate	Strong	Weak	Large	6	Same as Proposed Action	Same as Proposed Action
EW2C KOP-3	0.43 (0.69)	NA	NA	NA	0.43 (0.69)	NA	NA	Strong	Moderate	Strong	Weak	Large	6	Same as Proposed Action	Same as Proposed Action
EW2C KOP-4	0.19 (0.31)	NA	NA	NA	0.19 (0.31)	NA	NA	Weak	Weak	Weak	Weak	Small	3	Same as Proposed Action	Same as Proposed Action
SBMT KOP-1	0.2 (0.3)	NA	NA	NA	0.02 (0.03)	NA	NA	Strong	Moderate	Strong	Weak	Large	6	Same as Proposed Action	Same as Proposed Action
SBMT KOP-2	0.2 (0.3)	NA	NA	NA	0.04 (0.06)	NA	NA	Strong	Moderate	Strong	Weak	Large	6	Same as Proposed Action	Same as Proposed Action
SBMT KOP-3	3.7 (6.0)	NA	NA	NA	3.7 (6.0)	NA	NA	Moderate	Moderate	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action
SBMT KOP 4[4]	2.8 (4.5)	NA	NA	NA	0.8 (4.5)	NA	NA	Moderate	Moderate	Moderate	Weak	Medium	4	Same as Proposed Action	Same as Proposed Action

[1] KOP-1 Empire State Building (elevated view); KOP-2 Floyd Bennet Field-Gateway National Recreation Area; KOP-3 Fire Island Lighthouse (elevated view); KOP-4 Great Kills Park-Gateway National Recreation Area; KOP-5 Heckscher State Park; KOP-6 Jacob Riis Park-Gateway National Recreation Area; KOP-7 Jones Beach State Park; KOP-8 Norman J Levy Park and Preserve; KOP-9 Otis Pike Fire Island High Dune Wilderness; KOP-10 Sunken Forest; KOP-11 Hartshorne Wood Park; KOP-12 Ocean Grove Beach; KOP-13 Point Pleasant Beach; KOP-14 North Beach-Gateway National Recreation Area; KOP-15 Sandy Hook Light-Gateway National Recreation Area (elevated view); KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area; KOP-17 Commercial and Cruise Ship Shipping Lanes; EW1 KOP-1 2nd Avenue, Brooklyn; EW1 KOP-2 Columbia Street Esplanade, Brooklyn; EW1 KOP-3 Hudson River Waterfront Parkway; EW1 KOP-4 Statue of Liberty; EW2A KOP-1 Oceanlea Drive/Residential Neighborhood; EW2A KOP-2 Woodmere Dock Residential Neighborhood; EW2A KOP-3 Masone Point Beach/Residential Neighborhood; EW2C KOP-1 Quebec Road/Residential Neighborhood; EW2C KOP-2 Long Beach Bridge; EW2C KOP-3 Long Beach Skate Park; EW2C KOP-4 Island Park Station; SBMT Staging Facility KOP-1 2nd Avenue, Brooklyn; SBMT Staging Facility KOP-2 Columbia Street Esplanade, Brooklyn; SBMT Staging Facility KOP-3 Hudson River Waterfront Parkway; SBMT Staging Facility KOP-4 Statue of Liberty
[2] Noticeable elements: R = rotor, NL = navigation light, N = nacelle, H = hub, M = mid-tower light, O = OSS, and Y = yellow tower base color
[3] WTGs and offshore or onshore substation visibility: 0-Not visible. 1-Visible only after extended study; otherwise not visible. 2-Visible when viewing in general direction of the wind farm; otherwise likely to be missed by casual observer. 3-Visible after brief glance in general direction of the wind farm; unlikely to be missed by casual observer. 4-Plainly visible; could not be missed by casual observer but does not strongly attract visual attention or dominate view. 5-Strongly attracts viewers' attention to the wind farm; moderate to strong contrasts in form, line, color, or texture, luminance, or motion. 6-Dominates view; strong contrasts in form, line, color, texture, luminance, or motion fill most of the horizontal FOV or vertical FOV (NAEP 2012).
[4] Elevated observation deck or lighthouse.
NA = not applicable

The seascape character units, landscape character units, and viewer experiences would be affected by the Proposed Action's noticeable features, applicable distances and FOV extents, open views versus view framing and intervening foregrounds, and form, line, color, and texture contrasts, scale of change, and prominence in the characteristic seascape and landscape. Higher impact levels would stem from unique, extensive, and long-term appearance of strongly contrasting, large, and prominent vertical structures in the otherwise horizontal seascape environment; where structures are an unexpected element and viewer experience is of formerly open views of high-sensitivity seascape and landscape; and from high sensitivity view receptors.

Construction involving moving and stationary visual feature contrasts to forms, lines, colors, and textures, scale, and prominence in formerly open seascape may have more effect on viewers than operational and decommissioning impacts, where the viewing context is existing WTGs and substations. Construction impacts would be temporary and include:

- Daytime and nighttime movement of installation vessels, cranes, and other equipment visible in the seascape in and around the Lease Area;
- Dawn, dusk, and nighttime construction lighting on WTGs and OSS;
- Beach, other sensitive land-based, and boat and cruise ship views of WTGs and OSS under construction;
- Laying of the offshore and onshore buried export cables and the connections between offshore and onshore export cables at beach landing sites; and
- Activities along the onshore landfalls, export cable routes, and onshore substations.

Operational effects would be similar to those of end-stage construction and would be long term and fully reversible.

Proposed Action impacts on high-sensitivity seascape character would be **major**. The daytime and nighttime (lighting) presence of the WTGs, OSS, and construction and O&M vessel traffic would change perception of this area from natural, undeveloped seascape to a developed wind energy environment characterized by visually dominant WTGs and OSS.

Maintenance activities would cause **minor** effects on seascape character by increased O&M vessel traffic to and from the Wind Farm Development Area. Increases in these vessel movements would be noticeable to offshore viewers but are unlikely to have a significant effect.

Decommissioning would involve the removal of all offshore structures and is expected to follow the reverse of the construction activity. Decommissioning activities would cause effects similar to those of construction activities.

Viewshed analyses (COP Volume 3, Appendix AA; Empire 2023) determined that clear-weather visibility of the WTGs and OSS would occur from 12.5 percent of the land area within the Proposed Action's zone of visual influence. The Proposed Action would be visible along the barrier islands' southern beaches. The majority of landward visibility (155 square miles) would occur within 14.2–28 miles of the Proposed Action over inland bays. Visibility would diminish between 28 and 40 miles, contributing 44 square miles to the zone of visual influence. Elevated viewing conditions, such as would occur at the Fire Island Lighthouse (160 feet [48.5 meters]), Sandy Hook Lighthouse (108 feet [32.9 meters]), and Empire State Building (1,304 feet [397.5 meters]), would increase WTG visibility distances to as much as 42 miles (67.6 kilometers). Due to coastal meteorological conditions, Proposed Action visibility in these areas would be noticeably reduced on approximately 3 days out of 4 to 5 days.

Daytime lighting of WTGs is not required. ADLS would reduce nighttime impact levels from **major** to **moderate** or **moderate** to **minor**, due to substantially limited hours of lighting. Residual impacts would result from the presence of continuously flashing lights, sky light dome, and reflections on clouds during those limited hours. Lights of the two OSS, as required by the Occupational Safety and Health Administration for the safety of O&M personnel, potentially would be visible from beaches and adjoining land and built environment during hours of darkness. The nighttime sky light dome and cloud lighting caused by reflections from the water surface may be seen from distances beyond the 40-mile (64.4-kilometer) geographic analysis area, depending on variable ocean surface and meteorological reflectivity. Onshore substations' nighttime lighting would be visible in their immediate neighborhoods during hours of darkness and similar in magnitude and extent to existing conditions.

Table M-6 lists the Proposed Action's noticeable features based on their heights, distances, and EC.

Table M-6 Noticeable Elements and Impacts by Seascape Character Unit, Open Ocean Character Unit, Landscape Character Unit, and KOP for the Proposed Action

Noticeable Elements[1] Impacts	Seascape Units, Open Ocean Unit, Landscape Units, and Offshore and Onshore Key Observation Points
R, NL, N, H, M, O, Y **Major**	Open Ocean Character Unit: KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area KOP-17 Commercial and Cruise Ship Shipping Lanes
R, NL, N, H, M, O, Y **Moderate**	KOP-1 Empire State Building[2] (elevated view)
R, NL, N, H, M, O **Major**	Seascape Character Units: Beach and Islands KOP-3 Fire Island Lighthouse[2] (elevated view)
R, NL, N, H, M **Major**	KOP-7 Jones Beach State Park KOP-15 Sandy Hook Light-Gateway National Recreation Area[2] (elevated view)
R, NL, N, H, M **Moderate**	Landscape Character Units: Marshland, and Bay/Shoreline KOP-2 Floyd Bennett Field-Gateway National Recreation Area KOP-6 Jacob Riis Park-Gateway National Recreation Area KOP-8 Norman J Levy Park and Preserve KOP-11 Hartshorne Woods Park
R, NL, N, H **Moderate**	Landscape Character Units: Marshland, and Bay/Shoreline KOP-5 Heckscher State Park, New York KOP-10 Sunken Forest, New York KOP-12 Ocean Grove Beach KOP-13 Point Pleasant Beach KOP-14 North Beach-Gateway National Recreation Area
R, NL **Minor**	Landscape Character Units: Mainland and Ridges KOP-4 Great Kills Park-Gateway National Recreation Area KOP-9 Otis Pike Fire Island High Dune Wilderness

[1] R = rotor, NL = navigation light, N = nacelle, H = hub, M = mid-tower light, O = OSS, Y = yellow tower base color
[2] Elevated observation deck or lighthouse.

Table M-7 summarizes the Proposed Action's wind farm distance, percent of FOV occupied by the wind farm, and effects on the seascape units, open ocean unit, landscape units, and KOPs.

Table M-7 Wind Farm Distance Effects by Seascape Character Unit, Open Ocean Character Unit, Landscape Character Unit, and KOP for the Proposed Action

Distance miles (km) Noticeability Effects	Seascape Units, Open Ocean Unit, Landscape Units, and Offshore and Onshore Key Observation Points
0–40.0 (0–64.4) **Dominant/Major to Minor Noticeability**	Open Ocean Character Unit KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area KOP-17 Commercial and Cruise Ship Shipping Lanes
21.8 (35.1) (Elevated Observer) **Dominant/Major Noticeability**	KOP-3 Fire Island Lighthouse (eye level: 160 feet [48.8 meters] HAT)
24.5 (38.9) (Elevated Observer) **Dominant/Major Noticeability**	KOP-15 Sandy Hook Light-Gateway National Recreation Area (eye level: 108 feet [32.9 meters] HAT)
33.9 (54.6) (Elevated Observer)[1] **Moderate Noticeability**	KOP-1 Empire State Building (eye level: 1,304 feet [397.5 meters] HAT)[1]
14.1–30.7 (49.4–51.7) **Moderate Noticeability**	Seascape Character Units: Beachfront and Jetty/Seawall, Boardwalk, Coastal Dune, Island Community, Marshland, and Bay/Shoreline KOP-2 Floyd Bennett Field-Gateway National Recreation Area KOP-5 Heckscher State Park KOP-6 Jacob Riis Park-Gateway National Recreation Area KOP-7 Jones Beach State Park KOP-8 Norman J Levy Park and Preserve KOP-10 Sunken Forest KOP-11 Hartshorne Woods Park KOP-12 Ocean Grove Beach KOP-13 Point Pleasant Beach KOP-14 Sandy Hook–North Beach
32.1–40.0 (51.7–64.4) **Minor to Negligible Noticeability**	Landscape Character Units: Mainland and Ridges KOP-4 Great Kills Park-Gateway National Recreation Area KOP-9 Otis Pike Fire Island High Dune Wilderness

[1] The Empire State Building's upper observation view height includes 49 feet (14.9 meters) HAT, 1,250 feet (381 meters) floor elevation, and 5 feet (1.5 meters) human eye level.
HAT = highest astronomical tide

Table M-8 summarizes the Proposed Action's wind farm distance, percent of FOV occupied by the wind farm, and effects on the seascape units, landscape units, and KOPs.

Table M-8 Wind Farm Percent of FOV by Seascape Character Unit, Open Ocean Character Unit, Landscape Character Unit, and KOP for the Proposed Action

Percent (°) of 124° FOV POV[1]	Seascape Units, Open Ocean Unit, Landscape Units, and Offshore and Onshore Key Observation Points
100% (124°) to 16% (20°)	Open Ocean Character Unit KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area KOP-17 Commercial and Cruise Ship Shipping Lanes

Percent (°) of 124° FOV POV[1]	Seascape Units, Open Ocean Unit, Landscape Units, and Offshore and Onshore Key Observation Points
57° (46%) to 10° (8%)	Seascape Character Units: Beachfront and Jetty/Seawall, Boardwalk, Coastal Dune, Island Community Landscape Character Units[3]: Marshland, Bay/Shoreline, Mainland and Ridges KOP-1 Empire State Building (elevated view) KOP-2 Floyd Bennett Field-Gateway National Recreation Area KOP-3 Fire Island Lighthouse (elevated view) KOP-4 Great Kills Park-Gateway National Recreation Area KOP-5 Heckscher State Park KOP-6 Jacob Riis Park-Gateway National Recreation Area KOP-7 Jones Beach State Park KOP-8 Norman J Levy Park and Preserve KOP-9 Otis Pike Fire Island High Dune Wilderness KOP-10 Sunken Forest KOP-11 Hartshorne Woods Park KOP-12 Ocean Grove Beach KOP-13 Point Pleasant Beach KOP-14 North Beach-Gateway National Recreation Area KOP-15 Sandy Hook Light-Gateway National Recreation Area (elevated view)
Unseen[2]	Landscape Character Units[3]: Marshland, Bay/Shoreline, Mainland and Ridges

[1] Percent of view
[2] Seen, based on ArcGIS viewshed analyses.
[3] Unseen, based on ArcGIS viewshed analyses

Foreground influence assessments, involving the presence of intervening or framing elements and their influence on effects of Project characteristics, are based on each KOP's locale photography and visual simulations (COP Volume 3, Appendix AA; Empire 2023) and summarized in Table M-9.

