VINEYARD NORTHEAST

CONSTRUCTION AND OPERATIONS PLAN

VOLUME II APPENDIX

MARCH 2024



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VINEYARD OFFSHORE

PUBLIC VERSION

Vineyard Northeast COP

Appendix II-J Seascape, Landscape, and Visual Impact Assessment

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March 2024

0	July 2022	Initial submission.
1	April 2023	Updated to address Bureau of Ocean Energy Management (BOEM) Round 1 Comments (dated January 13, 2023) and made other minor corrections.
2	January 2024	Updated to address BOEM Round 4 Comments (dated September 24, 2023) and to reflect revisions to the onshore Project Design Envelope.
3	March 2024	Made minor revisions.

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VINEYARD NORTHEAST

SEASCAPE, LANDSCAPE, AND VISUAL IMPACT ASSESSMENT

Revised February 13, 2024

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#2022-009

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ABBREVIATIONS AND ACRONYMS

asl	Above Sea Level
BOEM	Bureau of Ocean Energy Management
COP	Construction and Operations Plan
EJA	Environmental Justice Area
ESP	Electric Service Platform
FAA	Federal Aviation Administration
ft	Feet
HFOV	Horizontal Field-of-View
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
KOP	Key Observation Point
Lidar	Light Detection and Ranging
km	Kilometers
km^2	Square kilometers
MA WEA	Massachusetts Wind Energy Area
mi	Statute mile
mi^2	Square miles
MLLW	Mean Lower Low Water
MW	Megawatt
nm	Nautical Miles
NNL	National Natural Landmark
NRHP	National Register of Historic Places
OCS	Outer Continental Shelf
OECC	Offshore export cable corridor
PATON	Private Aid to Navigation
POI	Point of Interconnect
ROW	Right-of-Way
SLIA	Seascape/Landscape Impact Assessment
SLVIA	Seascape, Landscape and Visual Impact Assessment
USCG	United States Coast Guard
USGS	United States Geologic Survey
VFOV	Vertical Field-of-View
VSA	Visual Study Area
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility
ZLV	Zone of Likely Visibility

1.0 INTRODUCTION

Vineyard Northeast LLC (the "Proponent") proposes to develop, construct, and operate offshore renewable wind energy facilities in Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0522 (the "Lease Area") along with associated offshore and onshore transmission systems. This proposed development is referred to as "Vineyard Northeast."

To address issues of potential aesthetic impact, the Proponent has retained Saratoga Associates, Landscape Architects, Architects, Engineers, and Planners, P.C. ("Saratoga Associates") to conduct a Seascape, Landscape, and Visual Impact Assessment (SLVIA) of Vineyard Northeast. The purpose of this SLVIA is to identify potential visibility of Vineyard Northeast's offshore facilities and objectively determine the difference in seascape and landscape quality and the impact on viewer experience with and without Vineyard Northeast in place. The information and recommendations included in this report are intended to assist regulatory agencies, interested stakeholders, and the general public in their review of Vineyard Northeast, in accordance with applicable regulatory requirements.

SLVIA Methodology - The SLVIA presents the assessment of potential visual effects from the offshore facilities in two parts. The first part—the Seascape/Landscape Impact Assessment (SLIA)—examines the effects of Vineyard Northeast on eleven Character Areas that have been identified within the VSA (refer to Section 7.0). The second part—the Visual Impact Assessment (VIA)—evaluates the possible effect that Vineyard Northeast may have on viewers who live, work, recreate, and enjoy the landscape, seascape, and open ocean (refer to Section 8.0).

Visual Study Area - The visual study area (VSA) is the outer limit of visual impact analysis. This limit is established as the maximum distance beyond which any view of an offshore component would be considered negligible. For the Vineyard Northeast VIA the VSA extends to a radius of 83.7 km (52 mi) from proposed WTG positions. Beyond this distance it is assumed that any remaining views of Vineyard Northeast components would be negligible due to sheer distance.

The VSA includes the entire land mass of Nantucket, Martha's Vineyard, Nomans Land, Muskeget, Tuckernuck and Esther Islands. The VSA does not include any portion of the Elizabeth Islands, Cape Cod, mainland Massachusetts, Rhode Island (including Block Island), Connecticut, or New York's Long Island which are more distant.

Project Description - Vineyard Northeast includes 160 wind turbine generators (WTG)/electrical service platform (ESP) positions within the Lease Area. Up to three of those positions will be occupied by ESPs[1] and the remaining positions will be occupied by WTGs. As proposed, the WTGs and ESP(s) will be oriented in fixed east-to-west rows and north-to-south columns with

[1] If two or three ESPs are used, they may be located at separate positions or two of the ESPs may be co-located at the same grid position. Co-located ESPs would be smaller structures installed on monopile foundations.

one nautical mile (1.9 km) spacing between positions. The WTGs and ESPs will be supported by monopiles or piled jacket foundations. The base of the foundations may be surrounded by scour protection. Submarine inter-array cables will transmit power from groups of WTGs to the ESP(s). If two or three ESPs are used, they may be connected with inter-link cables. Offshore export cables will then transmit the electricity collected at the ESP(s) to shore.

The WTGs, ESP(s), and their foundations as well as the inter-array cables, inter-link cables (if used), and a portion of the offshore export cables will be located in Lease Area OCS-A 0522. The Lease Area is within the Massachusetts Wind Energy Area (MA WEA) identified by BOEM, following a public process and environmental review, as suitable for wind energy development. At its closest point, the 536 square kilometer (km^2) (132,370 acre) Lease Area is approximately 46 km (29 miles) from Nantucket. The closest WTG/ESP position within the Lease Area is approximately 49.1 km (30.5 miles) from Nantucket and approximately 63.2 km (39.3 miles) from Martha's Vineyard. The location of the Lease Area is illustrated in Figure 1.

Between the Lease Area and shore, the offshore export cables will be installed within two offshore export cable corridors (OECCs)—the Massachusetts OECC and the Connecticut OECC—that connect to onshore transmission systems in Massachusetts and Connecticut. If high voltage alternating current (HVAC) offshore export cables are used in the Massachusetts OECC, the cables would connect to a booster station in the northwestern aliquot[2] of Lease Area OCS-A 0534[3].

Vineyard Northeast's onshore facilities will include landfall sites, onshore cable routes, and onshore substation sites in Bristol County, Massachusetts and New London County, Connecticut. Because the location of the onshore substations has not yet been finalized, a preliminary visual assessment of the onshore substation alternatives is provided in Appendix F.

[2] An aliquot is 1/64th of a BOEM Outer Continental Shelf (OCS) Lease Block.

[3] If high voltage alternating current (HVAC) cables are installed within the Massachusetts OECC, a booster station would be used to boost the electricity's voltage level, reduce transmission losses, and enhance grid capacity.

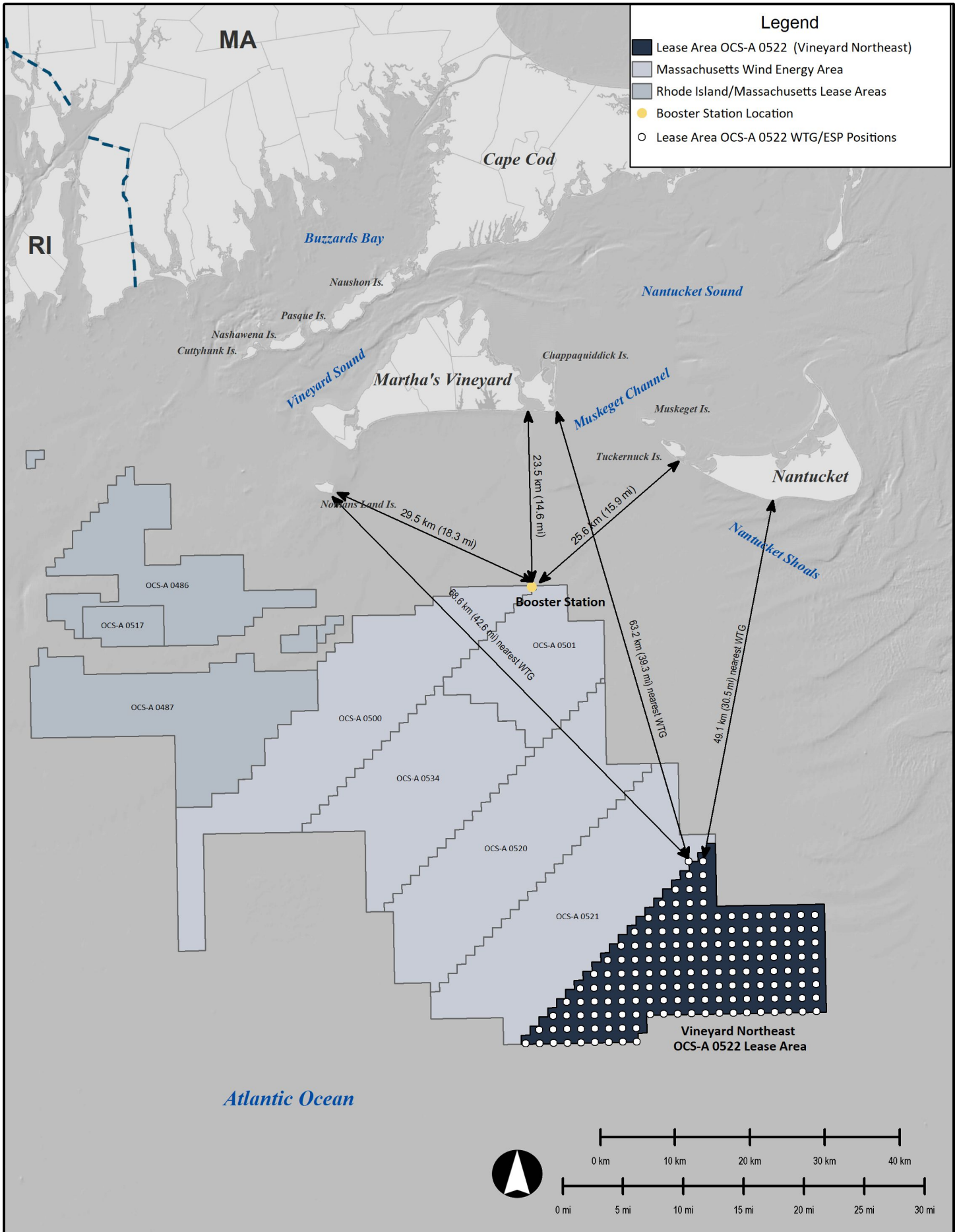


Figure 1
Lease Area Location Map

VINEYARD NORTHEAST
VINEYARD OFFSHORE

2.0 DESCRIPTION OF VINEYARD NORTHEAST

The following sections provide an overview of Vineyard Northeast's offshore and onshore facilities with a focus on the aspects of the facilities' design that relate to potential visual impacts. See Section 3 of Vineyard Northeast's Construction and Operations Plan (COP) Volume I for a full description of Vineyard Northeast.

2.1 Offshore Facilities

2.1.1 Wind Turbine Generators

Vineyard Northeast will include up to 160 WTGs. The maximum dimensions of the WTGs anticipated to be commercially available for Vineyard Northeast are provided in Table 1. The largest potential WTG dimension for Vineyard Northeast with a jacket foundation is evaluated herein as the maximum potential visual impact scenario.

Table 1 - WTG Dimensions

Dimension	Project Design Envelope
Maximum rotor diameter	320 m (1,050 ft)
Maximum tip height above MLLW	400 m (1,312 ft)
Maximum top of nacelle height above MLLW[1]	249 m (817 ft)
Maximum hub height above MLLW	240 m (787 ft)
Minimum tip clearance (air draft) above MLLW	27 m (89 ft)
Maximum nacelle dimensions (length x width x height)	36 m x 17 m x 17 m (118 ft x 56 ft x 56 ft)
Maximum blade chord	10 m (33 ft)
Maximum tower diameter	11 m (36 ft)

Notes:

1. Height includes Federal Aviation Administration (FAA) lights and other appurtenances.

Figure 2 illustrates the visual characteristics of the WTGs evaluated in this VIA.

2.1.2 Electrical Service Platform(s) and Booster Station

Vineyard Northeast will include up to three offshore electrical service platforms (ESPs), which will collect the power generated by the WTGs and transform it to a higher voltage for transmission to shore.[4] Three ESP concepts are included:

- High voltage direct current (HVDC) ESP: If Vineyard Northeast employs HVDC offshore export cables and HVAC inter-array cables, the ESP(s) will convert the electricity delivered by the inter-array cables from alternating current to direct current and transform the voltage to match the offshore export cables' voltage. If HVDC inter-array cables are used, the ESP would simply collect and transform the voltage of the electricity.

[4] Three ESPs are not additive to the 160 WTGs. There are a total of 160 WTG/ESP positions, up to three of which will be occupied by ESPs and the remaining positions will be occupied by WTGs.

- High voltage alternating current (HVAC) ESP and booster station: If Vineyard Northeast employs HVAC export cables to connect to a point of interconnection (POI) in Massachusetts, the ESP(s) would transform the voltage of electricity delivered by the inter-array cables to that of the offshore export cables. A booster station would need to be installed along the offshore export cables (between the ESP and shore) to boost the electricity's voltage level, reduce transmission losses, and enhance grid capacity.
- Integrated ESP equipment: ESP equipment would be placed on one or more expanded WTG foundation platforms rather than having a separate ESP situated on its own foundation.

The maximum design envelope for ESP and booster station topside dimensions are provided in Table 2. Although the same maximum design envelope is provided for the HVDC and HVAC ESP topsides, the topsides for HVAC ESPs are expected to be smaller because they do not require electrical equipment to convert power from alternating current to direct current AC to DC. The booster station requires even less electrical equipment and is therefore expected to be considerably smaller.

Table 2 - ESP and Booster Station Topside Dimensions

Parameter	ESP	booster station
Number of ESPs/booster stations	0–3*	0–1**
Maximum topside width	85 m (279 ft)	60 m (197 ft)
Maximum topside length	170 m (558 ft)	100 m (328 ft)
Maximum topside height above foundation	45 m (148 ft)	38 m (125 ft)
Maximum height above sea level (MLLW)	70 m (230 ft)***	70 m (230 ft)***

* Zero indicates the ESP equipment may be integrated onto WTG foundation(s).
** Only needed for HVAC transmission.
*** Height includes helipad (if present), but may not include antennae and other appurtenances.