Table M-9 Foreground View Framing and Intervening Elements for the Proposed Action Wind Farm

Foreground Element(s) Influence[1]	Seascape Units, Open Ocean Unit, Landscape Units, and Offshore and Onshore Key Observation Points
Open Ocean **Negligible Influence**	Open Ocean Character Unit: KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area KOP-17 Commercial and Cruise Ship Shipping Lanes

Foreground Element(s) Influence[1]	Seascape Units, Open Ocean Unit, Landscape Units, and Offshore and Onshore Key Observation Points
Beach, Dunes, and Ocean **Minor Influence**	Seascape Character Units: Beachfront and Jetty/Seawall, Boardwalk, and Coastal Dune KOP-4 Great Kills Park-Gateway National Recreation Area KOP-5 Heckscher State Park, New York KOP-7 Jones Beach State Park KOP-9 Otis Pike Fire Island High Dune Wilderness KOP-10 Sunken Forest, New York KOP-12 Ocean Grove Beach KOP-13 Point Pleasant Beach KOP-14 North Beach-Gateway National Recreation Area
Buildings, Landscape Structures, Vegetation, and Topography **Dominant/Major Influence**	KOP-2 Floyd Bennett Field-Gateway National Recreation Area
Buildings, Landscape Structures, Vegetation, and Topography **Minor to Moderate Influence**	Landscape Character Units: Island Community, Marshland, Bay/Shoreline, Mainland, and Ridges KOP-1 Empire State Building (elevated view) KOP-3 Fire Island Lighthouse (elevated view) KOP-6 Jacob Riis Park-Gateway National Recreation Area KOP-8 Norman J Levy Park and Preserve KOP-11 Hartshorne Woods Park KOP-15 Sandy Hook Lighthouse (elevated view)
Buildings, Landscape Structures, Vegetation, and Topography Screening **Unseen**[2]	Landscape Character Units: Island Community, Marshland, Bay/Shoreline, Mainland, and Ridges

[1] Based on conditions portrayed by representative photography contained in COP Volume 3, Appendix AA (Empire 2023). Nearby view receptor locations may vary from screened to open views of the wind farm.
[2] Based on ArcGIS viewshed analysis.

Proposed Action contrasts in the characteristic seascape and landscape, as perceived in views from each KOP, are based on visual simulations for eight representative KOPs (Appendix D to COP Volume 3, Appendix AA; Empire 2023). Open ocean unit view contrasts are estimated based on similar open view conditions in ocean environments. Landscape and seascape compatibility and photography conditions for each viewpoint are presented in COP Volume 3, Appendix AA, Table 9.1 (Empire 2023). The landscape and seascape evaluation scale ranges from faint, apparent, conspicuous, and prominent to dominant. No onshore substation viewpoints other than EW 2 Substation C viewpoints would result in either prominent or dominant conditions. Offshore potential viewpoints' evaluations range from faint to dominant. Visual contrast determinations involve comparisons of characteristics of the seascape and landscape before and after Proposed Action implementation. The range of potential contrasts includes strong, moderate, weak, and none. The strongest daytime contrasts would result from tranquil and flat seas combined with sunlit WTG towers, nacelles, rotating and flickering rotors, rotor shadow flicker, and the yellow tower 68.9-foot (21-meter) base color against a dark background sky and an undifferentiated foreground. The weakest daytime contrasts would result from turbulent seas combined with overcast daylight conditions on WTG towers, nacelles, and rotors again an overcast background sky and a foreground modulated by varied landscape elements. The strongest nighttime contrasts would result from dark skies (absent moonlight) combined with navigation lights, activated lighting on the OSS, mid-tower lights, and Project lighting

reflections on low clouds and active (non-reflective) surf, and the dark-sky light dome. The weakest nighttime contrasts would result from moonlit, cloudless skies, tranquil (reflective) seas, ADLS activation, and only mid-tower lights.

Photographic comparisons of characteristics of the seascape's and landscape's existing conditions and Proposed Action implementation are included in COP Volume 3, Appendix AA (Empire 2023) for eight of the 17 KOPs in the following summary tables. Visual contrast determinations are listed in Table M-10.

Table M-10 Visual Contrasts to Seascape, Open Ocean, Landscape, and KOPs for the Proposed Action

Contrast Rating Effects	Seascape, Open Ocean, Landscape, and Offshore and Onshore Key Observation Points
Strong Contrasts **Major**	Open Ocean Character Unit Seascape Character Units Landscape Character Units KOP-3 Fire Island Lighthouse (elevated view) KOP-7 Jones Beach State Park KOP-15 Sandy Hook Lighthouse (elevated view) KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area KOP-17 Commercial and Cruise Ship Shipping Lanes EW 2 Substation C: KOP-2 Long Beach Bridge KOP-3 Long Beach Skate Park **SBMT Staging Facility:** KOP-1 2nd Avenue, Brooklyn KOP-2 Columbia Street Esplanade, Brooklyn
Moderate Contrasts **Moderate**	Seascape Character Units: Beachfront and Jetty/Seawall, Boardwalk, and Coastal Dune Landscape Character Units: Island Community, Marshland, Bay/Shoreline, Mainland, and Ridges KOP-2 Floyd Bennett Field-Gateway National Recreation Area KOP-5 Heckscher State Park KOP-6 Jacob Riis Park-Gateway National Recreation Area KOP-8 Norman J Levy Park and Preserve KOP-10 Sunken Forest KOP-11 Hartshorne Woods Park KOP-12 Ocean Grove Beach KOP-13 Point Pleasant Beach KOP-14 North Beach-Gateway National Recreation Area **SBMT Staging Facility:** KOP-3 Hudson River Waterfront Walkway KOP-4 Statue of Liberty

Contrast Rating Effects	Seascape, Open Ocean, Landscape, and Offshore and Onshore Key Observation Points
Weak Contrasts **Minor**	**Landscape Character Units:** Island Community, Marshland, Bay/Shoreline, Mainland, and Ridges KOP-1 Empire State Building (elevated view) KOP-4 Great Kills Park-Gateway National Recreation Area KOP-9 Otis Pike Fire Island High Dune Wilderness **EW 1 Onshore Substation:** KOP-1 2nd Avenue, Brooklyn KOP-2 Columbia Street Esplanade, Brooklyn KOP-3 Hudson River Waterfront Walkway KOP-4 Statue of Liberty **EW 2 Onshore Substation A:** KOP-1 Residential Neighborhood/Oceanlea Drive KOP-2 Woodmere Dock/Residential Neighborhood KOP-3 Masone Point Beach/Residential Neighborhood **EW 2 Onshore Substation C:** KOP-1 Quebec Road/Residential Neighborhood KOP-4 Island Park Station/Residential Neighborhood
None (Unseen) **Negligible**	Unseen areas of Landscape Character Units

Table M-11 summarizes resource sensitivity, susceptibility, and magnitude of change in Proposed Action impacts on the seascape character units, open ocean character unit, and landscape character units throughout the geographic analysis area. The seascape, open ocean, and landscape criteria listed in Table M-1 and consideration of the preceding assessments would result in impact levels for character units as shown in Table M-11.

Table M-11 Proposed Action Impact on Seascape Character, Open Ocean Character, and Landscape Character

Level of Impact	Seascape Character Units, Open Ocean Character Unit, and Landscape Character Units
Major	SLIA: Open Ocean Character Unit
Moderate	SLIA: Seascape Character Units and Landscape Character Units: Beachfront and Jetty/Seawall, Boardwalk, Coastal Dune, and Island Community
Minor	SLIA: Landscape Character Units: Bay/Shoreline, Island, Mainland, Marshland, and Ridges
Negligible	SLIA: Landscape Character Units: Island, Mainland, and Ridges

Table M-12 summarizes Proposed Action impacts on viewer experience (KOP locations) throughout the geographic analysis area. The viewer experience criteria listed in Table M-1 and consideration of the preceding assessments would result in impact levels for KOPs as shown in Table M-12.

Table M-12 Proposed Action Impact on Viewer Experience

Impact Level	Offshore and Onshore Key Observation Points
Major	VIA: KOP-3 Fire Island Lighthouse, New York (elevated view) KOP-7 Jones Beach State Park, New York—Nighttime and Daytime KOP-15 Sandy Hook Light-Gateway National Recreation Area, New Jersey (elevated view) KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area KOP-17 Commercial and Cruise Ship Shipping Lanes **EW 2 Substation C:** KOP-2 Long Beach Bridge KOP-3 Long Beach Skate Park **SBMT Staging Facility:** KOP-1 2nd Avenue, Brooklyn KOP-2 Columbia Street Esplanade, Brooklyn
Moderate	**VIA:** KOP-1 Empire State Building (elevated view) KOP-2 Floyd Bennett Field-Gateway National Recreation Area KOP-5 Heckscher State Park KOP-6 Jacob Riis Park-Gateway National Recreation Area KOP-8 Norman J Levy Park and Preserve KOP-10 Sunken Forest KOP-11 Hartshorne Woods Park KOP-12 Ocean Grove Beach KOP-13 Point Pleasant Beach KOP-14 North Beach-Gateway National Recreation Area **SBMT Staging Facility:** KOP-3 Hudson River Waterfront Walkway KOP-4 Statue of Liberty
Minor	**VIA:** KOP-4 Great Kills Park-Gateway National Recreation Area KOP-9 Otis Pike Fire Island High Dune Wilderness **EW 1 Onshore Substation:** KOP-1 2nd Avenue, Brooklyn KOP-2 Columbia Street Esplanade, Brooklyn KOP-3 Hudson River Waterfront Walkway KOP-4 Statue of Liberty **EW 2 Onshore Substation A:** KOP-1 Residential Neighborhood/Oceanlea Drive KOP-2 Woodmere Dock/Residential Neighborhood KOP-3 Masone Point Beach/Residential Neighborhood **EW 2 Onshore Substation C:** KOP-4 Island Park Station/Residential Neighborhood

Impact Level	Offshore and Onshore Key Observation Points
Negligible	VIA: KOP-12 Ocean Grove Beach—Nighttime

Attachment M-1 portrays simulations of the incremental effects of the Projects in the context of other planned wind farms.

Consideration of effects of other planned wind farms on seascape character, open ocean character, and landscape character is listed in Table M-13.

Consideration of effects on viewer experience of other planned wind farms is listed in Table M-14.

Consideration of effects on seascape character, open ocean character, and landscape character of other planned wind farms in combination with the Proposed Action is listed in Table M-15.

Consideration of effects on viewer experience of other planned wind farms in combination with the Proposed Action is listed in Table M-16.

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Table M-13 Other Planned Wind Farms' Seascape, Open Ocean, and Landscape Units Cumulative Wind Farm Distances, FOVs, Noticeable Elements, Visual Contrasts, Scale of Change, and Prominence

Character Unit	Distance in miles (kilometers)[2,3]					FOV Degrees (% of 124°)	Noticeable Elements[4] & Impact Level	Visual Contrast, Scale of Change, and Prominence					
	ASN	OWE	VMA	AE	BWH			Form	Line	Color	Texture	Scale	Prominence[5]
New Jersey's Seascape (Beaches)[1]	47.6 (76.6)	63.6 (102.4)	41.9 (67.4)	53.7 (86.4)	60.5 (97.4)	None	None **Negligible**	None	None	None	None	1	0
Open Ocean	0.0 to 40.5 (0.0 to 65.2)	0.0 to 40.5 (0.0 to 65.2)	0.0 to 40.5 (0.0 to 65.2)	0.0 to 40.5 (0.0 to 65.2)	0.0 to 40.5 (0.0 to 65.2)	109° to 360° (88 to 290%)	R, NL, N, H, O, M, and Y to R **Major**	Strong	Strong	Strong	Strong	Large	6
New Jersey's Landscape[6]	47.8 (76.9)	63.8 (102.7)	42.1 (67.7)	53.9 (86.7)	60.7 (97.7)	None	None **Negligible**	None	None	None	None	Large	0
New York's Seascape (Beaches)[1]	65.3 (105.1)	54.9 (88.4)	32.3 (52.0)	54.7 (88.0)	64.9 (104.4)	33° (27%)	R **Minor**	Weak	Weak	Weak	Weak	Small	2
New York's Landscape[6]	65.5 (105.4)	55.1 (88.7)	32.5 (52.3)	54.9 (88.3)	65.1 (104.7)	33° (27%)	R **Minor**	Weak	Weak	Weak	Weak	Small	2

[1] The most conservative onshore case involves the seaward edge of the beach nearest the projects. The seascape unit edge is 3.45 miles (5.55 kilometers) offshore (New Jersey and New York jurisdictional boundaries). New Jersey's nearest beach (Sea Bright Beach) is 25.1 miles (40.1 kilometers) distant and New York's nearest beach (Jones Beach) is 14.1 miles (22.7 kilometers) distant from the Projects.
[2] AE = Attentive Energy LLC; ASN = Atlantic Shores North; BWH = Bight Wind Holdings; OWE = OW Ocean Winds East LLC; VMA = Vineyard Mid-Atlantic LLC
[3] Due to EC and known WTG heights, those WTGs beyond 40.5 miles (65.2 kilometers) would not be visible from ground level plus 5.5 feet (1.7 meters).
[4] Noticeable elements: R = rotor, NL = navigation light, N = nacelle, H = hub, O = OSS, M = mid-tower light, Y = yellow tower base color
[5] WTGs and OSS Prominence (visibility): 0 = Not visible. 1 = Visible only after extended study; otherwise not visible. 2 = Visible when viewing in general direction of the wind farm; otherwise likely to be missed by casual observer. 3 = Visible after brief glance in general direction of the wind farm; unlikely to be missed by casual observer. 4 = Plainly visible; could not be missed by casual observer, but does not strongly attract visual attention or dominate view. 5 = Strongly attracts viewers' attention to the wind farm; moderate to strong contrasts in form, line, color, or texture, luminance, or motion. 6 = Dominates view; strong contrasts in form, line, color, texture, luminance, or motion fill most of the horizontal FOV or vertical FOV (NAEP 2012).
[6] The seaward edge between landscape and seascape varies. The most conservative case is 0.2-mile (0.3-kilometer) distance from seaward beach edge.

Table M-14 Other Planned Wind Farms' Cumulative Viewer Experience Wind Farm Distances, FOVs, Noticeable Elements, Visual Contrasts, Scale of Change, and Prominence

Viewer[1]	Distance in miles (kilometers)[2,3]					FOV Degrees (% of 124°)	Noticeable Elements[4] & Impact Level	Visual Contrast, Scale of Change, and Prominence					
	ASN	OWE	VMA	AE	BWH			Form	Line	Color	Texture	Scale	Prominence[5]
KOP-3	76.5 (123.1)	45.7 (73.5)	24.0 (38.6)	55.7 (89.6)	67.1 (108.0)	33° (27%)	R, NL, N, H, O, and M[1] **Major**	Strong	Moderate	Strong	Moderate	Large	6
KOP-7	65.3 (105.1)	54.9 (88.4)	32.3 (52.0)	54.7 (88.0)	64.9 (104.4)	29° (23%)	R, NL, N, H, O, and M **Moderate**	Moderate	Weak	Moderate	Weak	Medium	6
KOP-12	37.7 (60.7)	61.5 (99.0)	41.9 (67.4)	48.2 (77.6)	54.1 (87.1)	11° (8%)	R, NL, N, and H **Negligible**	Weak	Weak	Weak	Weak	Small	2
KOP-13	30.1 (48.4)	61.4 (98.8)	44.1 (71.0)	45.7 (73.5)	50.1 (80.6)	13° (10%)	R and NL **Minor**	Weak	Weak	Weak	Weak	Small	3

[1] KOP-3 Fire Island Lighthouse (elevated view), KOP-7 Jones Beach State Park, KOP-12 Ocean Grove Beach, and KOP-13 Point Pleasant Beach
[2] AE = Attentive Energy LLC; ASN = Atlantic Shores North; BWH = Bight Wind Holdings; OWE = OW Ocean Winds East LLC; VMA = Vineyard Mid-Atlantic LLC
[3] Due to EC and known WTG heights, those WTGs beyond 40.5 miles (65.2 kilometers) would not be visible from ground level plus 5.5 feet (1.7 meters).
[4] Noticeable elements: R = rotor, NL = navigation light, N = nacelle, H = hub, O = OSS, M = mid-tower light, Y = yellow tower base color
[5] WTGs and OSS (onshore) visibility: 0 = Not visible. 1 = Visible only after extended study; otherwise not visible. 2 = Visible when viewing in general direction of the wind farm; otherwise likely to be missed by casual observer. 3 = Visible after brief glance in general direction of the wind farm; unlikely to be missed by casual observer. 4 = Plainly visible; could not be missed by casual observer, but does not strongly attract visual attention or dominate view. 5 = Strongly attracts viewers' attention to the wind farm; moderate to strong contrasts in form, line, color, or texture, luminance, or motion. 6 = Dominates view; strong contrasts in form, line, color, texture, luminance, or motion fill most of the horizontal FOV or vertical FOV (NAEP 2012)

Table M-15 Empire Wind and Other Planned Wind Farms' Seascape, Open Ocean, and Landscape Units Cumulative Wind Farm Distances, FOVs, Noticeable Elements, Visual Contrasts, Scale of Change, and Prominence

Character Unit	Distance in miles (kilometers)[2,3]						FOV Degrees (% of 124°)	Noticeable Elements[4] & Impact Level	Contrast, Scale of Change, and Prominence							
	EW	ASN	OWE	VMA	AE	BWH			Form	Line	Color	Texture	Scale	Prominence[5]	EW B, E, F	EW C, D, G, H
New Jersey's Seascape (Beaches) [1]	21.5 (34.3)	47.6 (76.6)	63.6 (102.4)	41.9 (67.4)	53.7 (86.4)	60.5 (97.4)	129° (104%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
Open Ocean	0.0 to 40.5 (0.0 to 65.2)	0.0 to 40.5 (0 to 65.2)	0.0 to 40.5 (0 to 65.2)	0.0 to 40.5 (0 to 65.2)	0.0 to 40.5 (0 to 65.2)	0.0 to 40.5 (0 to 65.2)	109° to 360° (88 to 290%)	R, NL, N, H, O, M, Y to R **Major to Minor**	Strong to Weak	Strong to Weak	Strong to Weak	Strong to Weak	Large to Small	6 to 2	Same as Proposed Action	Same as Proposed Action
New Jersey's Landscape[6]	21.7 (34.6)	47.8 (76.9)	63.8 (102.7)	42.1 (67.7)	53.9 (86.7)	60.7 (97.7)	129° (104%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
New York's Seascape (Beaches)[1]	14.1 (22.7)	65.3 (105.1)	54.9 (88.4)	32.3 (52.0)	54.7 (88.0)	64.9 (104.4)	49° (39%)	R, NL, N, H, M, O **Major**	Strong	Moderate	Strong	Moderate	Medium	6	Same as Proposed Action	Same as Proposed Action
New York's Landscape[6]	14.3 (23.0)	65.5 (105.4)	55.1 (88.7)	32.5 (52.3)	54.9 (88.3)	65.1 (104.7)	49° (39%)	R, NL, N, H, M, O **Major**	Strong	Moderate	Strong	Moderate	Medium	6	Same as Proposed Action	Same as Proposed Action

[1] The most conservative onshore case involves the seaward edge of the beach nearest the projects. The seascape unit edge is 3.45 miles (5.55 kilometers) offshore (New Jersey and New York jurisdictional boundaries). New Jersey's nearest beach (Sea Bright Beach) is 25.1 miles (40.1 kilometers) distant and New York's nearest beach (Jones Beach) is 14.1 miles (22.7 kilometers) distant from the Projects.
[2] AE = Attentive Energy LLC; ASN = Atlantic Shores North; BWH = Bight Wind Holdings; EW = Empire Wind; OWE = OW Ocean Winds East LLC; VMA = Vineyard Mid-Atlantic LLC
[3] Due to EC and known WTG heights, those WTGs beyond 40.5 miles (65.2 kilometers) would not be visible from ground level plus 5.5 feet (1.7 meters).
[4] Noticeable elements: R = rotor, NL = navigation light, N = nacelle, H = hub, O = OSS, M = mid-tower light, Y = yellow tower base color
[5] WTGs and OSS (onshore) visibility: 0 = Not visible. 1 = Visible only after extended study; otherwise not visible. 2 = Visible when viewing in general direction of the wind farm; otherwise likely to be missed by casual observer. 3 = Visible after brief glance in general direction of the wind farm; unlikely to be missed by casual observer. 4 = Plainly visible; could not be missed by casual observer, but does not strongly attract visual attention or dominate view. 5 = Strongly attracts viewers' attention to the wind farm; moderate to strong contrasts in form, line, color, or texture, luminance, or motion. 6 = Dominates view; strong contrasts in form, line, color, texture, luminance, or motion fill most of the horizontal FOV or vertical FOV (NAEP 2012).
[6] The seaward edge between landscape and seascape varies. The most conservative case is 0.2-mile (0.3-kilometer) distance from seaward beach edge.

Table M-16 Empire Wind and Other Planned Wind Farms' Cumulative Viewer Experience Wind Farm Distances, FOVs, Noticeable Elements, Visual Contrasts, Scale of Change, and Prominence

Viewer[1]	Distance in miles (kilometers)[2,3]						FOV Degrees (% of 124°)	Noticeable Elements[4] & Impact Level	Contrast, Scale of Change, and Prominence							
	EW	ASN	OWE	VMA	AE	BWH			Form	Line	Color	Texture	Scale	Prominence[5]	EW B, E, F	EW C, D, G, H
KOP-3	21.8 (35.1)	76.5 (123.1)	45.7 (73.5)	24.0 (38.6)	55.7 (89.6)	67.1 (108.0)	61° (49%)	R, NL, N, H, O, and M **Major**	Strong	Moderate	Strong	Moderate	Large	6	Same as Proposed Action	Same as Proposed Action
KOP-7	14.1 (22.7)	65.3 (105.1)	54.9 (88.4)	32.3 (52.0)	54.7 (88.0)	64.9 (104.4)	49° (39%)	R, NL, N, H, M, O **Major**	Strong	Moderate	Strong	Moderate	Medium	6	Same as Proposed Action	Same as Proposed Action
KOP-12	25.4 (40.9)	37.7 (60.7)	61.5 (99.0)	41.9 (67.4)	48.2 (77.6)	54.1 (87.1)	129° (104%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action
KOP-13	30.7 (49.4)	30.1 (48.4)	61.4 (98.8)	44.1 (71.0)	45.7 (73.5)	50.1 (80.6)	138° (112%)	R, NL, N, H **Moderate**	Moderate	Weak	Moderate	Weak	Medium	3	Same as Proposed Action	Same as Proposed Action

[1] KOP-3 Fire Island Lighthouse (elevated view), KOP-7 Jones Beach State Park, KOP-12 Ocean Grove Beach, and KOP-13 Point Pleasant Beach
[2] AE = Attentive Energy LLC; ASN = Atlantic Shores North; BWH = Bight Wind Holdings; EW = Empire Wind; OWE = OW Ocean Winds East LLC; VMA = Vineyard Mid-Atlantic LLC
[3] Due to EC and known WTG heights, those WTGs beyond 40.5 miles (65.2 kilometers) would not be visible from ground level plus 5.5 feet (1.7 meters).
[4] Noticeable elements: R = rotor, NL = navigation light, N = nacelle, H = hub, O = OSS, M = mid-tower light, Y = yellow tower base color
[5] WTGs and OSS (onshore) visibility: 0 = Not visible. 1 = Visible only after extended study; otherwise not visible. 2 = Visible when viewing in general direction of the wind farm; otherwise likely to be missed by casual observer. 3 = Visible after brief glance in general direction of the wind farm; unlikely to be missed by casual observer. 4 = Plainly visible; could not be missed by casual observer, but does not strongly attract visual attention or dominate view. 5 = Strongly attracts viewers' attention to the wind farm; moderate to strong contrasts in form, line, color, or texture, luminance, or motion. 6 = Dominates view; strong contrasts in form, line, color, texture, luminance, or motion fill most of the horizontal FOV or vertical FOV (NAEP 2012).

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M.3.2 Impacts of Alternative B on Scenic and Visual Resources

Visual contrast assessments and form, line, color, and texture comparisons of characteristics of the seascape, open ocean, and landscape before and after implementation of Alternative B are indicated in Table M-5. There would be a slight difference in contrasts between Alternative B and the Proposed Action due to alteration of the turbine array layout. Table M-17 and Table M-18 list Alternative B wind farm width-, height-, and distance-related occupation of views from the nearest shoreline area. Distance and FOV comparisons with the Proposed Action indicate similar effects, varying by 3.1 miles (5 kilometers) and the horizontal FOVs would vary by 3°. The vertical FOVs would vary by less than 1° (0.1° variation) of the viewer FOV. These results indicate slight changes to the FOV results compared to the Proposed Action (Table M-3 and Table M-4).

Table M-17 Horizontal FOV Occupied by Alternative B

Noticeable Element	Width[1] miles (km)	Distance[2] miles (km)	Horizontal FOV	Human FOV	Percent of FOV
WTGs	22.5 (36.2)	14.1 (22.7)	57.9°	124°	47%

[1] Maximum extent of the wind farm array.
[2] Nearest onshore distance to the wind farm array.
km = kilometers

Table M-18 Vertical FOV Occupied by Alternative B

Noticeable Element	Height feet (m) MLLW	Distance miles (km)	Visible Height[1] feet (m)	Vertical FOV	Human FOV	Percent of FOV
Rotor Blade Tip	951 (289.9)	14.1 (22.7)	865 (264)	0.6°	55°	1%

[1] Based on intervening EC, clear-day, and clear-night conditions.
km = kilometers; m = meters

M.3.2.1. Conclusion

The effects of Alternative B on seascape character, open ocean character, landscape character, and viewer experience would be similar to the effects of the Proposed Action. Due to distance, extensive FOVs, high view prominence, strong contrasts, and heretofore undeveloped ocean views, Alternative B would have **major** effects on the open ocean unit character and viewer boating and cruise ship experiences. Due to view distances, moderate FOVs, moderate and weak visual contrasts, clear-day conditions, and nighttime ADLS activation, effects of Alternative B on high- and moderate-sensitivity landscape character units would be **moderate** to **major**. The daytime presence of offshore WTGs and OSS, as well as their nighttime lighting, would change perception of ocean scenes from natural and undeveloped to a developed wind energy environment characterized by WTGs and OSS. In clear weather, the WTGs and OSS would be an unavoidable presence in views from the coastline, with **moderate** to **major** effects on landscape character.

Considering all the IPFs together, BOEM anticipates that the contribution of Alternative B to the impacts associated with ongoing and planned activities in combination with other future offshore wind development would be **major**. The main drivers for this impact rating are the major visual impacts associated with the presence of offshore structures, lighting, and vessel traffic.

M.3.3 Impacts of Alternative E on Scenic and Visual Resources

The effects of Alternative E on seascape character, open ocean character, landscape character, and viewer experience would be similar to the effects of the Proposed Action. Alternative E would alter the turbine array layout compared to the Proposed Action; however, Alternative E would allow for installation of up to 147 WTGs as defined in Empire's PDE. Table M-19 and Table M-20 list Alternative E wind farm width-, height-, and distance-related occupation of views from the nearest shoreline area. Distance and FOV comparisons would be the same as those of the Proposed Action. The vertical FOVs would be the same as for the Proposed Action.

Impacts of Alternative E related to the primary IPFs (presence of structures, lighting, vessel traffic, land disturbance, and accidental releases) would be similar to the impacts described for the Proposed Action. The seascape character units, open ocean character unit, landscape character units, and viewer experience would be affected by construction, O&M, and decommissioning of Alternative E due to the noticeable elements, distance effects, FOV extents, view framing and intervening foregrounds, prominence, and contrast rating.

Horizontal and vertical FOV extents (Table M-19 and Table M-20) of the Alternative E wind farm would be the same as for the Proposed Action (Table M-3 and Table M-4).

Table M-19 Horizontal FOV Occupied by Alternative E

Noticeable Element	Width[1] miles (km)	Distance[2] miles (km)	Horizontal FOV	Human FOV	Percent of FOV
WTGs	25.6 (41.2)	14.1 (22.7)	61.1°	124°	49%

[1] Maximum extent of the wind farm array.
[2] Nearest onshore distance to the wind farm array.
km = kilometers

Table M-20 Vertical FOV Occupied by Alternative E

Noticeable Element	Height feet (m) MLLW	Distance miles (km)	Visible Height[1] feet (m)	Vertical FOV	Human FOV	Percent of FOV
Rotor Blade Tip	951 (289.9)	14.1 (22.7)	865 (264)	0.6°	55°	1%

[1] Based on intervening EC, clear-day, and clear-night conditions.
km = kilometers; m = meters

M.3.3.1. Conclusions

The effects of Alternative E on seascape character, open ocean character, landscape character, and viewer experience would be similar to the effects of the Proposed Action. Due to distance, extensive FOVs, high view prominence, strong contrasts, and heretofore undeveloped ocean views, Alternative E would have **major** effects on the open ocean unit character and viewer boating and cruise ship experiences. Due to view distances, moderate FOVs, moderate and weak visual contrasts, clear-day conditions, and nighttime ADLS activation, effects of Alternative E on high- and moderate-sensitivity landscape character units would be **moderate** to **major**. The daytime presence of offshore WTGs and OSS, as well as their nighttime lighting, would change perception of ocean scenes from natural and undeveloped to a developed wind energy environment characterized by WTGs and OSS. In clear weather, the WTGs and OSS would be an unavoidable presence in views from the coastline, with **moderate** to **major** effects on seascape and landward landscape character.