The largest potential ESP or booster station dimension with a jacket foundation is evaluated herein as the maximum potential visual impact scenario because the specific type has not been determined at the time of this SLVIA.

Figure 3 illustrates the general visual characteristics of an ESP and booster station.

2.1.3 Lighting and Marking for WTGs, ESP(s) and Booster Station

In accordance with BOEM and Federal Aviation Administration (FAA) guidance, the WTGs will be no lighter than pure white (RAL 9010) and no darker than light grey (RAL 7035) in color; the Proponent expects that the WTGs will be off-white/light grey to reduce their visibility against

the horizon.[5] The ESP and booster station topsides are expected to be light grey in color, which would appear muted and indistinct.

Although the Lease Area falls outside of the FAA jurisdictional area, BOEM's "Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development" (BOEM, 2021) recommends that aviation lighting on wind energy facilities is consistent with FAA regulatory requirements for structures within 12 NM (13.8 mi) of shore.

All WTGs will include an aviation obstruction lighting system in compliance with FAA and/or BOEM guidance. Based on current guidance, the aviation obstruction lighting system will consist of two synchronized red flashing lights placed on the nacelle of each WTG. If the WTGs' total tip height is 213.36 m (699 ft) or higher, there will be at least three additional low intensity flashing red lights on the tower approximately midway between the top of the nacelle and sea level. If the height of the ESP(s) or booster station exceeds 60.96 m (200 ft) above Mean Sea Level (MSL) or any obstruction standard contained in 14 CFR Part 77, they will similarly include an aviation obstruction lighting system in compliance with FAA and/or BOEM guidelines. The aviation obstruction lights will be visible to pilots in all directions and will flash 30 times per minute, if approved by BOEM.

An Aircraft Detection Lighting System (ADLS) or similar system will be used to automatically activate all aviation obstruction lights (on both the nacelle and tower for WTGs) when aircraft approach the structures, subject to BOEM approval.

Additionally, to aid mariners navigating within and near the Lease Area, the WTGs, ESP(s), booster station (if used), and their foundations will be equipped with marine navigation lighting, marking, and signaling in accordance with USCG and BOEM guidance. Each WTG, ESP, and booster station will be maintained as a Private Aid to Navigation (PATON). A uniform system of marine navigation lighting and marking will be implemented. Based on USCG's current *ME, NH, MA, RI, CT, NY, NJ-Atlantic Ocean-Offshore Structure PATON Marking Guidance*,[6] each structure will include yellow flashing lights that are visible in all directions at a distance of 3.7 to 9.5 km (2.3 to 5.9 mi [2 to 5 NM]) (USCG, 2020). The intensity of the lights will depend on the location of the structure within the Lease Area.

[5] The exact color of the WTGs within this range (between RAL 9010 and RAL 7035) is unknown at this time. As clarified in Section 6.3, the visual simulations assume that the WTGs are pure white (RAL 9010), which represents a worst-case scenario, although the difference between WTGs colored RAL 9010 and RAL 7035 is likely indiscernible from coastal vantage points given the WTGs' distance from shore.

[6] USCG's PATON guidance for offshore wind energy structures in First District-area waters is periodically updated in District 1 Local Notice to Mariners (LNMs).

2.1.4 Offshore Cables

Submarine inter-array cables located within the Lease Area will connect strings of multiple WTGs to the ESP(s). If two or three ESPs are used, they may be connected with inter-link cables to provide redundancy and thus improve reliability. Offshore export cables will transmit the electricity collected at the ESP(s) to shore. Between the Lease Area and shore, the offshore export cables will be installed within two OECCs—the Massachusetts OECC and the Connecticut OECC—that connect to onshore transmission systems in Bristol County, Massachusetts and New London County, Connecticut (see Section 2.2). If high voltage alternating current (HVAC) offshore export cables are used in the Massachusetts OECC, the cables would connect to a booster station in the northwestern aliquot of Lease Area OCS-A 0534 (see Section 2.1.2). All offshore cables will be submerged and will not be visible.

2.1.5 Offshore Facility Specifications Used for SLVIA

In consultation with BOEM, the Proponent utilized the highest capacity WTG proposed for Vineyard Northeast (see dimensions in Table 1) and assumed the full build-out of 160 positions within the Lease Area to conduct the visual simulations. The Proponent also utilized a maximum density layout with spacing of 1 NM x 1 NM in an east-west and north-south direction.

The nearest possible ESP position would be 49.1 km (30.5 mi) from the nearest coastal vantage point. At this distance, the full height of the ESP would fall below the visible horizon. Therefore, to consider the maximum potential visual impact scenario, this SLVIA assumes a WTG will be installed at all 160 positions.

The booster station will be located approximately 41.7 km (25.9 mi) northwest of the Lease Area in the northwestern aliquot of Lease Area OCS-A 0534. The booster station is just over 23.5 km (14.6 mi) south of Martha's Vineyard, MA (at South Beach State Park) and 25.6 km (15.9 mi) southwest of Nantucket, MA (at Tuckernuck). The maximum dimensions of the booster station presented in Table 2 were used in this visual assessment.

The location and layout of the offshore components in the Lease Area are illustrated in Figure 4.

2.2 Onshore Facilities

2.2.1 Landfall Sites

Offshore export cables installed within the Massachusetts OECC will transition onshore at the Horseneck Beach Landfall Site. The Horseneck Beach Landfall Site is located in a portion of a paved parking area within Horseneck Beach State Reservation in Westport, Massachusetts. Offshore export cables installed within the Connecticut OECC will transition onshore at one of three potential landfall sites—the Ocean Beach Landfall Site, the Eastern Point Beach Landfall Site, or the Niantic Beach Landfall Site—which are located in paved parking areas at public beaches in New London, Groton, and East Lyme, Connecticut, respectively. At the landfall sites,

the offshore export cables will connect to the onshore export cables within underground transition vaults.

2.2.2 Onshore Cables

In Massachusetts, the onshore cables will be installed along the ~30 km (19 mi) Horseneck Beach Eastern Onshore Cable Route or the ~35 km (22 mi) Horseneck Beach Western Onshore Cable Route, which includes five potential variants with a total route length of approximately 33-39 km (20-24 mi) (see Figure 5).[7] HVDC or HVAC onshore export cables will transmit power from the landfall site to the new onshore substation site (see Section 2.2.3). HVAC grid interconnection cables will transmit power from the onshore substation site to one of three potential POIs: the existing Pottersville Substation in Somerset, a planned substation near Brayton Point in Somerset, or the existing Bell Rock substation in Fall River.

In Connecticut, the onshore cables will be installed along the ~21 km (13 mi) Ocean Beach Onshore Cable Route, the ~23 km (14 mi) Eastern Point Beach Onshore Cable Route, or the ~20 km (13 mi) Niantic Beach Onshore Cable Route (see Figure 6). HVDC onshore export cables will transmit power from the landfall site to the new onshore substation site (see Section 2.2.3). HVAC grid interconnection cables will transmit power from the onshore substation site to the POI at the existing Montville substation in Montville, Connecticut.

In Massachusetts and Connecticut, the onshore cables are expected to be installed primarily underground within public roadway layouts or within existing utility rights-of-way (ROWs). In most instances, underground trenchless crossing methods are expected to be used where the onshore cables traverse unique features (e.g., busy roadways, railroads, wetlands, and waterbodies). However, depending on the final location of the onshore substation site in Massachusetts and the transmission technology employed (HVAC or HVDC), the northern crossing of the Taunton River [redacted] (see Section 2.2.3) may require overhead transmission lines if further field data collection and detailed engineering confirms that an underground trenchless crossing at that location is technically or commercially infeasible.

The overhead transmission lines would be comprised of up to 24 individual conductors that are ~30 mm (1.2 inch) in diameter and likely arranged in bundles of four. At this time, it is envisioned that up to two lattice-type towers would be located [redacted] and up to two lattice-type towers would be located [redacted]. The overhead transmission towers are anticipated to have a maximum height of approximately 115 m (377 ft) above ground and a base footprint of up to approximately 45 m (148 ft) by 45 m (148 ft). The

[7] Vineyard Northeast may ultimately use any combination of route segments shown on Figure 5 to reach any of the three potential POIs.

total length of overhead transmission is estimated to be approximately 940 m (3,084 ft). The overhead transmission towers and lines would be marked and lit in accordance with FAA guidance.

2.2.3 Onshore Substation Sites

Vineyard Northeast will include two new onshore substations (one in Massachusetts and one in Connecticut). Since the Proponent has not yet secured site control for the onshore substation sites, the Proponent has identified several "onshore substation site envelopes."



If HVDC export cables are used, the onshore substations would contain equipment to convert the power from direct current to alternating current and, if necessary, the equipment to step up or step down the export cable voltage to match the voltage at each POI. At this time, the Proponent expects that a one-story conventional steel frame building (with a typical height of ~21 m [69 ft]) will be constructed to enclose a large portion of the HVDC voltage source converter components; the alternating current interface yard and power transformers, cooling fans, and the phase reactor cooling enclosure would be immediately outside the building. However, if this design is not feasible, alternative designs may be used, including a stacked design (where a stacked converter hall occupies two floors of a building). A stacked design

would result in a taller building of approximately 40 m (131 ft) but a smaller substation footprint. The HVDC onshore substation may include a small separate storage building.

If HVAC export cables are used to deliver power to a POI in Massachusetts, the onshore substation would include transformers, switchgear, and other necessary equipment to step up or step down the export cable voltage to match the electric grid's voltage at the POI. The onshore substation may use either an air-insulated switchgear design or a gas-insulated switchgear design pending detailed, site-specific engineering. The new onshore substation may include a small control room/service area, which may include fire protection systems as well as heating and cooling systems. The typical height of an HVAC substation building is up to approximately 17 m (56 ft). With the exception of the service area/control room, the substation equipment is expected to be located outside.

The onshore substations may include lightning masts approximately 27.5 m (90 ft) in height.[8] It is expected that the slender profile of the lighting masts and their proposed grey color will minimize potential visual effects. Outdoor lighting will be used at the onshore substation sites during construction and commissioning. During operations, the majority of the lights will only be used on an as-needed basis (e.g., if equipment inspection is needed at night). For security reasons, a few lights will typically be illuminated on dusk–to-dawn sensors and a few lights will likely be controlled by motion sensors. Outdoor lighting at the onshore substation sites will typically be equipped with light shields to prevent light from encroaching into adjacent areas. The Proponent will ensure that the lighting scheme complies with local requirements. A security fence and gates will be installed to enclose the onshore substations. Vegetative buffers may be installed to provide visual screening and sound attenuation walls may be installed to mitigate potential noise impacts, if needed.

The location of Vineyard Northeast's onshore facilities are illustrated in Figure 5 and Figure 6.

2.2.4 Onshore Facility Specifications Used for SLVIA

As noted above, the onshore cables are expected to be installed primarily underground; thus, the majority of the onshore cables will not be visible (except for at-grade manholes). Underground facilities are not further evaluated in this SLVIA.

Vineyard Northeast will include two new onshore substations (one in Massachusetts and one in Connecticut). Since the Proponent has not yet secured site control for the onshore substation sites, the Proponent has identified six "onshore substation site envelopes" (or "site envelopes") in Massachusetts and Connecticut. The Proponent also has not yet determined if high voltage

[8] Alternatively, if the onshore substation's electrical equipment is entirely enclosed within a building (e.g., in a stacked design), lighting spikes, which are anticipated to be ~1 m (3 ft) in height, may be located on top of the building.

direct current (HVDC) or high voltage alternating current (HDAC) export cables will be used. The type of export cables will affect the design of substation electrical equipment and associated elements within each onshore substation site envelope.

Because the location and design of the onshore substations has not yet been determined, a preliminary visual assessment of the onshore substation alternatives is provided in Appendix F.



Front Elevation

Side Elevation

WTG Color
In accordance with Federal Aviation Administration (FAA) Advisory Circular 70/7460-1M, the color of the WTGs will be no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey.

RAL 9010 "Pure White"

RAL 7035 "Light Grey

Figure 2
Wind Turbine Generator (WTG) Evaluated

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Figure 3
Representative ESP/Booster Station