Considering all the IPFs together, BOEM anticipates that the contribution of Alternative E to the impacts associated with ongoing and planned activities in combination with other future offshore wind development would be **major**. The main drivers for this impact rating are the major visual impacts associated with the presence of offshore structures, lighting, and vessel traffic.

M.3.4 Impacts of Alternative F on Scenic and Visual Resources

Table M-21 and Table M-22 list Alternative F wind farm width-, height-, and distance-related occupation of views from the nearest shoreline area. Distance and FOV comparisons with the Proposed Action indicate similar effects, varying by 3.1 miles (5 kilometers) and the horizontal FOVs would vary by 3°. The vertical FOVs would vary by less than 1° of the viewer FOV. These results indicate slight changes to the FOV results compared to the Proposed Action (Table M-3 and Table M-4).

Impacts of Alternative F related to the primary IPFs (presence of structures, lighting, vessel traffic, land disturbance, and accidental releases) would be similar to the impacts described for the Proposed Action. The seascape character units, open ocean character unit, landscape character units, and viewer experience would be affected by construction, O&M, and decommissioning of Alternative F due to the noticeable elements, distance effects, FOV extents, view framing and intervening foregrounds, prominence, and contrast rating effects.

The effects of Alternative F on seascape character, open ocean character, landscape character, and viewer experience would be similar to the effects of the Proposed Action. Alternative F would alter the turbine array layout compared to the Proposed Action; however, Alternative F would allow for installation of up to 147 WTGs as defined in Empire's PDE. Horizontal and vertical FOV extent (Table M-21 and Table M-22) differences between Alternative F and the Proposed Action (Table M-3 and Table M-4) would not be noticeable to the casual viewer at applicable seascape receptor distances to the WTG array.

Table M-21 Horizontal FOV Occupied by Alternative F

Noticeable Element	Width[1] miles (km)	Distance[2] miles (km)	Horizontal FOV	Human FOV	Percent of FOV
WTGs	24 (38.6)	14.1 (22.7)	59.6°	124°	48%

[1] Maximum extent of the wind farm array.
[2] Nearest onshore distance to the wind farm array.
km = kilometers

Table M-22 Vertical FOV Occupied by Alternative F

Noticeable Element	Height feet (m) MLLW	Distance miles (km)	Visible Height[1] feet (m)	Vertical FOV	Human FOV	Percent of FOV
Rotor Blade Tip	951 (289.9)	14.1 (22.7)	865 (264)	0.6°	55°	1%

[1] Based on intervening EC, clear-day, and clear-night conditions.
km = kilometers; m = meters

M.3.4.1. Conclusions

The effects of Alternative F on seascape character, open ocean character, landscape character, and viewer experience would be similar to the effects of the Proposed Action. Due to distance, extensive FOVs, high view prominence, strong contrasts, and heretofore undeveloped ocean views, Alternative F would have **major** effects on the open ocean unit character and viewer boating and cruise ship experiences. Due to view distances, moderate FOVs, moderate and weak visual contrasts, clear-day conditions, and nighttime

ADLS activation, effects of Alternative F on high- and moderate-sensitivity landscape character units would be **moderate** to **major**. The daytime presence of offshore WTGs and OSS, as well as their nighttime lighting, would change perception of ocean scenes from natural and undeveloped to a developed wind energy environment characterized by WTGs and OSS. In clear weather, the WTGs and OSS would be an unavoidable presence in views from the coastline, with **moderate** to **major** effects on seascape and landward landscape character.

Considering all the IPFs together, BOEM anticipates that the contribution of Alternative F to the impacts associated with ongoing and planned activities in combination with other future offshore wind development would be **major**. The main drivers for this impact rating are the major visual impacts associated with the presence of offshore structures, lighting, and vessel traffic.

M.3.5 Impacts of Alternatives C, D, G, and H on Scenic and Visual Resources

Alternatives C, D, and G involve selection of specific submarine export cable or onshore export cable routes to avoid impacts on federally maintained anchorage area (Alternative C-1), navigation channel (Alternative C-2), or sand borrow areas (Alternative D), or use a cable bridge to cross Barnums Channel (Alternative G). Alternative H would use a method of dredge or fill activities (clamshell dredging with environmental bucket) that would reduce the discharge of dredged material compared to other dredging options considered in the Empire Wind PDE (i.e., open cut trenching/jetting, suction hopper dredging, hydraulic dredging). None of these alternatives would add or modify above-water or aboveground infrastructure included in the PDE for the Proposed Action and impacts of Alternatives C, D, G, or H on scenic and visual resources would be the same as described for the Proposed Action. Impacts of Alternatives C, D, G, or H related to the primary IPFs (presence of structures, lighting, vessel traffic, and accidental releases) would also be similar to the impacts described for the Proposed Action.

M.3.5.1. Conclusions

The effects of Alternatives C, D, G, or H on seascape character, open ocean character, landscape character, and viewer experience would be similar to the effects of the Proposed Action. Due to distance, extensive FOVs, high view prominence, strong contrasts, and heretofore undeveloped ocean views, Alternatives C, D, G, or H would have **major** effects on the open ocean unit character and viewer boating and cruise ship experiences. Due to view distances, moderate FOVs, moderate and weak visual contrasts, clear-day conditions, and nighttime ADLS activation, effects of Alternatives C, D, G, or H on high- and moderate-sensitivity seascape character units would be **moderate** to **major**. The daytime presence of offshore WTGs and OSS, as well as their nighttime lighting, would change perception of ocean scenes from natural and undeveloped to a developed wind energy environment characterized by WTGs and OSS. In clear weather, the WTGs and OSS would be an unavoidable presence in views from the coastline, with **moderate** to **major** effects on seascape character.

Considering all the IPFs together, BOEM anticipates that the contribution of Alternative C, D, G, or H to the impacts associated with ongoing and planned activities in combination with other future offshore wind development would be **major**. The main drivers for this impact rating are the major visual impacts associated with the presence of offshore structures, lighting, and vessel traffic.

M.3.6 Impacts of the Connected Action on Scenic and Visual Resources

View distances, facility scale, view prominence, and visual contrasts (form, line, color, and texture comparisons) of characteristics of the seascape and landscape before and after implementation of the SBMT staging facility are indicated in Table M-5. Table M-10 lists visual contrasts as would be experienced from four representative KOPs: SBMT Staging Facility KOP-1 2nd Avenue, Brooklyn; SBMT Staging Facility KOP-2 Columbia Street Esplanade, Brooklyn; SBMT Staging Facility KOP-3

Hudson River Waterfront Parkway; and SBMT Staging Facility KOP-4 Statue of Liberty. Table M-12 lists impacts on viewer experience at each of these KOPs.

M.3.6.1. Conclusions

Due to nearness of view distances, large scale, high view prominence, and moderate to strong contrasts, the SBMT staging facility would have **moderate** to **major** effects on the seascape unit character, **minor** effects on the landscape character unit, and **moderate** to **major** effects on viewer experience. The daytime presence of moving and stationary cranes, storage and transfer of WTG components, moving and stationary barges and ships, and associated nighttime lighting would be moderately to strongly contrasting with the seascape. In clear weather, the SBMT staging facility would be an unavoidable presence in views from the water and from onshore sea level and elevated viewing locations, with **moderate** to **major** effects on seascape character.

Considering all the IPFs together, BOEM anticipates that the contribution of the SBMT staging facility activities to the impacts associated with ongoing and planned activities in combination with other future offshore wind development would be **major**. The main drivers for this impact rating are the major visual impacts associated with the presence of onshore equipment and WTGs, lighting, and offshore vessel traffic.

M.4. SLIA Summary

SLIA considers resource sensitivity, susceptibility, and magnitude of change in the impacts on the physical elements and features that make up a seascape, open ocean, or landscape and the aesthetic, perceptual, and experiential aspects of the seascape, open ocean, or landscape that contribute to its distinctive character. These impacts affect the “feel,” “character,” or “sense of place” of an area of seascape, open ocean, or landscape. Table M-23 summarizes the effects of the character of the offshore and onshore components of the Projects with the aspects that contribute to the distinctive character of the seascape, open ocean, and landscape areas from which the Projects would be visible (BOEM 2021).

Table M-23 Seascape Character, Open Ocean Character, Landscape Character and Impact Levels

Character Unit	Affected Environment						Proposed Action															Impact Levels				
	Unit Susceptibility			Unit Value			Project Visibility				Character Key Feature Change			Character Key Element Change			Character Key Quality Change			Proposed Action				Alternatives B, C, D, E, F, and G
	High	Medium	Low	High	Medium	Low	Dominant	Substantial	Low	Unseen	High	Medium	Low	High	Medium	Low	High	Medium	Low	Major	Moderate	Minor	Negligible	Impact Level
Open Ocean	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Ocean	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Beachfront	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Boardwalks/Jetties/ Seawalls	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Dunes	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Commerce	X				X		X				X			X			X			X				Same as Proposed Action
Seascape Institutional	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Municipal	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Parks	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Preserves	X			X			X				X			X			X			X				Same as Proposed Action
Seascape Residential	X			X			X				X			X			X			X				Same as Proposed Action

Character Unit	Affected Environment						Proposed Action															Impact Levels				
	Unit Susceptibility			Unit Value			Project Visibility				Character Key Feature Change			Character Key Element Change			Character Key Quality Change			Proposed Action				Alternatives B, C, D, E, F, and G
	High	Medium	Low	High	Medium	Low	Dominant	Substantial	Low	Unseen	High	Medium	Low	High	Medium	Low	High	Medium	Low	Major	Moderate	Minor	Negligible	Impact Level
Landscape Bay/ Estuary/Marsh	X			X				X				X			X			X			X			Same as Proposed Action
Landscape River	X			X				X				X			X			X			X			Same as Proposed Action
Landscape Agriculture			X			X		X				X			X			X			X			Same as Proposed Action
Landscape Commerce			X			X		X				X			X			X			X			Same as Proposed Action
Landscape Forest		X		X					X				X			X			X					Same as Proposed Action
Landscape Institutional	X			X				X				X			X			X			X			Same as Proposed Action
Landscape Park	X			X				X				X			X			X			X			Same as Proposed Action
Landscape Preserve	X			X				X				X			X			X			X			Same as Proposed Action
Landscape Recreation		X			X			X				X			X			X			X			Same as Proposed Action
Landscape Residential	X			X				X				X			X			X			X			Same as Proposed Action

M.5. VIA Summary

The VIA considers the characteristics of the view receptor, characteristics of the view toward the Project facilities, and the experiential impacts of the Projects. Table M-24 summarizes the viewer sensitivity, view receptor susceptibility, view value, and summary of the measures of effects from the visible character and magnitude of the offshore and onshore components of the Projects (BOEM 2021).

Table M-24 Viewer Sensitivity, Receptor Susceptibility, View Value, Viewer Experience, and Impact Levels

KOP[1]	Affected Environment									Viewer Experience				Impact Levels				
	Viewer Sensitivity			Receptor Susceptibility			View Value			Distance-Noticeable Elements-HFOV-VFOV-Contrast-Scale-Prominence Effects				Proposed Action				Alternatives B, C, D, E, F, and G
	High	Medium	Low	High	Medium	Low	High	Medium	Low	Dominant	Substantial	Low	Unseen	Major	Moderate	Minor	Negligible	Impact Levels
KOP-1[2]	X			X			X				X				X			Same as Proposed Action
KOP-2	X				X		X				X				X			Same as Proposed Action
KOP-3[2]	X			X			X				X			X				Same as Proposed Action
KOP-4	X					X	X					X				X		Same as Proposed Action
KOP-5	X				X		X				X				X			Same as Proposed Action
KOP-6	X				X		X				X				X			Same as Proposed Action
KOP-7	X			X			X			X				X				Same as Proposed Action
KOP-8	X			X			X			X					X			Same as Proposed Action
KOP-9	X					X	X				X					X		Same as Proposed Action
KOP-10	X				X		X				X				X			Same as Proposed Action
KOP-11	X				X		X				X				X			Same as Proposed Action
KOP-12	X				X		X				X				X			Same as Proposed Action
KOP-13	X				X		X				X				X			Same as Proposed Action
KOP-14	X				X		X				X				X			Same as Proposed Action
KOP-15[2]	X			X			X			X				X				Same as Proposed Action
KOP-16	X			X			X			X				X				Same as Proposed Action
KOP-17	X			X			X			X				X				Same as Proposed Action
EW1 KOP-1			X		X			X			X					X		Same as Proposed Action
EW1 KOP-2			X		X			X			X					X		Same as Proposed Action
EW1 KOP-3	X				X			X			X					X		Same as Proposed Action
EW1 KOP-4[2]	X				X		X					X				X		Same as Proposed Action

KOP[1]	Affected Environment									Viewer Experience				Impact Levels				
	Viewer Sensitivity			Receptor Susceptibility			View Value			Distance-Noticeable Elements-HFOV-VFOV-Contrast-Scale-Prominence Effects				Proposed Action				Alternatives B, C, D, E, F, and G
	High	Medium	Low	High	Medium	Low	High	Medium	Low	Dominant	Substantial	Low	Unseen	Major	Moderate	Minor	Negligible	Impact Levels
EW2A KOP-1			X		X			X			X					X		Same as Proposed Action
EW2A KOP-2		X			X		X				X					X		Same as Proposed Action
EW2A KOP-3		X			X			X			X					X		Same as Proposed Action
EW2C KOP-1			X		X			X			X				X			Same as Proposed Action
EW2C KOP-2		X			X			X		X				X				Same as Proposed Action
EW2C KOP-3		X			X		X			X				X				Same as Proposed Action
EW2C KOP-4		X			X			X			X				X			Same as Proposed Action
SBMT KOP-1			X	X				X		X				X				NA
SBMT KOP-2			X	X					X	X				X				NA
SBMT KOP3	X			X			X				X				X			NA
SBMT KOP-4	X			X			X				X				X			NA

[1] KOP-1 Empire State Building; KOP-2 Floyd Bennet Field-Gateway National Recreation Area; KOP-3 Fire Island Lighthouse; KOP-4 Great Kills Park-Gateway National Recreation Area; KOP-5 Heckscher State Park; KOP-6 Jacob Riis Park-Gateway National Recreation Area; KOP-7 Jones Beach State Park; KOP-8 Norman J Levy Park and Preserve; KOP-9 Otis Pike Fire Island High Dune Wilderness; KOP-10 Sunken Forest; KOP-11 Hartshorne Wood Park; KOP-12 Ocean Grove Beach; KOP-13 Point Pleasant Beach; KOP-14 North Beach-Gateway National Recreation Area; KOP-15 Sandy Hook Light-Gateway National Recreation Area; KOP-16 Recreational Fishing, Pleasure, and Tour Boat Area; KOP-17 Commercial and Cruise Ship Shipping Lanes; EW1 KOP-1 2nd Avenue, Brooklyn; EW1 KOP-2 Columbia Street Esplanade, Brooklyn; EW1 KOP-3 Hudson River Waterfront Parkway; EW1 KOP-4 Statue of Liberty; EW2A KOP-1 Oceanlea Drive/Residential Neighborhood; EW2A KOP-2 Woodmere Dock Residential Neighborhood; EW2A KOP-3 Masone Point Beach/Residential Neighborhood; EW2C KOP-1 Quebec Road/Residential Neighborhood; EW2C KOP-2 Long Beach Bridge; EW2C KOP-3 Long Beach Skate Park; EW2C KOP-4 Island Park Station; SBMT Staging Facility KOP-1 2nd Avenue, Brooklyn; SBMT Staging Facility KOP-2 Columbia Street Esplanade, Brooklyn; SBMT Staging Facility KOP-3 Hudson River Waterfront Parkway; SBMT Staging Facility KOP-4 Statue of Liberty
[2] Elevated observation deck or lighthouse.
HFOV = horizontal field of view; NA = not applicable; VFOV = vertical field of view

M.6. References

Bureau of Ocean Energy Management (BOEM). 2021. *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States*. OCS Study BOEM 2021-032. April.