VINEYARD NORTHEAST
VINEYARD OFFSHORE

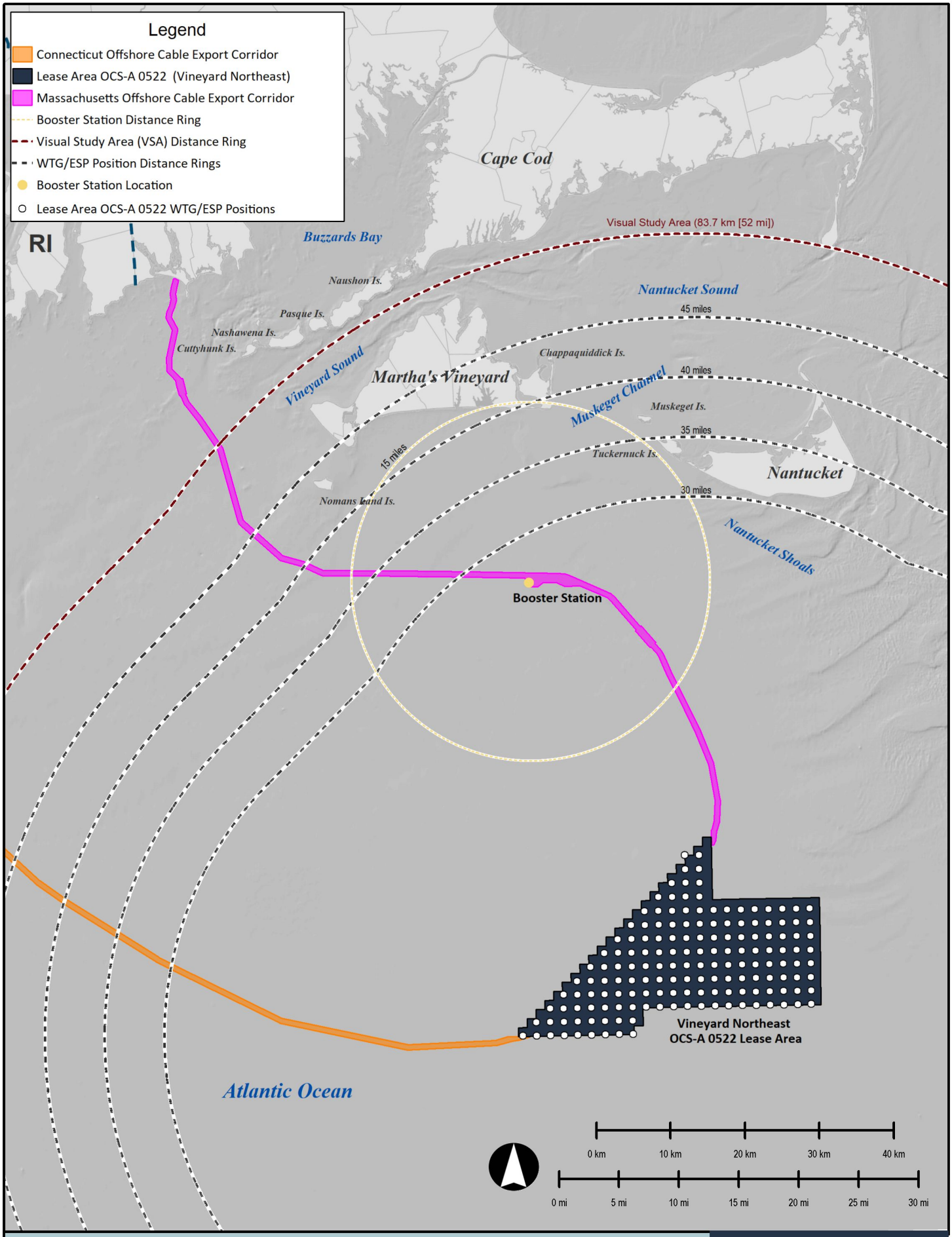


Figure 4
Vineyard Northeast Offshore Facilities

VINEYARD NORTHEAST
VINEYARD OFFSHORE

3.0 GEOGRAPHIC SCOPE OF POTENTIAL IMPACTS

3.1 Visual Study Area

The visual study area (VSA) is the outer limit of the visual impact analysis. This limit is established as the maximum distance beyond which any view of an offshore component would be considered negligible. For the Vineyard Northeast SLVIA, the VSA extends to a radius of 83.7 km (52 mi) from the proposed WTG positions. The VSA includes the entire land mass of Nantucket, Martha's Vineyard, Nomans Land, Muskeget, Tuckernuck, and Esther Islands. The VSA does not include any portion of the Elizabeth Islands, Cape Cod, mainland Massachusetts, Rhode Island (including Block Island), Connecticut, or New York's Long Island, which are more distant.

BOEM's guidance document "Assessment of Seascape, Landscape and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States" (hereafter "BOEM's SLVIA guidelines"), states;

> "For VIAs for projects considered by BOEM, where the closest turbine is located more than 43 km (23 nm) from shore (the approximately limit of blade motion visibility in the daytime), the area of impact analysis for the VIA is determined by running a viewshed from the height of the top of the nacelle of the proposed project turbines until the line of sight is intercepted by terrain (adjusted for viewer height and elevation) or limited by earth curvature, but not exceeding 74 km (40 nm) in any event, on the assumption that regardless of the turbine size or lighting, the wind facility would create only a negligible impact beyond that distance." (Sullivan R. G., 2021, p. 22) (Emphasis added)

Note that BOEM may change these limits in the future, based on changes in turbine sizes, better information about project visibility, or other considerations (Sullivan R. G., 2021, p. 22).

For Vineyard Northeast, the closest WTG is approximately 49.1 km (30.5 mi [26.5 NM]) from Nantucket; suggesting that a VSA limit of 74 km (46 mi [40 NM]) is consistent with BOEM's SLVIA guidelines. However, in consultation with BOEM (pre application meeting, March 28, 2022), the Proponent agreed to extend the VSA beyond what is recommended in BOEM's SVLIA guidelines to conservatively account for potential visibility of WTG rotors that are larger than those envisioned in the 2013 research relied upon in BOEM's 2021 guidelines. In response to BOEM's request, the outer limit of this visual impact analysis is extended to a radius of 83.7 km (52 mi [45.2 NM]) from the outermost WTG positions. This is 9.7 km (6.0 mi) farther than the area of impact analysis recommended in BOEM's SLVIA guidelines.

The location and layout of Vineyard Northeast and the Visual Study Area are illustrated in Figure 4.

3.2 Viewshed Analysis

Viewshed analysis identifies the maximum geographic area within which some portion of Vineyard Northeast's offshore facilities could potentially be visible based on GIS generated viewshed analysis.

For the purpose of this SLVIA, two viewshed conditions are identified;

- Zone of Theoretical Visibility (ZTV) – The ZTV defines the theoretical worst-case area of potential visual effect considering only the screening effect of existing topography and earth curvature (i.e., "bare earth" condition).
- Zone of Likely Visibility (ZLV) – The ZLV presents the more realistic case area of potential visual effect including the real-world screening elements of existing intervening vegetation and structures (i.e., "land cover" condition).

3.2.1 Viewshed Analysis Methodology

Topographic, vegetation, and built structure elevations are based on 2013–2015 Light Detection and Ranging (LiDAR) surveys obtained from the United States Geological Survey (USGS) data download (USGS, n.d.). Using the LiDAR data, a highly detailed digital terrain model (DTM) was created at a horizontal resolution of < 2 meters (< 6.6 ft) representing bare earth conditions of all sea and land surface areas within the 83.7 km (52.0 mi) radius VSA. Additionally, a digital surface model (DSM) was created at the same resolution representing the more realistic land cover condition incorporating all existing surface features including sea and land surface areas, as well as vertical elements, such as existing buildings and vegetation, that may cause visual screening.



Digital Terrain Model (DTM)



Digital Surface Model (DSM)

The viewshed calculation is based on 13 control points representing WTG positions along the shoreward facing perimeter of Lease Area OCS-A 0522 (i.e., northwestern and northeastern sides). Interior and more distant WTGs were not used in viewshed calculation as they are

redundant with the visibility of perimeter WTGs. Separate viewshed overlays were created to identify the areas with visibility of the top of foundation (35m [115ft] above MLLW) and higher, mid-tower (124m [407 ft] above MLLW) and higher, top of nacelle (249 m [817 ft] above MLLW) and higher, and the maximum blade tip height (400 m [1,312 ft] above MLLW) for both the ZTV and ZLV conditions.

Separate ZTV and ZLV viewshed overlays are also provided to define the maximum visible area of the booster station. The booster station viewshed calculation is based on the maximum structure height of 70 m (230 ft) above MLLW.

All viewshed calculations were generated using a horizontal resolution of five meters (16 ft). Viewshed calculations are based on a 1.75 m (5.75 ft) observer height above existing grade and incorporate a coefficient of refraction of 0.13 (refer to Section 5.2 below). Viewshed analyses were conducted using Global Mapper Pro v23.0 software.

Viewshed maps (including ZTV and ZLV overlays) are provided in Appendix A.

3.2.2 Field Verification

ZLV accuracy was evaluated in the field between April 10 and April 14, and May 5 and May 6, 2022. Accuracy was determined using a georeferenced PDF version of the ZLV map uploaded to Avenza Maps, a mobile map app that allows georeferenced maps to be viewed on a smartphone or tablet. Avenza Maps uses the mobile device's built-in GPS to track the user's real-time position within the context of the uploaded ZLV map. With the georeferenced ZLV map displayed on a mobile device, the visual analyst was able to visually observe whether or not a direct line-of-sight to the ocean or extended visibility across the landscape in the direction of the Lease Area and booster station exists in affected areas indicating the likelihood of project visibility.

The visual analyst travelled local roads and visited 32 Key Observation Points (KOPs) (refer to Section 6.1 below). In nearly all visited locations, the visual analyst found an unobstructed line-of-sight exists in places where project visibility is indicated on the ZLV map. Similarly, extended sight lines were consistently found to be screened in areas where no visibility is indicated on the ZLV maps.

Minor discrepancies in the ZLV overlay were noted in a limited number of visited locations where foreground scrub brush appeared to be somewhat taller than presented in the LiDAR-based DSM model. It is common for LiDAR-based DSM modelling to underestimate the height of screening vegetation. Such underestimate results in a conservative overestimate of the affected viewshed area.

In some cases where the visual analyst did not find a direct line-of-sight to the ocean from an area of ZLV indicated visibility, it is possible that the upper portion of one or more WTG's (or

the booster station) would actually be visible above intervening landform or vegetation, even though the ocean is not visible.

Minor discrepancies between the ZLV and field observation are not necessarily indicative of an error in the ZLV calculation. Such discrepancies typically represent areas that are within the margin of error of the source data. Based on field verification, the ZLV appears highly accurate and predicts the geographic extent of WTG and booster station visibility to a degree of certainty appropriate for an SLVIA.

Table 3 summarizes the affected land and ocean surface area within the VSA where one or more WTGs (blade tip, nacelle top, mid-tower and foundation top) are theoretically visible above intervening landform and the earth's curvature.

Table 4 summarizes the affected land and ocean surface area within the VSA where one or more WTGs (blade tips and nacelle tops) are likely visible above intervening landform, vegetation, and/or the earth's curvature.

Table 3- Visual Study Area ZTV Results (excluding screening vegetation)

Theoretical Visibility (Bare Earth)	Total Area		Foundation Top ZTV		Mid-Tower ZTV		Nacelle Top ZTV		Blade Tip ZTV		Total ZTV		Percent Visible
	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	
Martha's Vineyard*	26,615	65,766	0	0	62	153	8,223	20,320	4,515	11,157	12,800	31,630	48.1%
Nantucket**	14,391	35,562	0	0	3,544	8,758	2,048	5,060	1,422	3,515	7,014	17,333	48.7%
Total Islands	**41,006**	**101,328**	**0**	**0**	**3,606**	**8,911**	**10,271**	**25,380**	**5,938**	**14,672**	**19,815**	**48,963**	**48.3%**
Open Ocean***	3,077,319	7,604,221	578,555	1,429,640	682,319	1,686,047	770,062	1,902,864	880,420	2,175,565	2,911,355	7,194,116	94.6%
Total VSA	**3,118,325**	**7,705,549**	**578,555**	**1,429,640**	**685,925**	**1,694,958**	**780,333**	**1,928,244**	**886,357**	**2,190,237**	**2,931,170**	**7,243,079**	**94.0%**

* Includes Nomansland Island

** Includes Tuckernuck and Muskeget Islands

*** Open Ocean is the water surface within the VSA, exclusive of salt ponds, tidal marshes, ponds, bays, and harbors enclosed within the land mass of Martha's Vineyard, Nantucket, Nomans Land, Tuckernuck, and Muskeget Islands.

Table 4- Visual Study Area ZLV Results (including screening vegetation)

Likely Visibility (Land Cover)	Total Area		Foundation Top ZLV		Mid-Tower ZLV		Nacelle Top ZLV		Blade Tip ZLV		Total ZLV		Percent Visible
	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	(hectares)	(acres)	
Martha's Vineyard*	26,615	65,766	0	0	2	4	465	1,149	1,584	3,914	2,237	5,527	8.4%
Nantucket**	14,391	35,562	0	0	607	1,501	763	1,886	522	1,291	1,595	3,940	11.1%
Total Islands	**41,006**	**101,328**	**0**	**0**	**609**	**1,505**	**1,228**	**3,035**	**2,106**	**5,205**	**3,831**	**9,467**	**9.3%**
Open Ocean***	3,077,319	7,604,221	578,555	1,429,640	682,319	1,686,047	770,062	1,902,864	880,420	2,175,565	2,911,355	7,194,116	94.6%
Total VSA	**3,118,325**	**7,705,549**	**578,555**	**1,429,640**	**682,928**	**1,687,552**	**771,290**	**1,905,899**	**882,526**	**2,180,770**	**2,915,187**	**7,203,583**	**93.5%**

* Includes Nomansland Island

** Includes Tuckernuck and Muskeget Islands

*** Open Ocean is the water surface within the VSA, exclusive of salt ponds, tidal marshes, ponds, bays, and harbors enclosed within the land mass of Martha's Vineyard, Nantucket, Nomans Land, Tuckernuck, and Muskeget Islands.

4.0 VISUAL SETTING

4.1 Regional Landscape Description

The 83.7 km (52 mi) radius VSA includes Martha's Vineyard, Nantucket, and associated smaller islands. Martha's Vineyard is the largest island of the group, covering about 223 km^2 (55,040 acres). Nomans Land Island, a small uninhabited island of about 2.6 km^2 (640 acres) located about 4.8 km (3 mi) southwest of Martha's Vineyard, is protected as a National Wildlife Refuge. Nantucket is comprised of four islands: Nantucket, Esther Island, Tuckernuck Island, and Muskeget Island. Nantucket is the largest of the four islands and is approximately 127 km^2 (31,360 acres) in size.

With miles of oceanfront sand beaches, salt ponds, unique environmental areas, and quaint New England harbor front villages, Martha's Vineyard and Nantucket are popular tourist destinations and summer resort communities. Access to both islands is limited to boat and air service. Most visitors and residents utilize ferry services that connect mainland Cape Cod to the islands. According to the US Census Bureau, the year-round population on Martha's Vineyard is approximately 20,600 residents (United States Census Bureau, n.d.), although the summer population can swell to more than 100,000 (County of Dukes, n.d.). Nantucket has a year-round population of approximately 14,255 (United States Census Bureau, n.d.). With tourists and seasonal residents, the population of the island increases to more than 80,000 during the summer (Town of Nantucket, n.d.).

Martha's Vineyard and Nantucket were formed by the last period of continental glaciation and the rise in sea level that followed. The islands are generally characterized by low elevation, with undulating hills and shallow depressions. Elevations range from sea level to approximately 110 ft above sea level in the central portion of Martha's Vineyard and Nantucket. Most of the oceanfront is fringed by barrier beaches and sand dunes. The western and northwestern parts of Martha's Vineyard are marked by ridges and hills that extend southwesterly and end at the high cliffs of Aquinnah (Gay Head), Nashaquitsa, and Squibnocket. The elevation of these hills average about 61 m (200 ft) above sea level but extend as high as 91 m (300 ft) in some areas (SCS, 1993).

Vegetation on Martha's Vineyard and Nantucket within the VSA is characterized by a mix of scrub forest, upland heaths, sand plain grasslands, salt marshes, and open fields (agricultural and successional). Developed features include village centers, year-round and vacation homes, roads, and harbors/ports.