Empire Offshore Wind, LLC (Empire). 2023. *Empire Offshore Wind: Empire Wind Project (EW1 and EW2), Construction and Operations Plan*. Available: https://www.boem.gov/renewable-energy/empire-wind-construction-and-operations-plan.

National Association of Environmental Professionals. (NAEP). 2012. *Offshore Wind Turbine Visibility and Visual Impact Thresholds*. Available: https://blmwyomingvisual.anl.gov/docs/EnvPractice_Offshore%20Wind%20Turbine%20Visibility%20and%20Visual%20Impact%20Threshold%20Distances.pdf.

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ATTACHMENT M-1
CUMULATIVE VISUAL SIMULATIONS

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equinor

EMPIRE OFFSHORE WIND

CUMULATIVE EFFECTS SIMULATION

March 2022

EMPIRE OFFSHORE WIND
CUMULATIVE EFFECTS

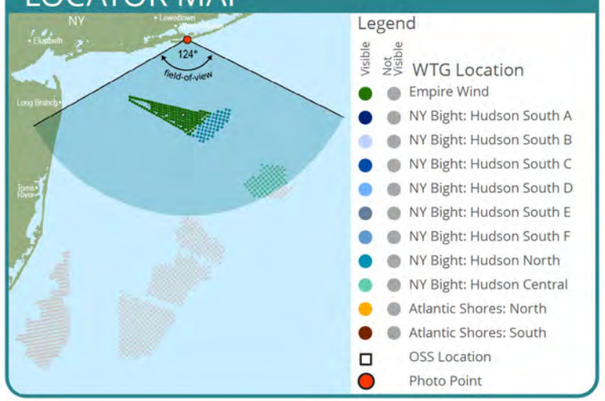
TABLE OF CONTENTS

EXISTING CONDITION

KOP 1

View of the existing condition at Fire Island Lighthouse

LOCATOR MAP



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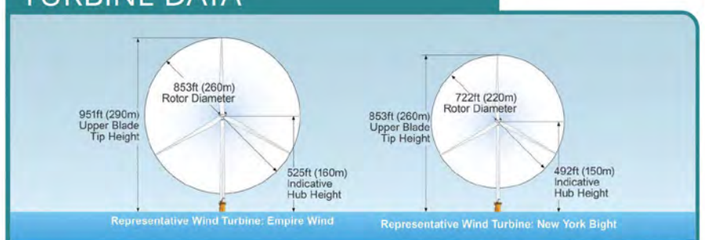


	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Empire Offshore Wind	21.7	29.6
New York Bight - Hudson North	24.3	32.1
New York Bight - Hudson Central	45.9	60.5

PHOTOGRAPH INFORMATION

Viewpoint Location:	Fire Island Lighthouse
Date of Photograph:	February 10, 2022
Time of Photograph:	9:20 AM
Weather Condition:	Partly Cloudy
Temperature	35° F
Humidity	96%
Latitude:	40.632216° N
Longitude:	-73.218455° W

	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens	NIKKOR Z 50mm f/1.8		
Focal Length	50 mm		
Viewing Direction:	South		
Ground Elevation + Tripod Height:	160 feet		

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

SIMULATION 1A.1: EMPIRE WIND

Simulation illustrating Empire Wind without other foreseeable future changes

COMPLETE PANORAMIC VIEW

SIMULATION 1A.2: EMPIRE WIND + NY BIGHT

Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

COMPLETE PANORAMIC VIEW

SIMULATION 1A.2: EMPIRE WIND + NY BIGHT *(Annotated)*

Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind. NY Bight Hudson Central is not present in this view.

COMPLETE PANORAMIC VIEW

SIMULATION 1A.3: NY BIGHT

Simulation illustrating full lease buildout not including Empire Wind

COMPLETE PANORAMIC VIEW

KOP 1A

SIMULATION 1A.3: NY BIGHT *(Annotated)*

Simulation illustrating full lease buildout not including Empire Wind. NY Bight Hudson Central is not present in this view.

COMPLETE PANORAMIC VIEW

SIMULATION 1B.1: EMPIRE WIND

Simulation illustrating Empire Wind without other foreseeable future changes

COMPLETE PANORAMIC VIEW

SIMULATION 1B.2: EMPIRE WIND + NY BIGHT

Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

COMPLETE PANORAMIC VIEW

KOP 1B

SIMULATION 1B.2: EMPIRE WIND + NY BIGHT *(Annotated)*

Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

COMPLETE PANORAMIC VIEW

KOP 1B

SIMULATION 1B.3: NY BIGHT

Simulation illustrating full lease buildout not including Empire Wind

COMPLETE PANORAMIC VIEW

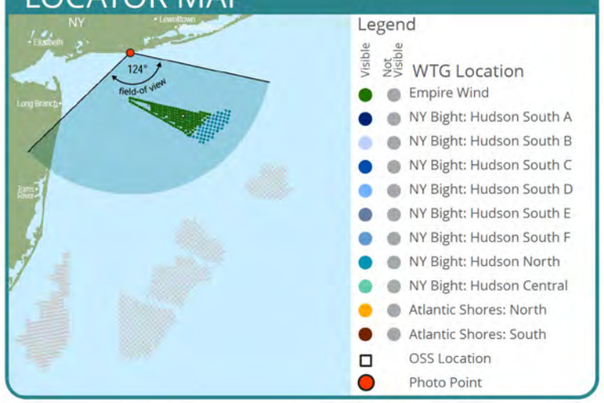
SIMULATION LOCATION 2: JONES BEACH STATE PARK

KOP 2

EXISTING CONDITION

View of the existing condition at Jones Beach State Park

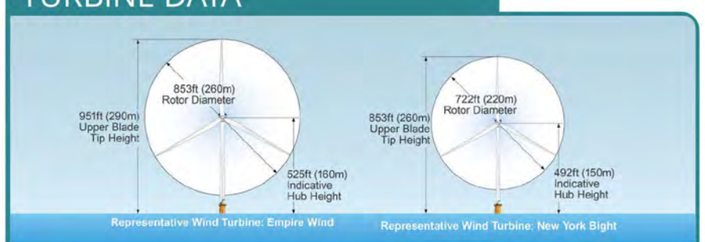
LOCATOR MAP



Legend

Visible	Not Visible	WTG Location
●	●	Empire Wind
●	●	NY Bight: Hudson South A
●	●	NY Bight: Hudson South B
●	●	NY Bight: Hudson South C
●	●	NY Bight: Hudson South D
●	●	NY Bight: Hudson South E
●	●	NY Bight: Hudson South F
●	●	NY Bight: Hudson North
●	●	NY Bight: Hudson Central
●	●	Atlantic Shores: North
●	●	Atlantic Shores: South
□		OSS Location
●		Photo Point

TURBINE DATA



	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Empire Offshore Wind	14.25	31.8
New York Bight - Hudson North	31.9	37.1

PHOTOGRAPH INFORMATION

Viewpoint Location:	Jones Beach State Park
Date of Photograph:	December 17, 2021
Time of Photograph:	11:12AM
Weather Condition:	Partly Cloudy
Temperature	58° F
Humidity	17%
Latitude:	40.580436° N
Longitude:	-73.55644° W

	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens	NIKKOR Z 50mm f/1.8		
Focal Length	50 mm		
Viewing Direction:	South		
Ground Elevation + Tripod Height:	16.5 feet		

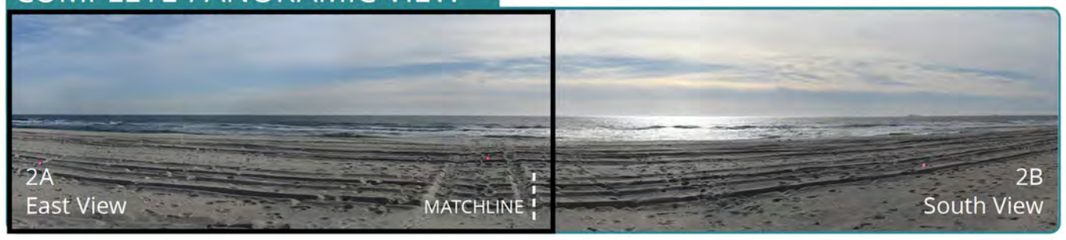
*The image on this page approximates the full horizontal field-of-view of typical human eyesight (124° horizontal)

SIMULATION 2A.1: EMPIRE WIND

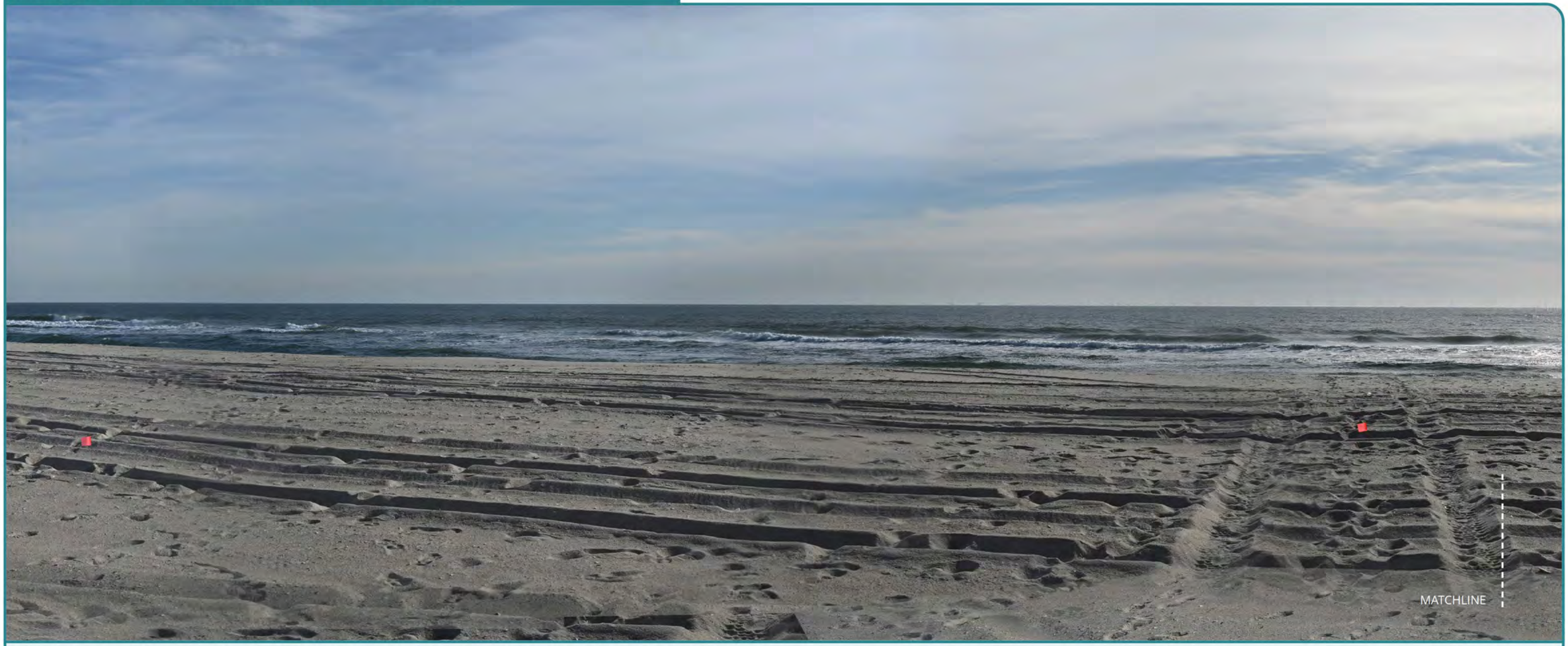
Simulation illustrating Empire Wind without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