4.2 Seascape, Landscape, and Ocean Character Areas

Landscape, Seascape, and Ocean Character Areas are discrete settings each with its own identifiable visual qualities. While a regional landscape may possess diverse features and characteristics, a Seascape, Landscape, or Ocean Character Area is a relatively homogenous,

unified landscape (or seascape) of visual character. These areas are established to provide a framework for comparing and prioritizing the differing visual quality and sensitivity of visual resources in the VSA. The following sections provide a general description of the unique Seascape, Landscape, and Ocean Character Areas found within the VSA.

A more detailed analysis of impacts on both the physical elements and features that make up a seascape or landscape and the aesthetic, perceptual, and experiential aspects that make it distinctive is provided in Section 7.0. Seascape, Landscape, and Ocean Character Area maps are provided in Appendix B.

4.2.1 Seascape Character Areas

Seascape Character Areas (SCAs) include discrete areas of coastal landscape and adjoining areas of open water, within which there is shared inter-visibility between land and sea and which includes an area of sea (the seaward component), a length of coastline (the coastline component), and an area of land (the landward component) (Sullivan R. G., 2021, p. 63). There are six identified SCAs within the Vineyard Northeast VSA: Ocean Beach/Coastal Dunes, Coastal Bluffs, Salt Pond/Tidal Marsh, Sand Plain Grassland/Coastal Scrub, Shoreline Residential, and Coastal Village/Town Center.

Ocean Beach/Coastal Dunes - Miles of sand beaches are a defining aesthetic feature of Martha's Vineyard and Nantucket. Beaches are a significant attraction for sunbathers, surfers, fishermen, and beachcombers. During the summer season, certain stretches of the beach setting are at capacity. At other times of the year, beaches can be nearly deserted and appear in a seemingly pristine natural condition. As a daytime destination, particularly during the summer season, visitors bring brightly colored umbrellas, coolers, folding chairs, towels, and recreational watercraft. Southerly views from the beach encompass views of the open water landscape across the Ocean Character Area (refer to Section 4.2.3).

The beaches are both sandy (primarily on Nantucket and the eastern portion of Martha's Vineyard) and rocky (primarily on the western portion of Martha's Vineyard). Breaking surf is a continuous and unique visual condition. Viewer activity is almost exclusively recreational in nature, focused on passive sunbathing, swimming/surfing, walking/beach combing, bird watching, surf fishing, and other traditional ocean beach activities.

Ocean views are almost always unobstructed and considered highly scenic. Views extend up and down the coast and across open water as one looks out to sea. Man-made structures are frequently visible from beach locations, although extended stretches of beachfront on Martha's Vineyard and Nantucket are located within protected open space areas with little to no man-made development within immediate view.

Oceanfront beaches are typically bordered by undulating barrier dunes typically ranging in height from 3-6 meters (10-20 feet). Dunes are typically vegetated with low grasses and low

shrubs. Coastal dunes typically occur along the shoreline between the ocean beaches and more inland landforms and are present throughout the VSA on Martha's Vineyard and Nantucket. The dunes are typically traversed by narrow enclosed footpaths through the beach grass that provide public access to the beaches from inland roads and parking areas. Ocean views from the back side of the coastal dunes are often restricted by the dune terrain. However, the sound of breaking surf, the smell of salt air, and other obvious oceanfront characteristics create a distinct understanding that ocean views are just beyond the dunes.

- Total SCA Area: 1,901 hectares (4,697 acres)
- Total SCA Area in ZLV: 763 hectares (1,886 acres)
- Percent of SCA within the ZLV: 40.2%

Coastal Bluffs - Portions of the coastal area are defined by a distinctive topographic rise in elevation from the beach below, with coastal scrub vegetation at the top of the bluffs. Dramatic coastal bluffs occur at the eastern end of Martha's Vineyard at Gay Head, Aquinnah, and Chilmark where the land rises steeply from sand or rocky beaches to an elevation of 30 meters (100 feet) or more. Notable bluffs in this area include Gay Head Cliffs, Zacks Cliffs, Squibnocket Ridge, Nashaquitsa Cliffs, and Wequobsque Cliffs. On Nantucket, Sconset Bluff rises approximately 30 meters (100 feet) above the ocean beach at the easternmost point on the island.

The Coastal Bluff character area is defined by scenic open vistas of the ocean and distant landscape from an elevated vantage point. Viewers frequently visit these areas specifically to enjoy scenic vistas over the ocean and long-distance views up and down the coastline. Bluff vistas also commonly include man-made development including roads and vehicles, overhead utility lines, and residential development.

- Total SCA Area: 94 hectares (233 acres)
- Total SCA Area in ZLV: 68 hectares (167 acres)
- Percent of SCA within the ZLV: 71.8%

Salt Pond/Tidal Marsh - Salt ponds and tidal marshes inland of the Ocean Beach/Coastal Dunes Character Area are common throughout the coastal area. Disconnected from the ocean except during flooding events, or connected to the ocean by narrow tidal channels, these water features are defined by shallow open water and buffered by herbaceous grasses and other salt-tolerant vegetation. In those areas with hydraulic connections to the ocean, water levels rise and fall with the tide, exposing mud flats. Views over the water body and flat marshland extend until interrupted by adjacent dunes and/or scrub vegetation. Residences often are present along the edges of the ponds, many with associated docks and boats. Recreational activities in this unit include walking, boating, clam digging, bird watching, and nature appreciation.

- Total SCA Area: 6,189 hectares (15,294 acres)
- Total SCA Area in ZLV: 1,199 hectares (2,963 acres)
- Percent of SCA within the ZLV: 19.4%

Sand Plain Grassland/Coastal Scrub – At varying distances inland from the Ocean Beach/Coastal Dunes and Salt Pond/Tidal Marsh Character Areas, the coastal landscape often transitions into a broad open space comprised of relatively flat terrain to small hills and eroded hollows. Vegetation communities are dominated by low growing herbaceous vegetation or woody and often impenetrable scrub brush. Ocean vistas across the open plain are common in some areas. In other areas distant views are more localized and framed by rolling inland dunes, taller brush, and transitional forest vegetation. Views are often highlighted by adjacent salt ponds/tidal marshes, sand plain grassland, scrub brush, and/or grassy dune landscape.

Large portions of this Character Area is protected open space, either by public agencies, private land trusts, or non-profit organizations. From portions of this SCA, little to no manmade development is in view. In other areas, residential structures are visible at the perimeter of the SCA. Viewer activity is almost exclusively recreational, focused on walking, biking, nature appreciation, and bird watching.

- Total SCA Area: 3,249 hectares (8,028 acres)
- Total SCA Area in ZLV: 879 hectares (2,172 acres)
- Percent of SCA within the ZLV: 27.1%

Shoreline Residential – Shoreline (or near shoreline) residential development is common in coastal areas not currently protected by public and private land conservation initiatives. Residential development ranges from small bungalow-style beach houses to large well-maintained vacation homes. The value of these properties is largely based on direct or proximate ocean views.

Shoreline residential land use is a mix of moderately developed areas organized in suburban style neighborhood clusters and lower density secluded residential properties. Although sometimes screened by coastal scrub vegetation, shoreline residences typically have panoramic or framed views of the ocean, salt ponds/tidal marshes, and/or dune landscape. Architecture is a mixture of old and new construction and traditional/historic and contemporary styles.

The local landscape is gently rolling with a mix of coastal scrub, heath, and dunes surrounding maintained residential landscapes. Larger trees are not common in this character area. Shoreline residential homes are often used seasonally by owners or offered as vacation rentals. Visitors to these properties enjoy views of the ocean or beachfront landscape and frequently walk or drive from the residential property to the beach and other scenic coastal locations as part of their vacation routine.

- Total SCA Area: 5,170 hectares (12,776 acres)
- Total SCA Area in ZLV: 396 hectares (979 acres)
- Percent of SCA within the ZLV: 7.7%

Coastal Village/Town Center – On Martha's Vineyard and Nantucket, village and town centers are small coastal seaports with clusters of historic buildings focused around clearly defined and thriving downtown commercial districts. These maintain a quaint coastal New England character. Narrow side streets are characterized by well-maintained residential structures adjacent to the village center. Buildings are most commonly of a traditional New England architectural style and arranged in an organized pattern focusing views along the streets. Although buildings, street trees, and local landscaping generally prevent long-distance views from interior areas, direct visual access or mere proximity to harbors, bays, salt ponds, tidal marshes, and the open ocean is an important and valued aesthetic component of the Coastal Village and Town center Character Area.

Vegetation most commonly includes street trees and residential landscaping yard trees. Buildings (typically two to three stories tall) and other man-made features dominate the landscape. Architecture is highly variable in size, style, and arrangement. Each town center on Martha's Vineyard and Nantucket maintains an individual and distinctive New England character.

Village and town center communities include the population centers of Vineyard Haven, Oak Bluffs, and Edgartown on Martha's Vineyard and Nantucket Village on Nantucket.

- Total SCA Area: 1,623 hectares (4,010 acres)
- Total SCA Area in ZLV: 11 hectares (26 acres)
- Percent of SCA within the ZLV: 0.6%

Table 5 summarizes the acreage and percent of land area for each SCA found within the VSA on Martha's Vineyard and Nantucket Islands. It also lists the percentage of land area that falls within the viewshed. Table 6 summarizes the acreage and percent of land area for each SCA found within the entire VSA. It also lists the percentage of land area that falls within the viewshed.

4.2.2 Landscape Character Areas

Landscape Character Areas (LCAs) are unique and discrete geographic areas of a particular landscape type, but do not include seacoast.

There are five identified LCAs within the Vineyard Northeast VSA: Forest, Inland Sand Plain Grassland/Scrub, Rural Residential, Suburban Residential, and Industrial Open Space.

Forest—Inland from various Seascape Character Areas are extended wooded areas including both deciduous and coniferous species (e.g., oaks, hickories, and white pine). The understory is comprised of mixed shrubs, vines, and saplings. In areas exposed to coastal winds, trees are often irregular in form and stunted; trees located in better shielded inland areas are taller and more regular in form.

Although this landscape type once dominated the interior of Martha's Vineyard and Nantucket, various forms of human development extensively encroach upon this area, and only a patchwork of mature forest remains. A variety of land use activities exist in the Forest LCA, including low density residential development, rural roads, small open yards and fields, and other land uses. Such conditions are not specifically identified as separate areas due to the visual dominance of the surrounding forest. The topography in the Forest LCA is typically level to rolling with distinct ridges and gullies. Views are frequently restricted to openings in the forest canopy and axial views along roadways.

Large forest areas on Martha's Vineyard and Nantucket are protected open space, either by public agencies, private land trusts, or non-profit organizations, with little to no manmade development in immediate view. Viewer activity includes residential uses and local travel as well as recreational uses focused on walking, bicycling, and birding watching along local roads and trails.

- Total LCA Area: 7,442 hectares (18,390 acres)
- Total SCA Area in ZLV: 32 hectares (79 acre)
- Percent of LCA within the ZLV: 0.4%

Inland Sand Plain Grassland/Scrub – Large interior areas in east central and west central Nantucket include broad open space in relatively flat land or small hills dominated by low growing herbaceous vegetation or woody and often impenetrable scrub brush. In these interior areas, ocean views are not found, although long vistas across the open plain to the distant horizon are common in some areas. In other areas, distant views are more localized and framed by rolling inland dunes, taller brush, and transitional forest vegetation.

Large portions of this Character Area is protected open space, either by public agencies, private land trusts, or non-profit organizations. From portions of this SCA, little to no manmade development is in view. In other areas, residential structures are visible at the perimeter of the SCA. Viewer activity is almost exclusively recreational, focused on walking, biking, nature appreciation, and bird watching.

- Total LCA Area: 2,431 hectares (6,006 acres)
- Total SCA Area in ZLV: 85 hectares (211 acres)
- Percent of LCA within the ZLV: 3.5%

Rural Residential—The Rural Residential LCA is found along the frontage of rural roads throughout Martha's Vineyard and Nantucket, outside of the Village/Town Center and Suburban Residential LCAs and inland from coastal areas. Structures are typically single-family homes that vary widely in age and architectural style, from the traditional Cape style house to modern modular homes and historic farmhouses. Residences tend to be larger and well-maintained, often with a traditional New England character. On Martha's Vineyard and Nantucket, older homes vary in size while newer, seasonal homes are larger estates located on large lots. Many rural roads on the islands are unpaved. Residential structures are often set back from the road and interspersed with hedgerows and small woodlots. Topography is characterized by relatively level to gently rolling landforms typical of inland areas on Martha's Vineyard and Nantucket. Extended distance views are often restricted to open fields and axial views along roadways. Rural residential uses are not typically oriented toward ocean views. Viewer activity includes common residential uses, recreation, and local travel.

- Total LCA Area: 6,251 hectares (15446 acres)
- Total SCA Area in ZLV: 57 hectares (141 acres)
- Percent of LCA within the ZLV: 0.9%

Suburban Residential—Suburban residential development includes medium- to high-density single-family residential neighborhoods that typically occur on the outskirts of villages and town centers, along secondary roads and cul-de-sacs. The Suburban Residential LCA is most commonly found around the perimeter of the Village/Town Center LCA on Martha's Vineyard and Nantucket. Buildings are most often one- and two-story wood frame structures with peaked roofs and clapboard or shingle siding. House styles are primarily Capes, ranches, bungalows, salt boxes, and colonial residential structures.

Suburban residential developments generally have regularly spaced homes surrounded by landscaped yards. Residential subdivisions are commonly located within forest areas or have pockets of remnant forest vegetation within developed areas. Streets are well-organized in layout and are often curvilinear in form with well-defined access to collector streets. Activities include normal residential uses and local travel. Views are often limited by surrounding vegetation or adjacent structures. Suburban Residential Areas are not typically oriented toward ocean views.

- Total LCA Area: 6,132 hectares (15,153 acres)
- Total SCA Area in ZLV: 238 hectares (588 acres)
- Percent of LCA within the ZLV: 3.9%

Industrial Open Space–Commercial and industrial development on Martha's Vineyard and Nantucket is generally limited to relatively small commercial light manufacturing parks or individual properties on the outskirts of the Coastal Village/Town Center and Suburban Residential LCAs. For this reason, commercial and industrial uses are not defined as a distinct

landscape character area for the purpose of this SLVIA. Such areas are largely incorporated as incidental uses within the surrounding Coastal Village/Town Center and Suburban Residential LCAs.

Because the ZLV analysis has identified a relatively large area of potential project visibility within the boundary of the Nantucket Airport, located along the south shore of the island, and on the southerly facing slopes of the Nantucket Landfill, located in the west central portion of the island, these areas are separately delineated as the Industrial Open Space LCA.