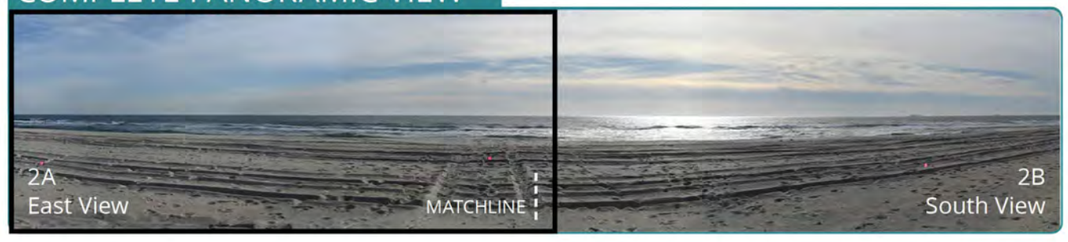
SIMULATION 2A.2: EMPIRE WIND + NY BIGHT



Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

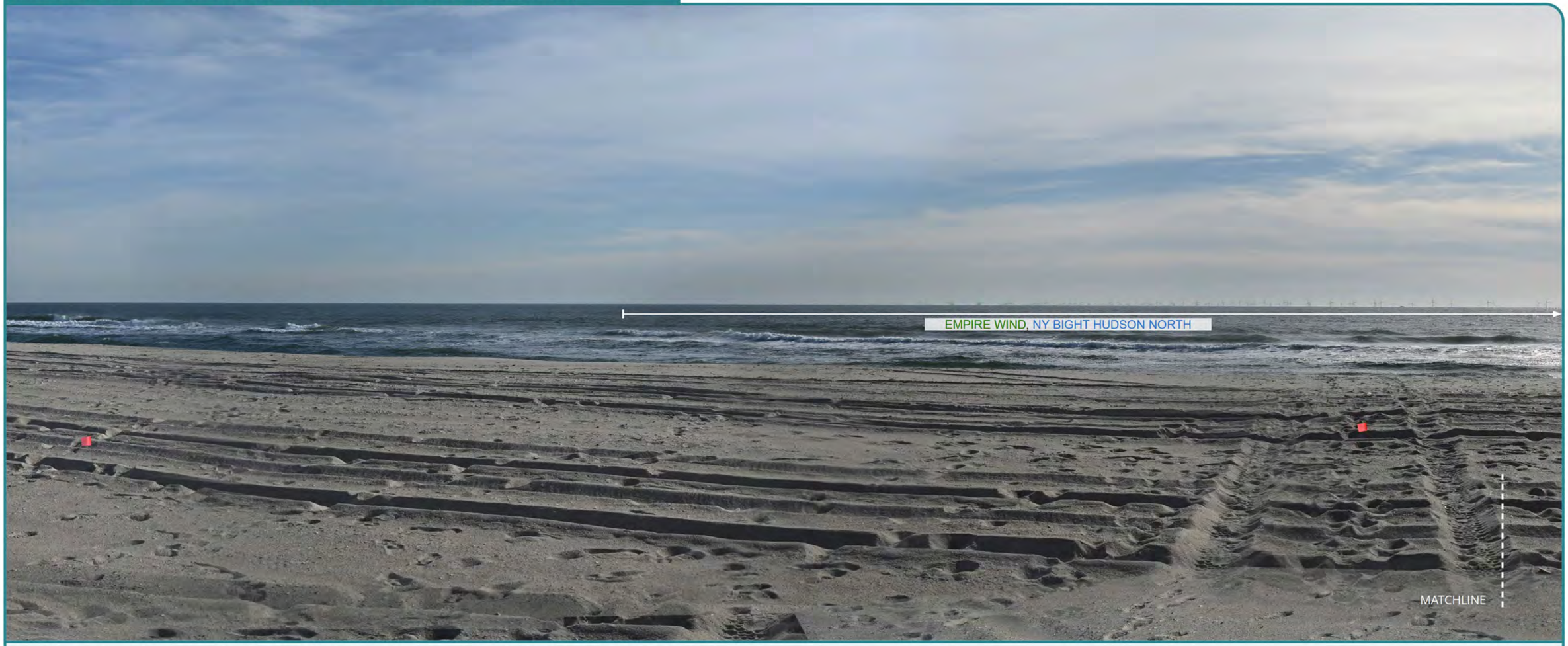
*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



KOP 2A

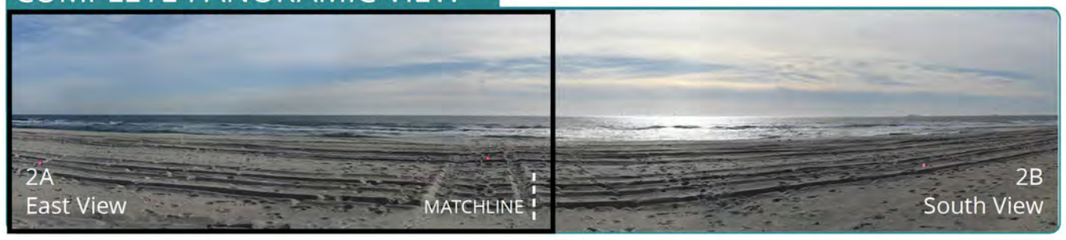
SIMULATION 2A.2: EMPIRE WIND + NY BIGHT *(Annotated)*



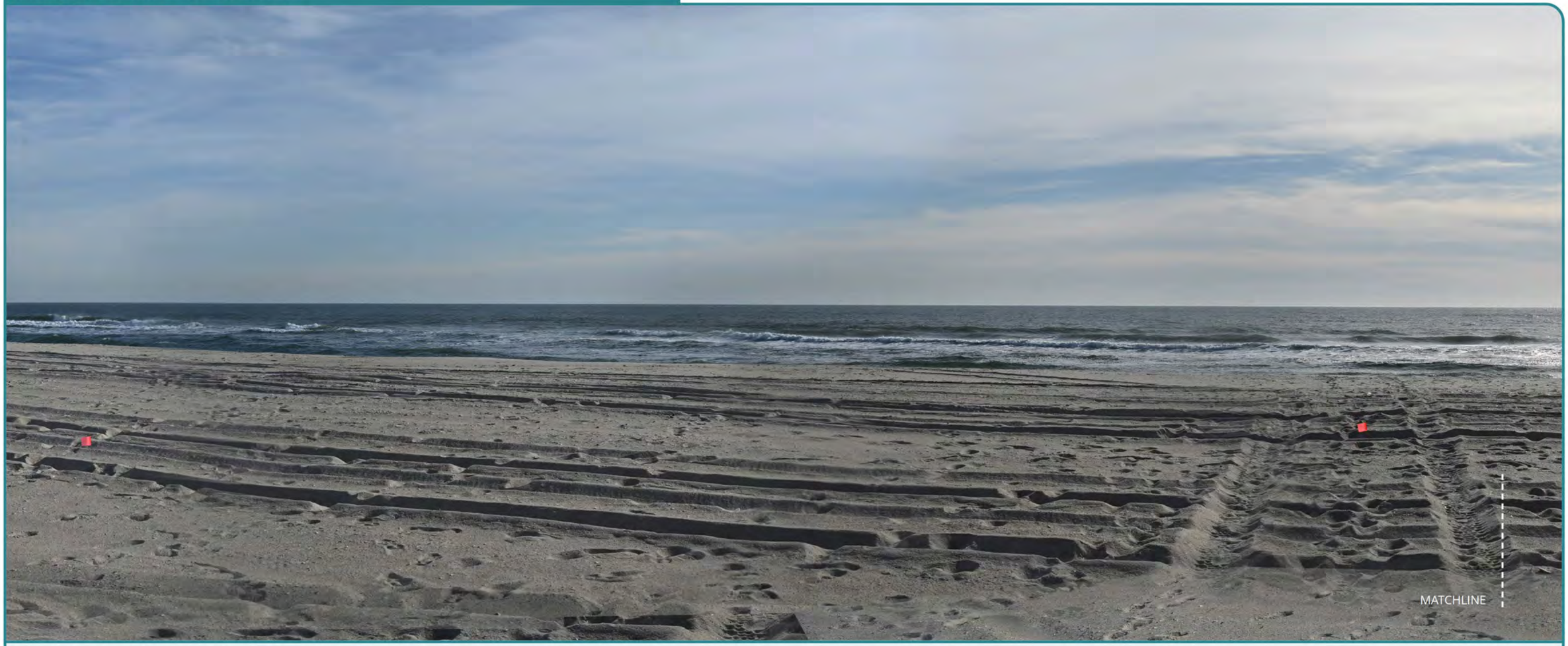
Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



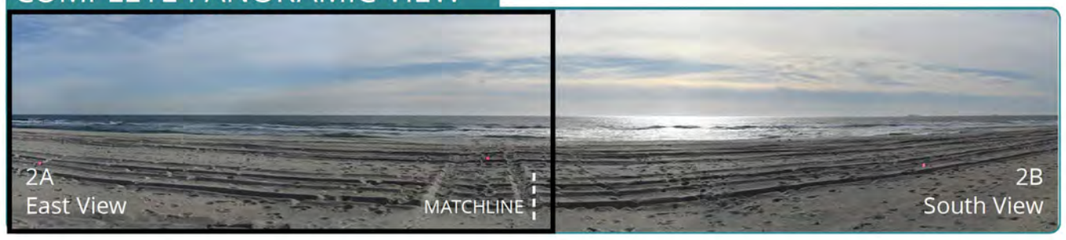
SIMULATION 2A.3: NY BIGHT



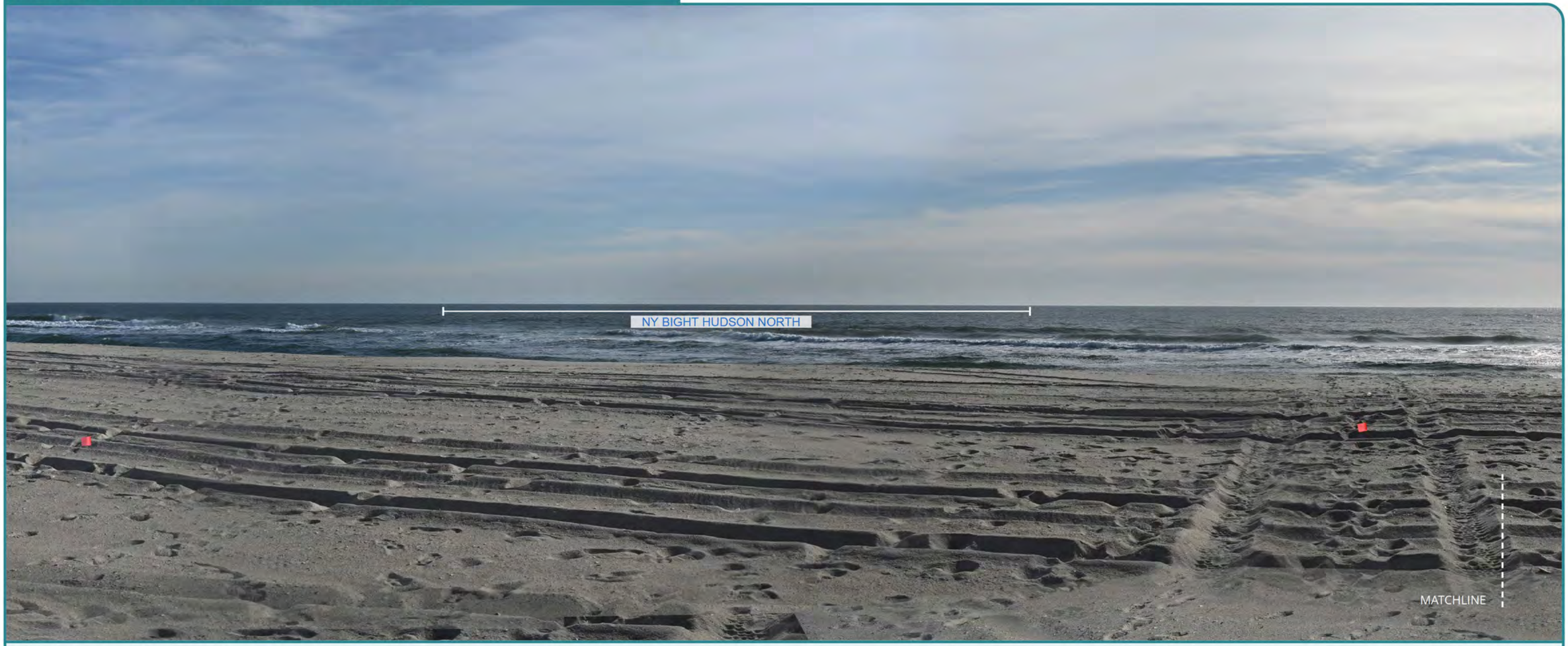
Simulation illustrating full lease buildout not including Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



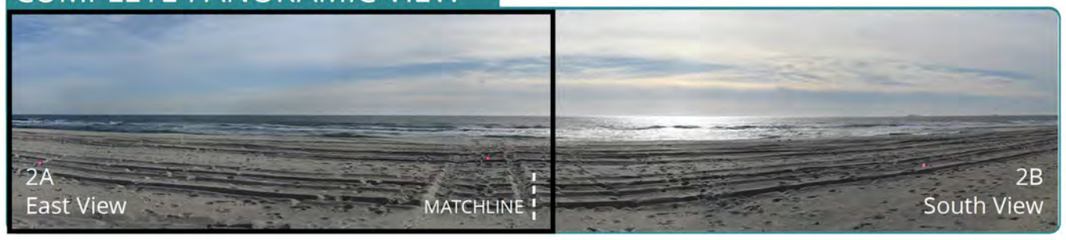
SIMULATION 2A.3: NY BIGHT *(Annotated)*



Simulation illustrating full lease buildout not including Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