For consistency, the Martha's Vineyard Airport, located in the central portion of the island is included in the Industrial Open Space LCA. However, the ZLV analysis demonstrates that Vineyard Northeast will not be visible from the Martha's Vineyard Airport.

- Total LCA Area: 1527 hectares (1,302 acres)
- Total SCA Area in ZLV: 204 hectares (505 acres)
- Percent of LCA within the ZLV: 38.8%

Table 5 summarizes the acreage and percent of land area for each LCA found within the VSA on Martha's Vineyard and Nantucket Islands. It also lists the percentage of land area that falls within the viewshed. Table 6 summarizes the acreage and percent of land area for each LCA found within the entire VSA. It also lists the percentage of land area that falls within the viewshed.

4.2.3 Ocean Character Area

The Ocean Character Area (OCA) is the area of the ocean within the ZLV but outside of any Seascape Character Areas (SCAs) within the ZLV. The OCA includes the offshore components of Vineyard Northeast. There is only one OCA for an offshore wind energy project (Sullivan R. G., 2021, p. 63).

The Ocean Character Area includes the open water of the Atlantic Ocean, Nantucket Sound, Vineyard Sound, Buzzards Bay, and Rhode Island Sound. The Ocean Character Area is characterized by broad expanses of open water that form the dominant foreground element in all directions. From all vantage points, Vineyard Northeast will be viewed over open water. In general, the waters of the Atlantic Ocean appear dark bluish-gray typical of northeastern U.S. oceanic water (as compared to the light greenish blue colors common to southeastern waters of the U.S.). Cloud cover, wind, sun reflectance, and surface glare affect the color of the water and often create patterns of color variation over the water's surface. The visible texture of the water is affected by the action of waves, which can include flat water, rolling swells, and/or choppy white cap conditions. Together, these factors contribute to an amalgam of shimmering colors and patterns of light that are of aesthetic interest and may command the attention of observers.

The waters off Martha's Vineyard and Nantucket support a wide variety of human activities, including water sports, recreational boating (sail and power craft), recreational and commercial fishing, ferry services, and commercial shipping, among others uses. Navigation through the area includes ocean-going vessels headed to/from major ports (e.g., New York and Boston), commercial fishing vessels, ferry transport (Nantucket and Martha's Vineyard), pleasure craft, and recreational fishing boats. The ocean, sound, channels, harbors, and bays are marked with maritime aids (e.g., buoys, channel markers, and warning lights).

4.2.4 Historic Districts

Landscape/Seascape Character Areas might include historic districts, which may be susceptible to visual effects of new development within their viewshed. The entirety of the islands of Nantucket, Tuckernuck, and Muskeget are listed together as a National Historic Landmark District known as the Nantucket Historic District. On Martha's Vineyard, National Register of Historic Places (NRHP) and locally designated historic districts are found in Aquinnah, Chilmark, West Tisbury, Tisbury, Vineyard Haven, Oak Bluffs, and Edgartown. Historic districts are identified on SCA/LCA mapping found in Appendix B. The degree of potential Vineyard Northeast visibility from historic districts is summarized in and . Historic properties within the viewshed of Vineyard Northeast are further described in the Historic Resources Visual Effects Assessment (HRVEA) included as Appendix II-K of the COP.

4.2.5 Environmental Justice Areas

Implemented in 1994, *Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to identify and address any potential disproportionately high and adverse health or environmental effects of federal actions (such as projects requiring federal permits) on population groups of potential concern, including minority populations, low-income populations, and Native American tribes. While this order addresses actions undertaken by federal agencies, states have also identified criteria to define Environmental Justice areas (EJAs)[9] at the state level to mitigate the potential for disproportionately high and adverse human health or environmental impacts on minority, low-income, and/or tribal populations from state actions.

EJAs based on federal and state EJ criteria are identified on ZLV mapping found in Appendix B. The degree of potential Vineyard Northeast visibility from EJAs is summarized in and . EJ communities that may be affected by views of Vineyard Northeast are further described in Section 5.2 of COP Volume II.

[9] Environmental Justice areas are not character areas but are but are special or overburdened populations census demographics that are identified within the respective Character Areas.

4.2.6 Summary of Character Areas

Table 5 and Table 6 summarize the acreage and percent of character area for each SCA, LCA, and OCA found within the VSA. It also lists the percentage of each character area that falls within the viewshed of Vineyard Northeast.

Table 5 - Character Area/Zone of Likely Visibility (ZLV) Analysis (Islands)

CHARACTER AREA	MARTHA'S VINEYARD TOTALS													NANTUCKET TOTALS											
	Total Character Area		Percent of Character Area	ZLV Area Blade Tips		ZLV Area Nacelle Top		ZLV Area Mid-Tower		ZLV Area Foundation Top		ZLV Total		Percent of Character Area in ZLI	Total Character Area		Percent of Character Area	ZLV Area Blade Tips		ZLV Area Nacelle Top		ZLV Area Mid-Tower		ZLV Area Foundation Top		ZLV Area Total		Percent of Character Area in ZLI
	(ha)	(ac)		(ha)	(ac)	(ha)	(ac)	(ac)	(ha)	(ac)	(ha)	(ha)	(ac)		(ha)	(ac)		(ha)	(ac)	(ha)	(ac)	(ha)	(ac)	(ac)	(ha)	(ha)	(ac)	
Seascape Character Areas (SCA)																												
Ocean Beach/Coastal Dunes	834	2,061	3.1%	195	482	149	368	0	0	0	0	344	850	41.2%	1,067	2,636	7.4%	101	249	230	569	88	218	0	0	419	1,036	39.3%
Coastal Bluffs	87	215	0.3%	13	32	53	132	0	0	0	0	66	164	76.3%	7	18	0.1%	0	0	0	1	1	2	0	0	1	3	18.0%
Salt Ponds/Tidal Marsh	3,802	9,395	14.3%	1,024	2,530	6	15	0	0	0	0	1,030	2,545	27.1%	2,387	5,899	16.6%	157	388	12	30	0	0	0	0	169	418	7.1%
Sand Plain Grassland/Coastal Scrub	1,266	3,129	4.8%	202	499	146	361	0	0	0	0	348	860	27.5%	1,983	4,899	13.8%	87	215	262	647	182	450	0	0	531	1,312	26.8%
Shoreline Residential	3,247	8,024	12.2%	97	239	59	147	0	0	0	0	156	386	4.8%	1,923	4,752	13.4%	37	92	84	207	119	294	0	0	240	593	12.5%
Coastal Village/Town Center	1,091	2,697	4.1%	0	0	0	0	0	0	0	0	0	0	0.0%	531	1,313	3.7%	4	9	6	16	0	1	0	0	11	26	2.0%
SCA TOTALS	**10,328**	**25,521**	**38.8%**	**1,531**	**3,782**	**414**	**1,023**	**0**	**0**	**0**	**0**	**1,945**	**4,805**	**18.8%**	**7,898**	**19,517**	**54.9%**	**386**	**953**	**595**	**1,470**	**390**	**965**	**0**	**0**	**981**	**2,423**	**12.4%**
Landscape Character Areas (LCA)																												
Forest	7,051	17,423	26.5%	23	58	8	20	0	0	0	0	32	78	0.4%	391	967	2.7%	0	0	0	1	0	0	0	0	0	1	0.1%
Inland Sand Plain Grassland/Scrub	0	0	0.0%	0	0	0	0	0	0	0	0	0	0	NA	2,431	6,006	16.9%	51	127	24	60	10	24	0	0	85	211	3.5%
Rural Residential	5,834	14,416	21.9%	17	41	41	100	4	2	0	0	57	141	1.0%	417	1,030	2.9%	0	0	0	0	0	0	0	0	0	0	0.0%
Suburban Residential	3,206	7,923	12.0%	10	25	0	1	0	0	0	0	11	26	0.3%	2,926	7,230	20.3%	66	164	80	197	81	201	0	0	227	562	7.8%
Industrial Open Space	193	478	0.7%	0	0	0	0	0	0	0	0	0	0	0.0%	333	824	2.3%	18	44	64	157	123	304	0	0	204	505	61.3%
LCA TOTALS	**16,285**	**40,240**	61.2%	**50**	**124**	**49**	**121**	**2**	**4**	**0**	**0**	**99**	245	0.6%	**6,498**	**16,057**	45.1%	**136**	**335**	**168**	**415**	**214**	**529**	**0**	**0**	**518**	1,279	8.0%
ISLANDS TOTALS	**26,613**	**65,761**	**100.0%**	**1,581**	**3,906**	**463**	**1,144**	**2**	**4**	**0**	**0**	**2,044**	**5,050**	**7.7%**	**14,396**	**35,574**	**100.0%**	**521**	**1,288**	**763**	**1,885**	**605**	**1,494**	**0**	**0**	**1,284**	**3,173**	**8.9%**
Historic Districts																												
NRHP/Local Historic Districts	349	863	1.3%	1	3	0	0	0	0	0	0	1	3	0.4%	14,396	35,574	100.0%	521	1,288	763	1,885	0	1,494	0	0	1,284	3,173	8.9%
Environmental Justice Areas																												
State EJ Area (Low-income)	501	1,239	1.9%	0	0	0	0	0	0	0	0	0	0	0.0%	0	0	0.0%	0	0	0	0	0	0	0	0	0	0	0.0%
State EJ Area (Minority)	2,040	5,041	7.7%	51	127	10	24	0	0	0	0	61	151	3.0%	2,917	7,207	20.3%	100	248	271	670	408	1,009	0	0	780	1,927	26.7%
State EJ Area (Low-income & Minority	321	794	1.2%	0	0	0	0	0	0	0	0	0	0	0.0%	0	0	0.0%	0	0	0	0	0	0	0	0	0	0	0.0%
Federal EJ Area	3,045	7525	11.4%	51	127	10	24	0	0	0	0	61	151	2.0%	202	499	1.4%	1	2	0	0	0	0	0	0	1	2	0.4%

Table 6 - Character Area/Zone of Likely Visibility (ZLV) Analysis Totals

CHARACTER AREA	VISUAL STUDY AREA (VSA) TOTALS													
	Total Character Area		Percent all Character Areas	ZLV Area Blade Tips		ZLV Area Nacelle Top		ZLV Area Mid-Tower		ZLV Area Foundation Top		ZLV Total		Percent of Character Area in ZLI
	(ha)	(ac)		(ha)	(ac)	(ha)	(ac)	(ha)	(ac)	(ha)	(ac)	(ha)	(ac)	
Seascape Character Areas (SCA)														
Ocean Beach/Coastal Dunes	1,901	4,697	4.6%	296	731	379	937	88	218	0	0	763	1,886	40.2%
Coastal Bluffs	94	233	0.2%	13	32	54	133	1	2	0	0	68	167	71.8%
Salt Ponds/Tidal Marsh	6,189	15,294	15.1%	1,181	2,918	18	45	0	0	0	0	1,199	2,963	19.4%
Sand Plain Grassland/Coastal Scrub	3,249	8,028	7.9%	289	714	408	1,008	182	450	0	0	879	2,172	27.1%
Shoreline Residential	5,170	12,776	12.6%	134	331	143	354	119	294	0	0	396	979	7.7%
Coastal Village/Town Center	1,623	4,010	4.0%	4	9	6	16	0	1	0	0	11	26	0.6%
SCA TOTALS	**18,226**	**45,038**	**44.4%**	**1,916**	**4,735**	**1,009**	**2,493**	**390**	**965**	**0**	**0**	**2,925**	**7,228**	**16.0%**
Landscape Character Areas (LCA)														
Forest	7,442	18,390	18.1%	23	58	8	21	0	0	0	0	32	79	0.4%
Inland Sand Plain Grassland/Scrub	2,431	6,006	5.9%	51	127	24	60	10	24	0	0	85	211	3.5%
Rural Residential	6,251	15,446	15.2%	17	41	41	100	2	4	0	0	57	141	0.9%
Suburban Residential	6,132	15,153	15.0%	76	189	80	198	81	201	0	0	238	588	3.9%
Industrial Open Space	527	1,302	1.3%	18	44	64	157	123	304	0	0	204	505	38.8%
LCA TOTALS	**22,783**	**56,297**	**55.6%**	**186**	**459**	**217**	**536**	**216**	**533**	**0**	**0**	**617**	**1,524**	**2.7%**
ISLANDS TOTALS	**41,009**	**101,335**	**100.0%**	**2,102**	**5,194**	**1,226**	**3,029**	**606**	**1,498**	**0**	**0**	**3,328**	**8,224**	**8.1%**
Ocean Character Area (OCA)														
Ocean	3,077,322	**7,604,221**	98.7%	880,523	2,175,817	770,064	1,902,869	682,320	1,686,047	578,555	1,429,640	1,650,587	4,078,686	53.6%
SCA/LCA TOTALS	**3,118,331**	**7,705,556**	**100.0%**	**882,625**	**2,181,011**	**771,290**	**1,905,898**	**682,926**	**1,687,545**	**578,555**	**1,429,640**	**1,653,915**	**4,086,910**	**53.0%**
Historic Districts														
NRHP/Local Historic Districts	14,746	36,437	36.0%	523	1,291	763	1,885	605	1,494	0	0	1,285	3,176	8.7%
Environmental Justice Areas														
State EJ Area (Low-income)	501	1,239	1.2%	0	0	0	0	0	0	0	0	0	0	0.0%
State EJ Area (Minority)	4,957	12,248	12.1%	152	375	281	694	408	1,009	0	0	841	2,078	17.0%
State EJ Area (Low-income & Minority	321	794	0.8%	0	0	0	0	0	0	0	0	0	0	0.0%
Federal EJ Area	3,247	8,024	7.9%	52	129	10	24	0	0	0	0	62	153	1.9%

4.3 Viewer Groups

Viewers engaged in different activities while in the same setting are likely to perceive their surroundings differently. The description of viewer groups is provided to assist in understanding the sensitivity and probable reaction of potential observers to visual change resulting from a proposed project.

Year-Round Residents – Year-Round Residents include those who live, work, and travel for their daily business within the VSA. Local Residents typically refers to year-round residents who are employed or raising their family on Martha's Vineyard and Nantucket.