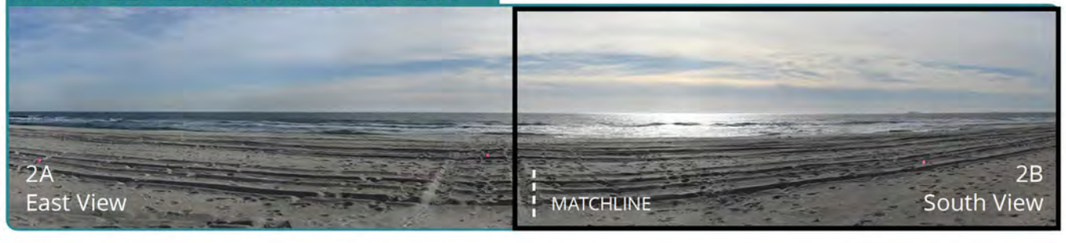
SIMULATION 2B.1: EMPIRE WIND

MATCHLINE

Simulation illustrating Empire Wind without other foreseeable future changes

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



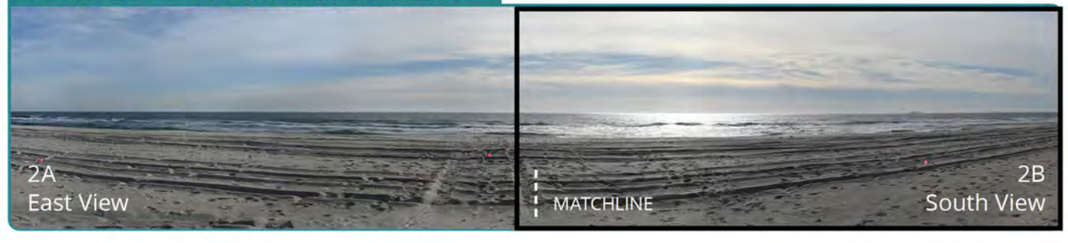
SIMULATION 2B.2: EMPIRE WIND + NY BIGHT

MATCHLINE

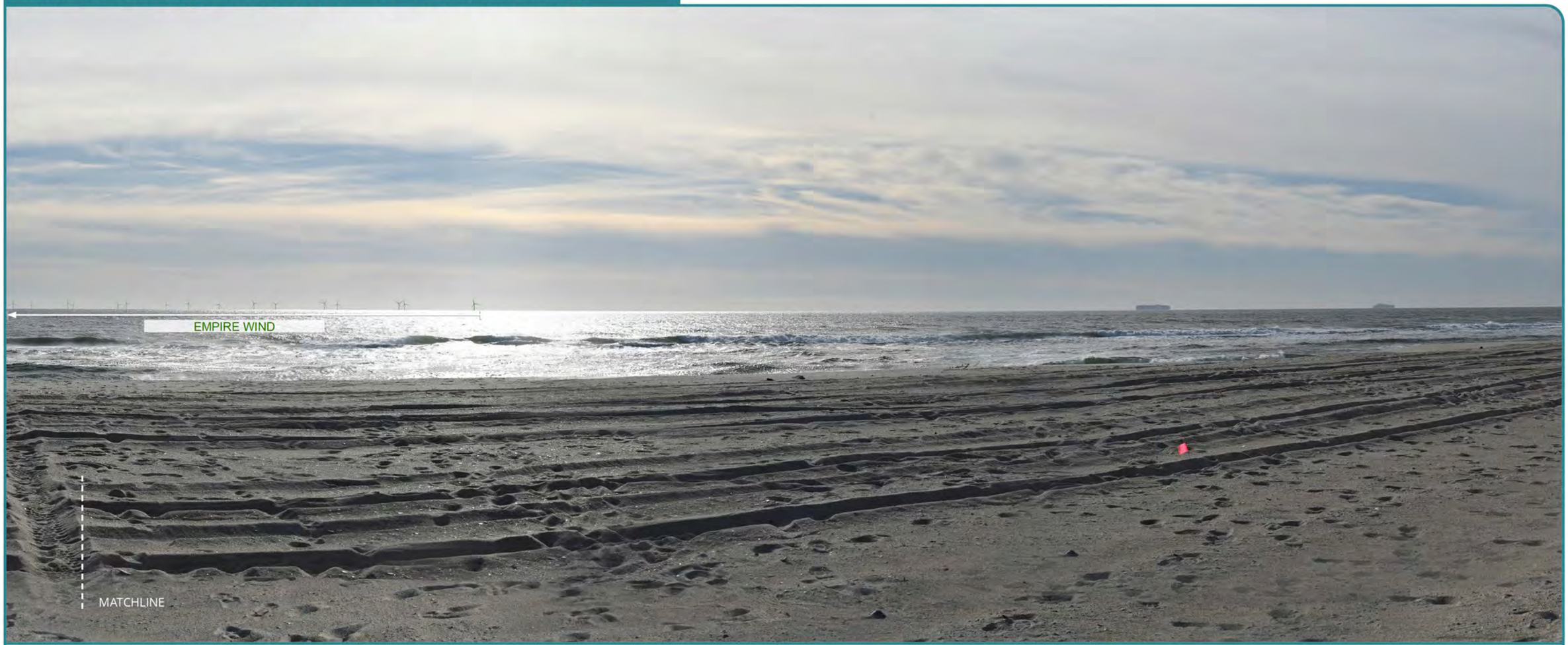
Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



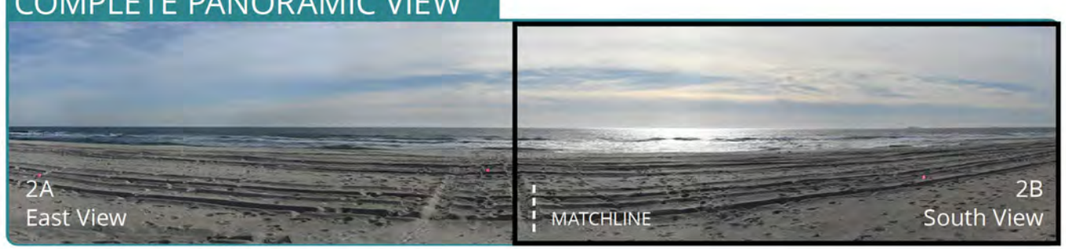
SIMULATION 2B.2: EMPIRE WIND + NY BIGHT *(Annotated)*



Simulation illustrating full lease buildout showing foreseeable projects located in leased areas with Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



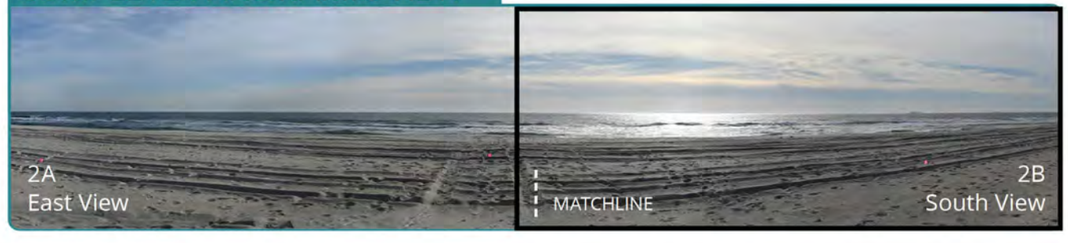
SIMULATION 2B.3: NY BIGHT

MATCHLINE

Simulation illustrating full lease buildout not including Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW



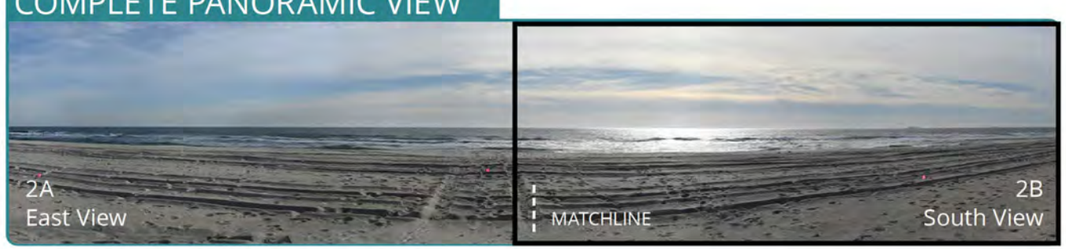
SIMULATION 2B.3: NY BIGHT *(Annotated)*

MATCHLINE

Simulation illustrating full lease buildout not including Empire Wind

*The simulation image includes approximately 62° horizontal field of view.

COMPLETE PANORAMIC VIEW

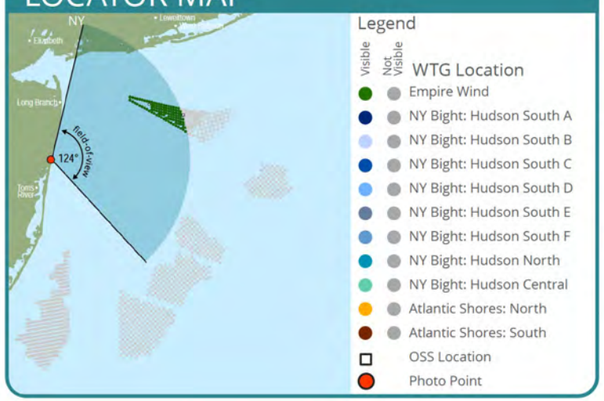


EXISTING CONDITION: NORTHEAST VIEW

KOP 3

View of the existing condition at Point Pleasant Beach

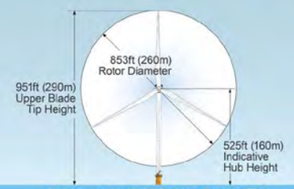
LOCATOR MAP



Legend

Visible	Not Visible	WTG Location
●	●	Empire Wind
●	●	NY Bight: Hudson South A
●	●	NY Bight: Hudson South B
●	●	NY Bight: Hudson South C
●	●	NY Bight: Hudson South D
●	●	NY Bight: Hudson South E
●	●	NY Bight: Hudson South F
●	●	NY Bight: Hudson North
●	●	NY Bight: Hudson Central
●	●	Atlantic Shores: North
●	●	Atlantic Shores: South
□		OSS Location
●		Photo Point

TURBINE DATA



Representative Wind Turbine: Empire Wind

	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Empire Offshore Wind	31	51.88

PHOTOGRAPH INFORMATION

Viewpoint Location:	Point Pleasant Beach
Date of Photograph:	November 19, 2021
Time of Photograph:	1:00 PM
Weather Condition:	Partly Cloudy
Temperature	48° F
Humidity	37%
Latitude:	40.093589° N
Longitude:	-74.035308° W

	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens		NIKKOR Z 50mm f/1.8	
Focal Length			50 mm
Viewing Direction:			East/Northeast
Ground Elevation + Tripod Height:			15 feet

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

SIMULATION 3A.1: EMPIRE WIND

Simulation illustrating Empire Wind without other foreseeable future changes

COMPLETE PANORAMIC VIEW

SIMULATION 3A.1: EMPIRE WIND *(Annotated)*

Simulation illustrating Empire Wind without other foreseeable future changes

COMPLETE PANORAMIC VIEW

SIMULATION 3B.1: EMPIRE WIND

Simulation illustrating Empire Wind without other foreseeable future changes

COMPLETE PANORAMIC VIEW

SIMULATION 3B.1: EMPIRE WIND *(Annotated)*

Simulation illustrating Empire Wind without other foreseeable future changes

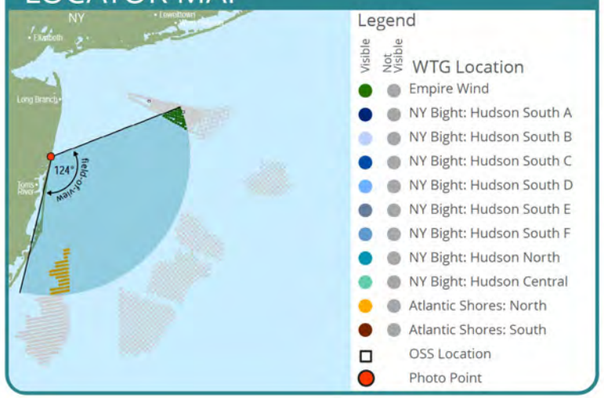
COMPLETE PANORAMIC VIEW

EXISTING CONDITION: SOUTHEAST VIEW

KOP 3

View of the existing condition at Point Pleasant Beach

LOCATOR MAP



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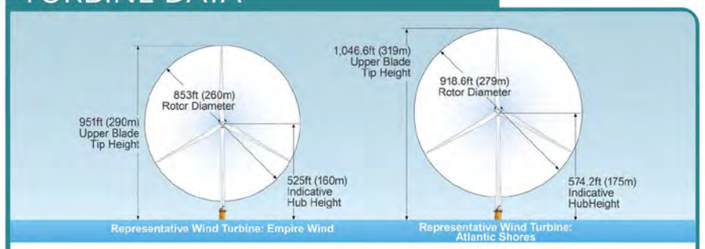


	Distance to the closest WTG (mi)	Distance to the farthest WTG (mi)
Empire Offshore Wind	31	51.88
Atlantic Shores North	29.6	53

PHOTOGRAPH INFORMATION

Viewpoint Location:	Point Pleasant Beach
Date of Photograph:	November 19, 2021
Time of Photograph:	1:00 PM
Weather Condition:	Partly Cloudy
Temperature	48° F
Humidity	37%
Latitude:	40.093589° N
Longitude:	-74.035308° W

	Type	Brand	Model
Camera	Mirrorless	Nikon	Z6
Lens	NIKKOR Z 50mm f/1.8		
Focal Length	50 mm		
Viewing Direction:	Southeast		
Ground Elevation + Tripod Height:	15 feet		

*The image on this page approximates the full horizontal and vertical field-of-view of typical human eyesight (124° horizontal by 55° vertical)

SIMULATION 3C.1: EMPIRE WIND

Simulation illustrating Empire Wind without other foreseeable future changes. Empire Wind is not present in this view.

COMPLETE PANORAMIC VIEW

SIMULATION 3C.2: EMPIRE WIND + ATLANTIC SHORES

Simulation illustrating full lease buildout showing foreseeable projects with Empire Wind. Empire Wind and Atlantic Shores are not present in this view.

COMPLETE PANORAMIC VIEW

SIMULATION 3C.3: ATLANTIC SHORES

Simulation illustrating full lease buildout not including Empire Wind. Atlantic Shores is not present in this view.

COMPLETE PANORAMIC VIEW

SIMULATION 3D.1: EMPIRE WIND

Simulation illustrating Empire Wind without other foreseeable future changes. Empire Wind is not present in this view.

COMPLETE PANORAMIC VIEW

SIMULATION 3D.2: EMPIRE WIND + ATLANTIC SHORES

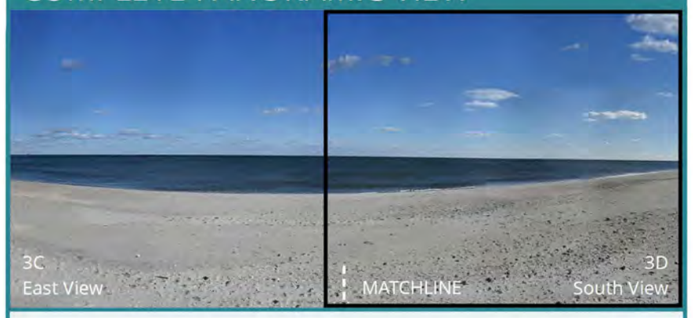
Simulation illustrating full lease buildout showing foreseeable projects located in Atlantic Shores with Empire Wind

COMPLETE PANORAMIC VIEW

SIMULATION 3D.2: EMPIRE WIND + ATLANTIC SHORES *(Annotated)*

Simulation illustrating full lease buildout showing foreseeable projects located in Atlantic Shores with Empire Wind

COMPLETE PANORAMIC VIEW



SIMULATION 3D.3: ATLANTIC SHORES

Simulation illustrating full lease buildout not including Empire Wind

COMPLETE PANORAMIC VIEW

SIMULATION 3D.3: ATLANTIC SHORES *(Annotated)*

Simulation illustrating full lease buildout not including Empire Wind

COMPLETE PANORAMIC VIEW

ATTACHMENT M-2
NIGHTTIME VISUAL SIMULATION

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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).