Year-round residents generally view the landscape from their yards, homes, local roads, and places of employment. Residents are concentrated in and around the various village and shoreline residential areas, but can be found throughout the VSA. Except when involved in local travel, residents are likely to be stationary and have frequent or prolonged views of the landscape. Local residents may view the landscape from ground level or elevated viewpoints (typically upper floors/stories of homes). Residents of Martha's Vineyard and Nantucket also experience the landscape from the water since visits to the mainland for goods and services often require travel by ferry. Residents' sensitivity to visual quality is variable and may be tempered by the aesthetic character/setting of their neighborhood or workplace. Those living in more densely settled areas with views focused on their neighborhood street or downtown centers may be less sensitive to landscape changes than those with a view of undeveloped land or the ocean. Residents living on the coast with views toward the water may have an increased level of sensitivity to changes in the seascape. It is generally assumed, however, that all residents are familiar with the surrounding landscape and may be sensitive to changes in their views.

Seasonal Residents and Vacationers—One of the coastal area's greatest assets is the view of the Atlantic Ocean and Nantucket Sound and its shoreline landscape. Martha's Vineyard and Nantucket have long been renowned tourist destinations offering a broad-spectrum of passive and active recreational pursuits focused on their scenic and upscale coastal setting. While some visit the islands for a few days or a week in the summer, others may spend the entire summer season in the area. Seasonal residents and vacationers typically visit Martha's Vineyard and Nantucket for relaxation and enjoyment of the natural, cultural, and social resources of the area. They are commonly involved in outdoor recreational activities at beaches, parks, and conservation areas or visiting Village/Town Center areas. Typical activities include sunbathing, beach combing, swimming, walking, bicycling, recreational boating, fishing, and other passive recreation.

While the sensitivity of these viewers will vary, seasonal residents and vacationers will be highly sensitive to built elements on the landscape since quality views of the ocean are likely a primary reason for their visit and an integral part of their recreational experience. Some visitors may find their experience would be worsened, primarily due to the visual disruption of the seascape. Other visitors may have a preference for areas providing views of WTGs and may visit the area

primarily for the purpose of seeing WTGs. The potential impact of Vineyard Northeast on recreation and tourism is further discussed in Section 5.3 of COP Volume II.

Greater numbers of tourists, vacationers, and recreational users will be present in the coastal area during the summer and on sunny days, when the weather is often clear and warm as compared to overcast, rainy, or cold days. In addition, more recreational users will be present in the coastal area on weekends and holidays than on weekdays.

Scenery/Heritage-Oriented Visitors– Scenery/Heritage-Oriented Visitors may be a subset of Seasonal Residents and Vacationers or may also include single day visitors to Martha's Vineyard and Nantucket. This user group typically visits natural or scenic areas for the express purpose of enjoying the aesthetic quality of the landscape. This user group may also include heritage tourists interested in exploring valued assets such as historic buildings and cultural traditions.

Recreational activities enjoyed by this viewer group may include biking/hiking, camping, hunting, fishing, birdwatching, nature/landscape photography, star gazing, general appreciation of historic architecture and the cultural landscape, and other passive outdoor recreational activities. Scenery/Heritage-Oriented Visitors are likely highly sensitive to built elements within seascape views since open views of the ocean are likely a primary reason for their visit and an integral part of their recreational experience.

Recreation-Oriented Visitors – Recreation-Oriented Visitors may also be a subset of Seasonal Residents and Vacationers, or may be single day visitors to Martha's Vineyard and Nantucket. This user group typically visits the area to enjoy more active outdoor recreational pursuits such as biking, jogging, vigorous hiking, surfing, golf, tennis, beach/field sports, or other active outdoor recreational activities. Recreation-Oriented Visitors may be highly sensitive to built elements on the landscape since quality views of the ocean may be an integral part of their recreational experience. Others may be less sensitive as the visual quality of their surroundings may be secondary to enjoyment of the recreational activity itself.

Recreational Mariners – Seasonal residents, vacationers, and day use visitors commonly enjoy on-water leisure pursuits in private vessels and for-charter vessels, including sport fishing, sailing, and sight-seeing.

Recreational boating is typically concentrated within several miles of the coastline. However, recreational mariners may venture many miles offshore along the Outer Continental Shelf, including on water vantage points near or within Lease Area. Recreational mariners may be particularly sensitive to man-made structures within the seascape since views are commonly limited to open ocean and horizon when venturing far offshore, and distant coastal land masses when closer to shore. Recreational mariners may have prolonged visual exposure to the seascape and coastal environment. This is the only user group that would have foreground and middleground views of the WTGs and booster station. Land based user groups are limited to the far background views (i.e., greater than 49.1 km [30.5 mi] from the WTGs) (refer to Section 5.1.1 below).

While the unique character of open ocean views is an important part of the recreational experience for most recreational mariners, viewers may also be cognizant of waterfront development visible from near shore vantage points. While the sensitivity of recreational mariners will vary, to most viewers, the unique visual character of the open ocean, bays, harbors, and inlets is an important and integral part of the recreational experience.

Through Travelers—This group includes non-local viewers with views of the ocean. Through travelers are typically moving, have a relatively narrow field of view oriented along the axis of the roadway, and are destination oriented. Through Travelers include driver and passenger automobile users. Drivers will generally be focused on the road and traffic conditions but do have the opportunity to observe roadside scenery. Passengers in moving vehicles will have greater opportunities for prolonged off-road views than will drivers, and therefore may be more aware of the quality of surrounding scenery.

Field observation found few roads with significant or extended views of the ocean.

Also included in this group are travelers that may transit the ocean on ferries from the mainland. These viewers include those engaged in passive enjoyment of the ocean ambiance as well as those who pass the travel time occupying themselves with business or other personal activities.

Views from the Hyannis/Nantucket ferry would be limited to the blade tip potentially visible above the land mass of Nantucket Island at distances greater than 56.3 km (35 mi). At no point along the Nantucket/Hyannis ferry route would the nacelle of any WTG be visible above the horizon.

Vineyard Northeast will not be visible from the Woods Hole/Martha's Vineyard ferries.

4.3.1 Public Reaction

Regardless of the viewer group, public reaction to Vineyard Northeast is likely to be variable. Not all viewers see WTGs as having an adverse visual impact. A number of research studies examining the visual impacts of offshore and onshore wind energy developments indicate that wind power enjoys strong support among members of the public and, unlike most large-scale energy facilities, WTGs are, in some cases, viewed as a positive visual impact by significant portions of the public (BOEM, 2007).

While strong support for wind power development generally exists, local concerns relating to the aesthetics of planned wind facilities are not uncommon. The perceptions of visual impacts associated with wind energy development vary among potential viewers and may be positive or negative, can change over time, and, in some cases, possibly trend toward more positive perceptions after the installation of wind energy facilities (BOEM, 2007).

Warren et al. (2005) assessed pre- and post-development attitudes toward visual impacts associated with two onshore wind facilities in Ireland. Their survey found, for one location, that more than 90% of survey respondents supported the concept of wind power, but 66% of

respondents were initially opposed to a local proposed wind facility. Contrary to expectations, individuals living closest to the onshore wind facility, who had originally opposed it on aesthetic grounds, actually increased their acceptance of the visual impacts after construction, with 62% regarding the visual impact as positive. Similar results were observed for a second onshore wind facility. The results in both cases suggest that familiarity with the wind facilities decreased aesthetic objections. Stated reasons for changing perceptions of visual impacts varied among respondents—some felt the WTGs were attractive while others felt that the actual impacts were less than had been anticipated (BOEM, 2007).

4.4 Circumstances of View

View duration affects perceived visual impacts. Impacts that are viewed for a long period of time, such as from a place of residence or employment, are generally judged to be more severe than those viewed briefly (BOEM, 2007). Sites of short-term exposure include locations where a stationary observer is only visiting, such as beaches or other coastal recreation areas. The duration of visual impact remains at the discretion of the individual observer; however, short-term impacts diminish with repeated observations by the same observer (i.e., people become accustomed to common views).

Moving Views—Moving views are those experienced in passing, such as from moving land-based or water-based vehicles and craft, where the time available for a viewer to cognitively experience a particular view is limited. Typically, such views apply to motorists proceeding at a high rate of speed along a defined path through highly complex stimuli.

Traveling at a slower speed over open water, recreational boaters and ferry travelers may have greater opportunities to cognitively experience their surroundings. For sailboats and very slow-moving motor craft, visual recognition may be similar to that described for stationary viewers. For reasons of safety, including avoidance of other vessels and surface flotsam, a boater may nevertheless still tend to focus more on the direction of travel rather than other directions.

5.0 OTHER FACTORS AFFECTING VISIBILITY OF VINEYARD NORTHEAST

In the case of long-distance views, theoretical visibility typically exceeds actual visibility. In seascapes, atmospheric conditions reduce the practical viewing limit, sometimes significantly. The presence of waves will obscure objects very low on the horizon. The limits of human visual acuity reduce the ability of an observer to discern objects at great distances, suggesting that some WTG components (e.g., blades) would not be discernible. The color, reflectivity, and other visual characteristics of the object, and its contrast with the visual background under varying lighting conditions, also affect its visibility (BOEM, 2007).

5.1 Viewer Distance

5.1.1 Distance Zones

Viewer distance from an area is a key factor in determining the level of visual impact, with perceived impact generally diminishing as distance between the viewer and the affected area increases (BOEM, 2007).

Distance can be discussed in terms of pre-defined distance zones: foreground, mid-ground, and background. Each zone represents a set of visual conditions that are predictive of how an object will appear to change from zone to zone. The following description of each distance zone is provided to assist in understanding the effect of distance on potential visual impacts (BLM, 2013; Jones and Jones; 1977; Litton, 1968).

Foreground (0 to 1/2 mi)—At a foreground distance, viewers typically recognize a very high level of detail. Contrast and color intensity are at their greatest and human scale is an important cognitive factor in judging spatial relationships and the relative size of objects. Visual impact is likely to be considered the greatest at a foreground distance.

With the nearest coastal vantage point just over 49.1 km (30.5 mi) from any WTG and 23.5 km (14.6 mi) from the booster station, only boaters passing within very close proximity to the Lease Area will view Vineyard Northeast from the foreground distance zone.

Mid-ground (1/2 mi to 3–5 mi)—At this distance, elements begin to visually merge or join. Colors, intensity, and textures become muted by distance, but are still identifiable. Visual detail is reduced, although distinct patterns may still be evident. Viewers at mid-ground distances typically recognize surface features such as tree stands, building clusters, and small landforms. Scale is perceived in terms of identifiable features of development patterns. From this distance, the contrast between color and texture is identified in terms of their regional context rather than their immediate surroundings.

Background (3–5 mi to horizon)—At this distance, landscape elements lose detail and become less distinct. Even on the clearest of days, the sky is not entirely transparent because of the presence of atmospheric particulate matter. As the distance between an observer and a visible object increases, the light scattering effect of particulate matter causes a reduction in color intensity and contrast between light and dark. Contrast depends upon the position of the sun

and the reflectance of the object, among other conditions. The net effect is that objects appear "washed out" over great distances; referred to as atmospheric perspective, this phenomena changes colors to blue-grays, while surface texture characteristics are lost, and only broad landforms are discernible. With atmospheric perspective, visual emphasis is on the outline or edge of one landmass or water resource against another with a strong skyline element (NYSDEC, 2000).

All land-based vantage points will view Vineyard Northeast from the far background distance zone.

5.1.2 Point of Visual Extinction

The Lease Area (excluding the separate booster station aliquot that is closer to shore) is approximately 46 km (29 miles) from the south shore of Nantucket, MA (at Long Joseph Point) and 62 km (38 mi) southeast of Martha's Vineyard, MA (at Wasque Point, Chappaquiddick Island). Viewing distances increase as viewers move up or down the coast on Martha's Vineyard and Nantucket.

As an observer moves farther and farther from an object, the smaller the object appears. Beyond a certain distance, depending upon the size and degree of contrast between the object and its surroundings, the object may not be a point of interest for most people. At this hypothetical distance it can be argued that the object has little impact on the composition of the landscape of which it is a tiny part. Eventually, at even greater distances, the naked eye is incapable of seeing the object at all (NYSDEC, 2000).

Sullivan, in *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances* (2013), concludes that small- to moderately-sized facilities were visible to the unaided eye at distances greater than 41.8 km (26 mi), with WTG blade movement visible up to 38.6 km (24 mi). At night, aviation obstruction lighting was visible at distances greater than 38.6 km (24 mi). The observed wind facilities were judged to be a major focus of visual attention at distances of up to 16 km (10 mi), were noticeable to casual observers at distances of almost 28.9 km (18 mi), and were visible with extended or concentrated viewing at distances beyond 30 km (25 mi). While Vineyard Northeast is larger in scale than the projects evaluated by Sullivan, these findings provide additional perspective concerning the effect of distance on human visibility of offshore wind energy facilities and further support the conclusion that the 83.7 km (52 mi) VSA used in this visual analysis is highly conservative.

5.2 Curvature of the Earth

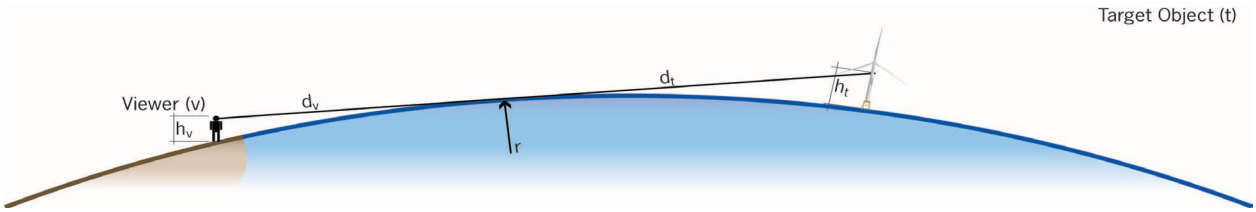
Due to the curvature of the earth's surface, objects viewed on the horizon are not seen in their entirety because they begin to fall below the visible horizon. Therefore, as the distance from the viewing location to the object continues to increase, less of the object will be visible. The impact the earth's curvature has on views of objects on the horizon may be lessened by the refraction of light in the earth's atmosphere, which, at long distances, curves our line of sight

downwards. As described below, the phenomenon of light refraction is based on a number of environmental factors that can affect the extent of distant visibility.

From all vantage points, Vineyard Northeast WTGs will be viewed over open water, as atmospheric conditions permit, at great distance (at or greater than 49.1 km [30.5 mi] from any coastal vantage point). At such an extended distance, the curvature of the earth will affect the visibility of the offshore facilities in Lease Area OCS-A 0522. The degree of screening caused by earth's curvature depends on the elevation of the viewer above sea level (denoted as "hv" in the diagram below) and the distance of the viewer from the proposed object.

The degree of visibility above the visible horizon for any object can be geometrically calculated using the Pythagorean Theorem ($a^2+b^2=c^2$). The distance that the target object will become visible above the horizon from a known vantage point is the sum of the distance between from the viewer location to the visible horizon and the distance from the target object to the visible horizon.

Figure 7 – Geometric Horizon Diagram



The distance to the geometric horizon from any point is calculated as follows:

From the Pythagorean theorem:	Where:
$r^2+d^2=(r+h)^2$,	d=distance to horizon;
Simplifying;	h=elevation (asl) of viewer (eye level) or target
d = square root of (h^2+2hr)	object; and
	r=radius of the earth (3,963 miles = 20,924,640 ft)

The sightline distance between viewer (v) and target object (t) = dv+dt

Atmospheric Refraction—The distance to the optical horizon is slightly greater than the simple geometric calculation because the atmosphere bends light around the earth (atmospheric refraction) allowing a viewer to see farther. The exact amount of bending depends on several variables, including elevation and the composition of the atmosphere (which varies with location, weather, etc.).

BOEM's SLVIA guidelines state, "[a]ll viewshed analysis conducted for BOEM-approved SLVIAs incorporate earth curvature and atmospheric refraction. Given the atmospheric refraction effects on visibility vary over time and at different locations, the GIS software's default value for atmospheric refraction or a stated and generally accepted value for refraction can be used" (Sullivan R. G., 2021, p. 69).

All calculations used in this SLVIA include a coefficient of refraction of 0.13 to account for atmospheric refraction. This coefficient of refraction is based on two sources: the default refractivity coefficient in ArcGIS Spatial Analyst software is 0.13 (ESRI, n.d.) and WaBis Advanced Earth Curvature Calculator, which classifies a refraction coefficient between 0.12 and 0.17 as "standard" (WaBis, n.d.). It is notable that BOEM previously referenced a less conservative refraction coefficient of 0.088 as a reasonable standard for visual impact assessment (URS Group, Inc. and Truscape, 2015).

Table 7 below provides values for the extent to which the WTGs would fall below the visible horizon at different distances and viewer elevations based on a coefficient of refraction of 0.13. For example, from beach level vantage points (assuming a viewer eye level of 1.83 meters [6 feet] asl), the nacelle (and FAA aviation obstruction lights) will fall below the horizon at approximately 65.5 km (40.7 mi). At the same beach level viewing elevation, the blade tip will fall below the horizon at approximately 81.6 km (50.7 mi).

Due to distance (at or greater than 49.1 km [30.5 mi] from any coastal vantage point), any ESP located within the Lease Area would fall well below the visible horizon as viewed from any coastal vantage point.

The booster station is just over 23.5 km (14.6 mi) south of Martha's Vineyard, MA and 25.6 km (15.9 mi) southwest of Nantucket, MA. From beach level vantage points (assuming a viewer eye level of 1.83 meters [6 feet]), the up to 70 m (230 ft) tall (above MLLW) booster station would fall below the visible horizon at a distance of approximately 37.1 km (23 mi).

Similarly, due to this extended distance, there is no land-based vantage point that will view an entire WTG; some portion of the WTG structure will always fall below the visible horizon. Because atmospheric conditions reduce visibility, sometimes significantly, and the presence of waves obscure objects very low on the horizon, maximum theoretical viewing distances typically exceed what is experienced in reality. Furthermore, limits to human visual acuity reduce the ability to discern objects at great distances, suggesting that a WTG may not be discernible at the maximum distances, although they theoretically would be visible (BOEM, 2007).

Table 7 – Portion of WTG (1,312 ft) Visible Above Horizon (ft) (0.13 refraction coefficient)

Eye Level Elev. (ft) asl	*Distance (mi)*																																		
	30	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**
6	895	864	831	797	762	726	689	650	611	570	528	485	441	396	349	301	253	203	151	99	46														
10	924	893	862	829	795	760	724	686	648	608	567	526	482	438	393	346	298	249	199	148	96	42													
15	951	922	891	860	827	793	758	721	684	645	606	565	523	480	435	390	343	295	246	196	145	92	39												
20	973	945	915	885	853	820	785	750	714	676	637	597	556	514	470	426	380	333	285	236	185	134	81	27											
25	992	965	936	906	875	843	809	775	739	702	664	625	585	543	501	457	412	366	318	270	221	170	118	65	11										
30	1009	982	954	925	895	863	830	797	762	725	688	650	610	569	527	484	440	395	348	301	252	202	151	98	45										
35	1024	998	971	942	912	881	849	816	782	746	710	672	633	593	552	509	466	421	375	328	280	231	180	129	76	22									
40	1038	1012	985	957	928	898	867	834	801	766	730	693	654	615	574	532	489	445	400	354	306	257	208	157	104	51									
45	1050	1025	999	972	943	914	883	851	818	783	748	711	674	635	595	554	511	468	423	377	330	282	233	182	131	78	24								
50	1062	1037	1012	985	957	928	898	866	834	800	765	729	692	654	614	573	532	489	445	399	353	305	257	207	156	104	50								
55	1073	1049	1023	997	970	941	911	881	849	815	781	746	709	671	632	592	551	508	465	420	374	327	279	230	179	127	75	21							
60	1083	1059	1034	1009	982	954	925	894	863	830	796	761	725	688	649	610	569	527	484	440	394	348	300	251	201	150	98	44							
65	1092	1069	1045	1020	993	966	937	907	876	844	810	776	740	703	665	626	586	544	502	458	413	367	320	272	222	171	120	67	12						
70	1101	1078	1055	1030	1004	977	948	919	888	857	824	790	755	718	681	642	602	561	519	476	431	386	339	291	242	192	140	88	34						
75	1109	1087	1064	1040	1014	987	960	931	900	869	837	803	768	732	695	657	618	577	535	493	449	403	357	310	261	211	160	108	55	1					
80	1117	1096	1073	1049	1024	997	970	942	912	881	849	816	781	746	709	672	633	592	551	509	465	421	375	328	279	230	180	128	75	21					
85	1125	1104	1081	1058	1033	1007	980	952	923	892	861	828	794	759	723	685	647	607	566	524	481	437	391	345	297	248	198	147	94	41					
90	1132	1111	1089	1066	1042	1016	990	962	933	903	872	840	806	771	736	699	661	621	581	539	496	453	408	361	314	265	216	165	113	60	6				
95	1139	1118	1097	1074	1050	1025	999	972	943	914	883	851	818	783	748	711	674	635	595	554	511	468	423	377	330	282	233	182	131	78	24				
100	1145	1125	1104	1082	1058	1034	1008	981	953	924	893	862	829	795	760	724	686	648	608	567	525	482	438	393	346	298	249	199	148	96	42				
105	1152	1132	1111	1089	1066	1042	1016	990	962	933	903	872	840	806	771	736	699	661	621	581	539	496	453	408	361	314	265	216	165	113	60	6			
110	1158	1138	1118	1096	1074	1050	1025	998	971	942	913	882	850	817	783	747	710	673	634	594	553	510	467	422	376	329	281	232	181	130	77	23			
115	1163	1144	1124	1103	1081	1057	1032	1007	980	951	922	892	860	827	793	758	722	685	646	606	565	523	480	436	390	344	296	247	197	146	93	40			
120	1169	1150	1131	1110	1088	1064	1040	1015	988	960	931	901	870	837	804	769	733	696	658	618	578	536	493	450	404	358	311	262	212	161	109	56	2		
125	1174	1156	1137	1116	1094	1071	1047	1022	996	968	940	910	879	847	814	779	744	707	669	630	590	549	506	463	418	372	325	277	227	177	125	72	18		
130	1179	1161	1142	1122	1101	1078	1055	1030	1004	977	948	919	888	857	824	790	754	718	680	642	602	561	519	476	431	385	339	291	242	192	140	88	34		

Nacelle Top (817 ft) visible above horizon

Nacelle Top (817 ft) falls below horizon

5.3 Meteorological Visibility

Visibility can be reduced by fog, rain, snow, particulate matter, smog, or any combination of thereof as part of normal atmospheric conditions.

Visibility measurements from meteorological stations measure the "the greatest distance at which an observer can just see a black object viewed against the horizon sky" and are typically recorded in intervals ranging from ¼ to 10 statute miles. Visibility data from Martha's Vineyard and Nantucket airports for the 11-year period from 2006-2016 was measured and recorded on a 1-minute basis, averaged across hours, and then binned to the following categories: less than ¼ mile, ¼ mile, ½ mile, ¾ mile, 1 mile, 1¼ miles, 1½ miles, 1¾ miles, 2 miles, 2½ miles, 3 miles, 3½ miles, 4 miles, 5 miles, 7 miles, and 10 miles or greater for the hourly reports. It is important to note one key limitation of the airport data, which is the fact that airports do not report visibility greater than 10 statute miles. As shown in Table 8, analysis of the hourly data indicates the majority of the hours yielded a visibility of 10 miles or greater.

Table 8 – Frequency of Reported and Truncated Visibility Ranges

	Less than 10 miles (percent)				10 miles or greater (percent)			
	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall
Martha's Vineyard	21%	24%	30%	20%	79%	76%	70%	80%
Nantucket	30%	34%	39%	26%	70%	66%	61%	74%

Table 9 provides a breakdown of the airport-reported visibility during daytime and nighttime hours.

Table 9 – Frequency of Reported Visibility Ranges from Martha's Vineyard and Nantucket Airports (Not Equivalent to Visibility of Vineyard Northeast from the Shoreline)

Percentage of Time Airport Visibility is 10 Statute Miles or Greater						
Location	Time	Winter	Spring	Summer	Fall	Annual
Martha's Vineyard Airport	Day	80%	80%	77%	83%	80%
	Night*	0%	0%	0%	0%	0%
	Total**	37%	47%	45%	38%	42%
Nantucket Airport	Day	71%	69%	66%	75%	70%
	Night*	0%	0%	0%	0%	0%
	Total**	33%	41%	38%	35%	37%

* Unlit objects will not be visible at >10 miles at night. The use of ADLS reduces expected nighttime lighting approximately 1.25 hours/year, which is <0.1% of annual nighttime hours and is rounded to 0% in this table.

** Seasonal results adjusted to reflect daylight hours.

Given that Vineyard Northeast is 49.1 km (30.5 mi) from shore, this analysis of airport data (where values are simply reported as 10 statute miles or greater) does not equate to actual

visibility of the wind turbines or associated structures. While meteorology will impact the ability of an observer to see the wind turbines or associated structures, factors such as turbine color, scale, movement, distance, and observer geometry are also other critical considerations. For example, at 49.1 km (30.5 mi) or greater from shore, there is no land-based vantage point that will view an entire WTG. Some portion of each of the structures will always fall below the visible horizon, and the presence of waves further reduces the portion of structures visible.

Importantly, the Proponent's proposed actions will substantially mitigate the visibility of the offshore facilities:

- Subject to BOEM approval, the Proponent will use an Aircraft Detection Lighting System (ADLS) or similar system that automatically activates all aviation obstruction lights when aircraft approach the Lease Area. The use of ADLS will reduce nighttime lighting and thus, minimize nighttime visibility of Vineyard Northeast's offshore facilities. Such a lighting system will only be activated a tiny fraction of the time (estimated at approximately 1.25 hours/year). Accordingly, nighttime lighting will be almost eliminated, and in the absence of lighting, Vineyard Northeast will not be visible from shore at night.
- In accordance with BOEM and FAA guidance, the WTGs will be no lighter than pure white (RAL 9010) and no darker than light grey (RAL 7035) in color; the Proponent expects that the WTGs will be off-white/light grey to reduce their visibility against the horizon. The ESP and booster station topsides are expected to be light grey in color. The off-white/light grey color will reduce contrast with the sea and sky and thus minimize daytime visibility of the offshore facilities. The conservative threshold for visibility is "the greatest distance at which an observer can just see a black object viewed against the horizon sky." The WTGs will not be black; instead, the neutral off-white/light grey color will be highly compatible with the hue, saturation, and brightness of the background sky. This lack of contrast between the structures and the background means that the percentage of the time the structures might be visible is greatly reduced.

Additionally, different factors affect visibility, including air quality, sea spray and salts over the ocean's surface, and the angle of the sun. The presence of sea spray and salts affects visibility but is not likely captured by the measurements of visibility in Tables 8 and 9. Therefore, calculated visibilities should be considered conservative since they do not account for these light-reducing factors.

Based on the analysis described above, the structures will not be visible most of the time for viewers along the Martha's Vineyard and Nantucket coastlines.

6.0 IMPACT RECEPTOR IDENTIFICATION AND DESCRIPTION

The scenic and aesthetic values of coastal areas play an important role in attracting visitors. Martha's Vineyard and Nantucket are both well-known tourist locations. Recreation and tourism-related industries provide almost one quarter of the employment and wages in Nantucket and Dukes Counties, which include Nantucket and Martha's Vineyard, respectively.

A mix of public, private, and residential beaches are located on Martha's Vineyard and Nantucket. Martha's Vineyard has 19 beaches: 14 are public, four are for town residents only, and one is off limits. Seven of these beaches are on the south side of Martha's Vineyard looking towards Lease Area OCS A-0522. Nantucket has 10 public beaches, four of which are on the south side of the island looking towards the Lease Area. Both Martha's Vineyard and Nantucket have walking and biking paths accessible to the public along the southern coasts of the islands.

There are five lighthouses on Martha's Vineyard, but only one is on the southern side of the island—the Gay Head Lighthouse in Aquinnah—which is open to the public during the summer season. Of the three lighthouses on Nantucket, none are on the south side of the island. However, Sankaty Head Lighthouse is located along Nantucket's eastern coast at the highest point on the Island. Southward vistas across the landscape in the direction of Lease Area OCS-A 0522 are found.

Extensive land areas recognized to be of significant cultural, agricultural, scenic, natural, and recreational importance on both Martha's Vineyard and Nantucket are protected under the stewardship of various land conservation organizations (i.e., The Trustees of Reservations, Vineyard Conservation Society, Nantucket Conservation Foundation, Nantucket Land Bank, Nantucket Land Council, and others). Most conservation lands are open to the public for recreation enjoyment with permitted uses including hiking, biking, horseback riding, birding, and general enjoyment of the natural and scenic landscape. Many protected properties offer open vistas of the ocean or views of the extended island landscape across sand plain grasslands and heathlands.