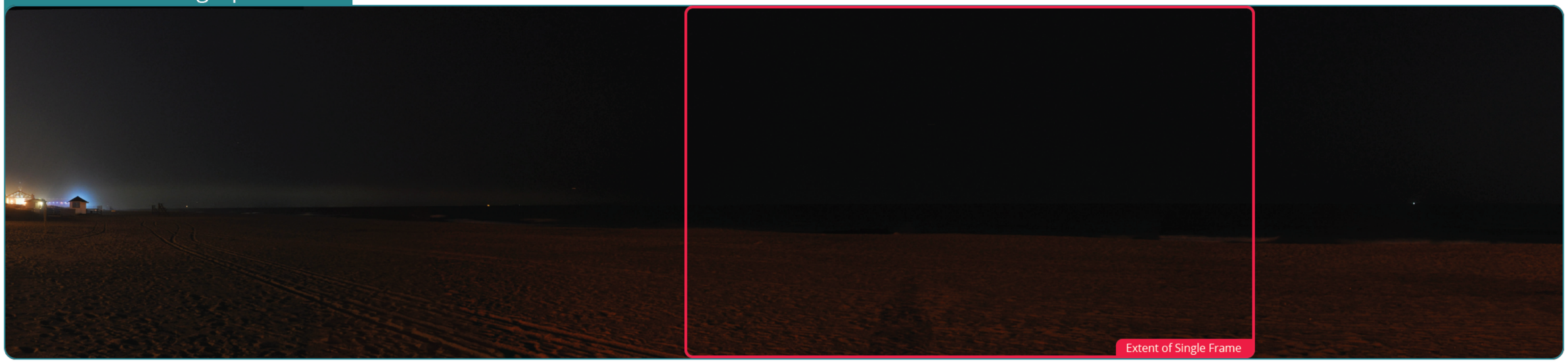
Equinor Wind proposes to implement an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Therefore, while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

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

equinor

Panoramic Photograph

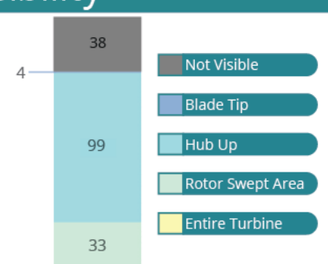


Vicinity Map

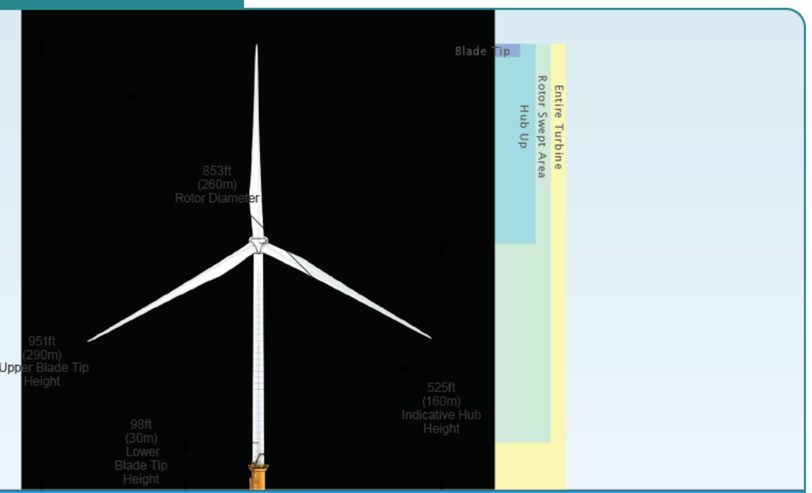
Photograph Information

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

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

equinor

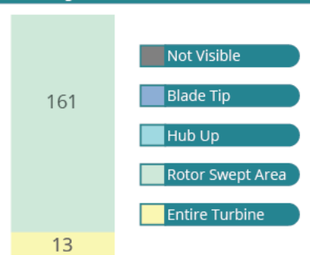
Panoramic Photograph

Vicinity Map

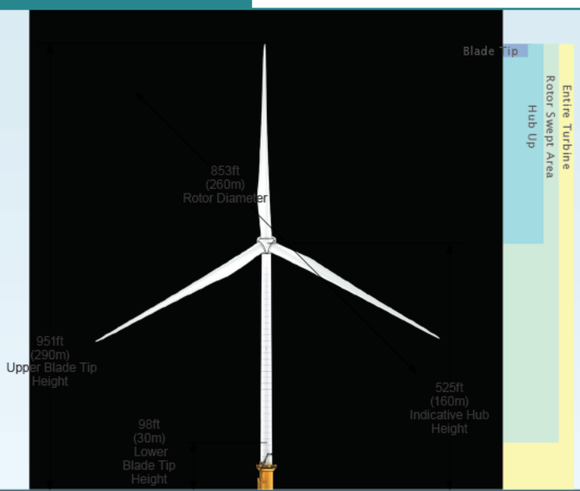
Photograph Information

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



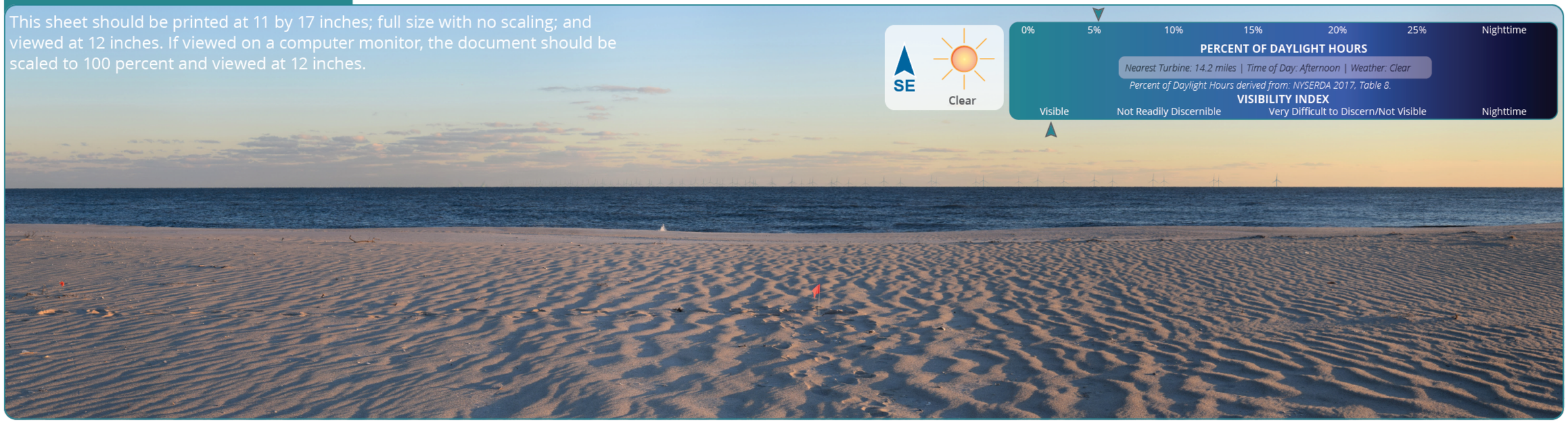
Representative Wind Turbine

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.



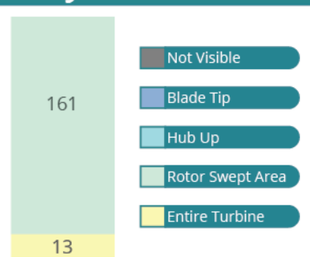
Panoramic Photograph

Vicinity Map

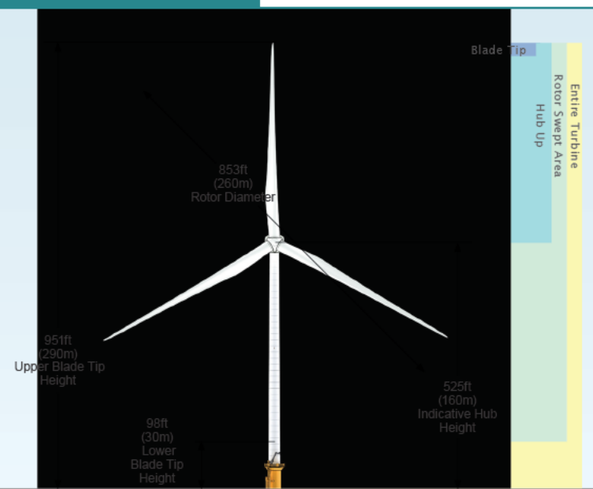
Photograph Information

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

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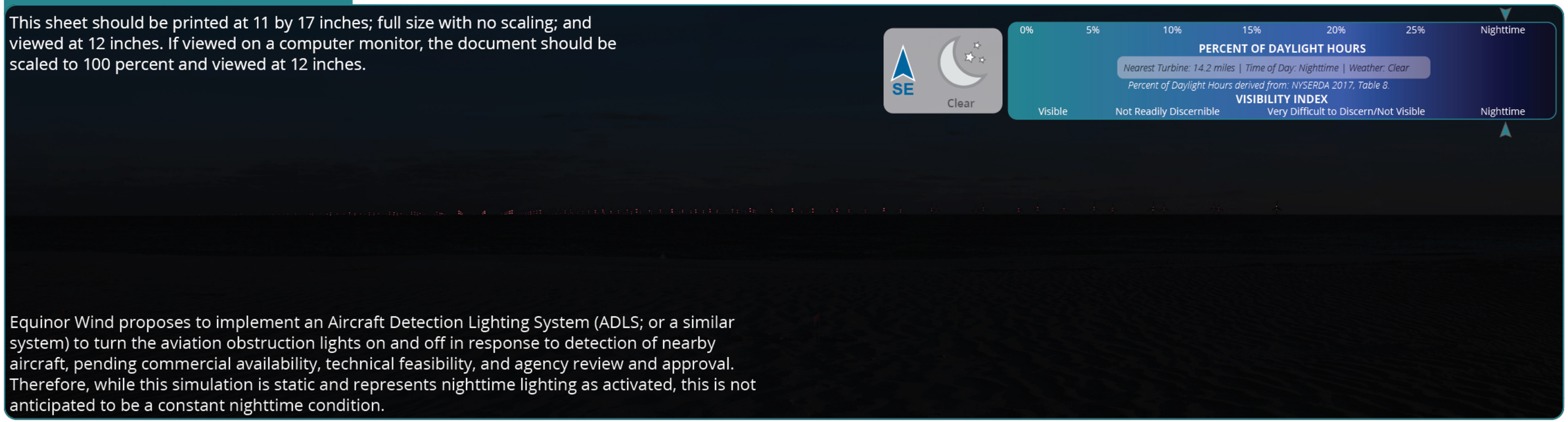


Equinor Wind proposes to implement an Aircraft Detection Lighting System (ADLS; or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Therefore, while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

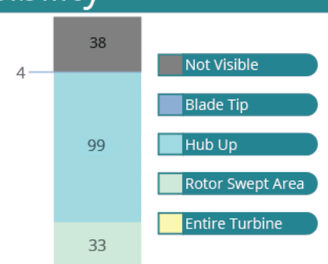
Panoramic Photograph

Vicinity Map

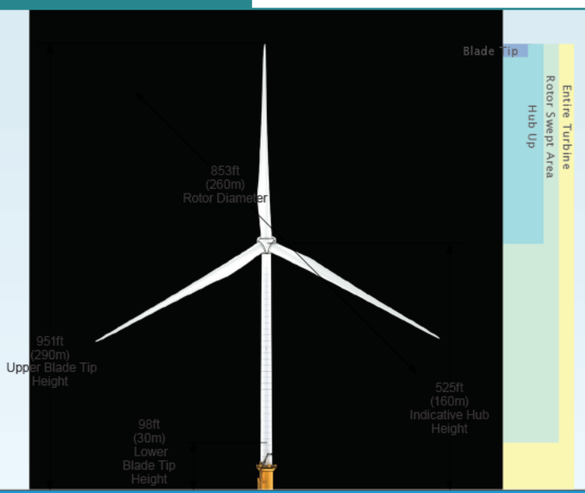
Photograph Information

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

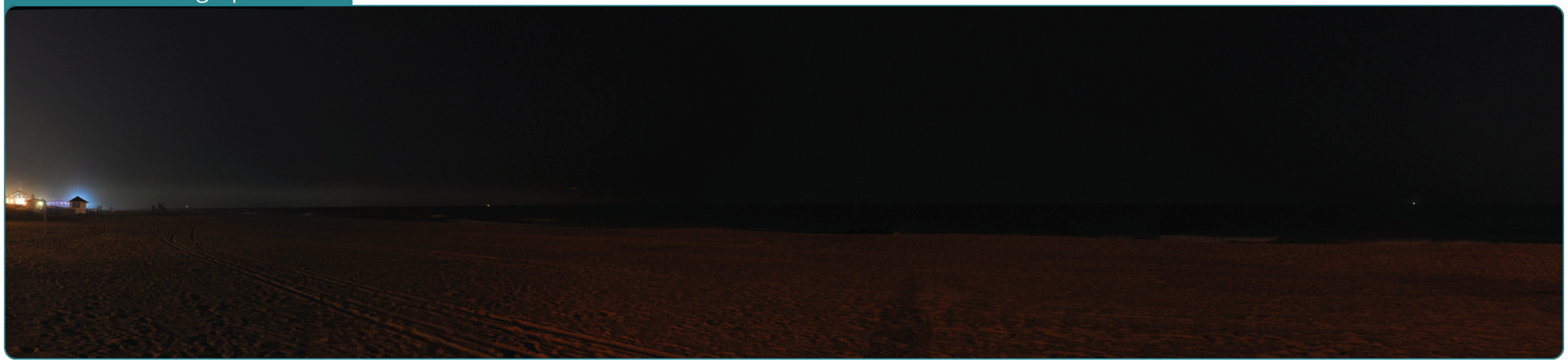
Viewpoint Visibility	
Closest Visible Turbine	25.4 miles
Farthest Visible Turbine	48.5 miles
Structures Potentially Visible	136 of 174 total

*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

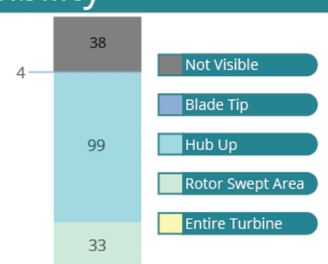


Vicinity Map

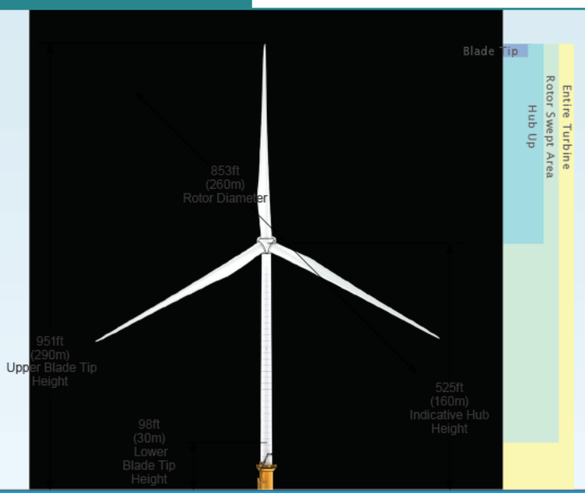
Photograph Information

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

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Panoramic Simulation

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