As a practical reality, the entire oceanfront within the VSA is highly scenic and of great aesthetic importance to the social, cultural, and economic well-being of the region. In fact, the Nantucket Historic District is a National Historic Landmark District that encompasses the entire island of Nantucket, as well as the smaller adjacent islands of Tuckernuck and Muskeget. At over 30,000 acres, the Nantucket Historic District is the largest National Historic Landmark District by area in the contiguous United States.

Additional information on historic properties is found in the Vineyard Northeast Historic Properties Visual Effects Assessment (COP Appendix II-K).

For the purpose of this SLVIA, all public places with ocean views are considered to be of significance. This notwithstanding, man-made development is a common aspect of the visual landscape. Residential homes, commercial establishments, roads, above ground utility

infrastructure, recreational and commercial marine uses, and other built features are readily apparent in most views.

6.1 Key Observation Points

Although the possibility of views of Vineyard Northeast exists throughout the oceanfront area, 32 key observation points (KOPs) were selected in consultation with BOEM (pre application meeting, March 28, 2022) from which more detailed analyses were conducted.

KOPs were selected based on the following criteria:

- Locations identified by federal, state, local, or tribal officials/agencies as important visual resources, either in prior studies or through direct consultation;
- Locations which provide clear, unobstructed views toward the Lease Area site (as determined through ZLV analysis and field verification);
- Visually sensitive places representative of a larger group of candidate KOPs of the same type or in the same geographic area;
- Vantage points representative typical views from different Landscape Character Areas;
- Views of the Lease Area commonly available to representative viewer/user groups; and
- Geographic distribution across the VSA illustrating a range of distances to the Lease Area and booster station.

Locations of the selected KOPs are shown in Figure 10 and Figure 11. Information describing each of the 32 evaluated KOPs is summarized in Table 10. A photo log and supplemental information describing individual KOPs is provided in Appendix C.

Cape Poge Light - BOEM requested the Cape Poge Light (sometimes called Cape Pogue Light) be considered as a KOP (pre application meeting, March 28, 2022).

Cape Poge Lighthouse is situated at the northeast corner of Chappaquiddick Island within the Cape Poge Wildlife refuge on land owned by the Trustees of Reservations (“the Trustees”). While the Coast Guard still owns the lighthouse and cares for the optic, the Trustees have been maintaining the tower since 1994. The ground elevation at the lighthouse is approximately 8.8 meters (29 feet) above mean high water and the lighthouse itself is approximately 10.9 meters (36 feet) tall.

The lighthouse can be reached on foot via a 5.6 km (3.5 mile) sand road or with a four-wheel drive vehicle (by special permit). The Trustees offer guided tours to the lighthouse (by reservation only) during the summer season. However, the lighthouse structure is unsafe for public visitation and tours to the top of the structure are not currently offered.

The base of the light house is surrounded by dense scrub vegetation which substantially limits ground level views in the direction of Vineyard Northeast to the immediate foreground.

Unobstructed views in the direction of Vineyard Northeast are found at a nearby beach front vantage point approximately 200 meters (650 feet) from the lighthouse structure.



View in the direction of Vineyard Northeast from the lighthouse base.



View in the direction of Vineyard Northeast from a nearby beach.

The nearest Vineyard Northeast WTG is approximately 70.8 km (44.0 mi) south southeast of the Cape Poge Light and nearby beach. At this distance, the top of the nearest WTG nacelle would fall below the visible horizon from ground level vantage points. Only the upper portion of the rotor blades would be visible above the horizon. From the top of the lighthouse (should the lighthouse reopen for public visitation) the nacelle would be visible low on the horizon at a distance of approximately 70.8 km (44.0 mi).

Views from the base of the lighthouse are substantially screened by local scrub vegetation and only the upper portion of the rotor blades would be visible above the horizon from the nearby beachfront vantage point. Therefore, the Cape Poge Light is not included in the KOP analysis. M01 – Wasque Beach, M02 Wasque Reservation and M03 - Quammux Trailhead are included as KOPs representative of views from Chappaquiddick Island.

Table 10 – Key Observation Points

Map ID	Name	Municipality	SCA/LCA	Resource Type	Use Type	Relevant Viewer Groups	Dist. to nearest WTG	View Orientation	Horiz. Field of View	Elevation (Ft ASL)	Dist. to Booster Station
MARTHA'S VINEYARD											
M09	Gay Head Lighthouse	Aquinnah	Coastal Bluffs	Historic Site/Scenic Overlook	Scenic/Cultural Tourism	Scenery/Heritage-oriented Visitors	78.4 km (48.7 mi)	SE	26.3	49.1 m (161 ft)	37.5 km (23.3 mi)
M08	Squibnocket Beach	Chillmark	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	72.3 km (44.9 mi)	SE	28.2	4.2 m (14 ft)	30.9 km (19.2 mi)
M07	Peaked Hill	Chillmark	Forest	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	74.4 km (46.2 mi)	SE	27.4	95.7 m (314 ft)	32.3 km (20.1 mi)
M06	Allen Farm Scenic Overlook	Chillmark	Shoreline Residential	Scenic Overlook	Scenic/Cultural Tourism	Scenery/Heritage-oriented Visitors	72.4 km (45.0 mi)	SE	28.0	14.3 m (47 ft)	30.7 km (19.1 mi)
M05	Long Point Beach	West Tisbury	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	69.0 km (42.9 mi)	SE	28.8	5.5 m (18 ft)	26.7 km (16.6 mi)
M04	South Beach	Edgartown	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	65.2 km (40.5 mi)	SSE	29.6	3.7 m (12 ft)	24.0 km (14.9 mi)
M03	Quammux Trailhead	Edgartown	Salt Ponds/Tidal Marsh	Trail, car-top launch	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	65.2 km (40.5 mi)	SSE	29.3	3.0 m (10 ft)	25.1 km (15.6 mi)
M02	Wasque Reservation	Edgartown	Sand Plain Grassland/Coastal Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	63.9 km (39.7 mi)	SSE	29.6	12.8 m (42 ft)	24.5 km (15.2 mi)
M01	Wasque Beach	Edgartown	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	63.2 km (39.3 mi)	SE	29.3	7.3 m (24 ft)	24 km (14.9 mi)
NANTUCKET											
N25	Madaket Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	51.5 km (32.0 mi)	S	31.4	6.4 m (21 ft)	28.2 km (17.5 mi)
N24	Madaket Residential Area	Nantucket	Shoreline Residential	Residential	Vacation Residential	Seasonal Residents and Vacationers	51.7 km (32.1 mi)	S	31.3	7.0 m (23 ft)	28.2 km (17.5 mi)
N23	Head of Plains Beach	Nantucket	Sand Plain Grassland/Coastal Scrub	Public Beach, trail	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.5 km (31.4 mi)	S	31.3	7.9 m (26 ft)	29.5 km (18.3 mi)
N22	Clark Cove Pond	Nantucket	Salt Ponds/Tidal Marsh	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.9 km (31.6 mi)	S	31.0	4.9 m (16 ft)	30.3 km (18.8 mi)

Table 10 – Key Observation Points

Map ID	Name	Municipality	SCA/LCA	Resource Type	Use Type	Relevant Viewer Groups	Dist. to nearest WTG	View Orientation	Horiz. Field of View	Elevation (Ft ASL)	Dist. to Booster Station
N21	Sanford Farm Barn Walk/Ram Pasture	Nantucket	Sand Plain Grassland/Coastal Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	51.3 km (31.9 mi)	S	30.4	15.2 m (50 ft)	31.5 km (19.6 mi)
N20	Cisco Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.7 km (30.9 mi)	S	31.1	7.0 m (23 ft)	30.7 km (19.1 mi)
N19	Cisco Bike Path	Nantucket	Shoreline Residential	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.1 km (31.1 mi)	S	31.0	7.9 m (26 ft)	31.1 km (19.3 mi)
N18	Proprietors Way	Nantucket	Sand Plain Grassland/Coastal Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.2 km (31.2 mi)	S	30.5	7.9 m (26 ft)	32.3 km (20.1 mi)
N17	Ladies Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.5 km (30.8 mi)	S	30.9	5.5 m (18 ft)	31.9 km (19.8 mi)
N16	Moxies Pond Road	Nantucket	Sand Plain Grassland/Coastal Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.7 km (30.9 mi)	S	30.6	7.3 m (24 ft)	32.5 km (20.2 mi)
N14	Miacomet Pond	Nantucket	Salt Ponds/Tidal Marsh	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.9 km (31.0 mi)	S	30.3	7.3 m (14 ft)	33.5 km (20.8 mi)
N13	Miacomet Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.2 km (30.6 mi)	S	30.6	7.3 m (14 ft)	33.0 km (20.5 mi)
N12	Surfside Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.6 km (30.8 mi)	S	29.9	4.6 m (15 ft)	36.5 km (21.7 mi)
N11	Nobadeer Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.1 km (31.1 mi)	S	29.3	5.5 m (18 ft)	36.2 km (22.5 mi)
N10	Madequecham Beach	Nantucket	Sand Plain Grassland/Coastal Scrub	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.7 km (31.5 mi)	S	29.3	8.9 m (29 ft)	38.6 km (24.0 mi)
N08	Tom Nevers Field	Nantucket	Ocean Beach/Coastal Dunes	Public Park, Beach	Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	51.2 km (31.8 mi)	SSW	27.1	9.4 m (31 ft)	41.5 km (25.8 mi)
N07	Wanoma Way	Nantucket	Shoreline Residential	Residential	Vacation Residential	Seasonal Residents and Vacationers	52.3 km (32.5 mi)	SSW	26.2	5.2 m (17 ft)	43.5 km (27.0 mi)

Table 10 – Key Observation Points

Map ID	Name	Municipality	SCA/LCA	Resource Type	Use Type	Relevant Viewer Groups	Dist. to nearest WTG	View Orientation	Horiz. Field of View	Elevation (Ft ASL)	Dist. to Booster Station
N06	Low Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	53.8 km (33.4 mi)	SSW	25.2	2.7 m (9 ft)	45.4 km (28.2 mi)
N05	Low Beach Residential Area	Nantucket	Shoreline Residential	Residential	Vacation Residential	Seasonal Residents and Vacationers	54.2 km (33.7 mi)	SSW	25.1	10.4 m (34 ft)	45.5 km (28.3 mi)
N04	Siasconset Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	54.7 km (34.0 mi)	SSW	24.8	2.7 m (9 ft)	46.0 km (28.6 mi)
N03	Front Street - Siasconset	Nantucket	Coastal Village/Town Center	Village Historic District	Scenic/Cultural Tourism	Seasonal Residents and Vacationers	54.9 km (34.1 mi)	SSW	24.8	11.9 m (39 ft)	46.0 km (28.6 mi)
N02	Sankaty Head Light	Nantucket	Coastal Bluffs	Historic Site	Scenic/Cultural Tourism	Scenery/Heritage-oriented Visitors	57.1 km (35.5 mi)	SSW	24.4	45.7 m (150 ft)	46.5 km (28.9 mi)
N01	Altar Rock	Nantucket	Inland Sand Plain Grassland/Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	55.2 km (34.3 mi)	SSW	26.3	30.8 m (101 ft)	41.8 km (26.0 mi)

Seascape, Landscape, and Visual Impact Assessment

Figure 8

Visually Sensitive Resource (VSR) and Key Observation Point (KOP) Map

Visually Sensitive Resources (VSRs)

- Historic Districts
- Public Parks/Openspace/Conservation Land
- Public Trails
- Lighthouse
- Public Beach

Zone of Theoretical Visibility (ZTV)

(Excludes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Theoretically Visible
- Booster Station (70m [230ft]) Theoretically Visible
- Foundation Top (35m [115ft]) and higher Theoretically Visible
- Mid-tower (124m [407ft]) and higher Theoretically Visible
- Nacelle Top (249m [817ft]) and higher Theoretically Visible

Zone of Likely Visibility (ZLV)

(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Photo Locations

- Photo Simulation Locations
- Key Observation Points (KOPs)

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings
- Booster Station Location

0 km 5 km 10 km 15 km 20 km

0 mi 2 mi 4 mi 6 mi 8 mi 10 mi 12 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure 9

Visually Sensitive Resource (VSR) and Key Observation Point (KOP) Map

Visual Study Area

Visually Sensitive Resources (VSRs)

- Historic Districts
- Public Parks/Openspace/Conservation Land
- Public Trails
- Lighthouse
- Public Beach

Zone of Theoretical Visibility (ZTV)

(Excludes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Theoretically Visible
- Booster Station (70m [230ft]) Theoretically Visible
- Foundation Top (35m [115ft]) and higher Theoretically Visible
- Mid-tower (124m [407ft]) and higher Theoretically Visible
- Nacelle Top (249m [817ft]) and higher Theoretically Visible

Zone of Likely Visibility (ZLV)

(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Photo Locations

- Photo Simulation Locations
- Key Observation Points (KOPs)

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings
- Booster Station Location
- Lease Area OCS-A 0522 WTG/ESP Positions

0 km 10 km 20 km 30 km 40 km

0 mi 5 mi 10 mi 15 mi 20 mi 25 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure 10
Visually Sensitive Resource (VSR) and Key Observation Point (KOP) Map
Martha's Vineyard

Visually Sensitive Resources (VSRs)
- Historic Districts
- Public Parks/Openspace/Conservation Land
- Public Trails
- Lighthouse
- Public Beach

Zone of Likely Visibility (ZLV)
(Includes screening by existing vegetation and structures)
- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Photo Locations
- Photo Simulation Locations
- Key Observation Points (KOPs)

Legend
- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

Key Observation Points (KOPs)

ID	KOP Name	Sea/Land Character Area
M01	Wasque Beach	Ocean Beach
M02	Wasque Reservation	Sand Plain Grasslands/Heathlands
M03	Quammux Trail/Katama Bay	Salt Pond/Tidal Marsh
M04	South Beach	Ocean Beach
M05	Long Point Beach	Ocean Beach
M06	Allen Farm Scenic Overlook	Agricultural/Open Field
M07	Peaked Hill	Coastal Scrub Brush, Forest
M08	Squibnocket Beach	Ocean Beach
M09	Gay Head Lighthouse	Coastal Bluffs

0 km 2 km 4 km 6 km 8 km

0 mi 1 mi 2 mi 3 mi 4 mi 5 mi 6 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

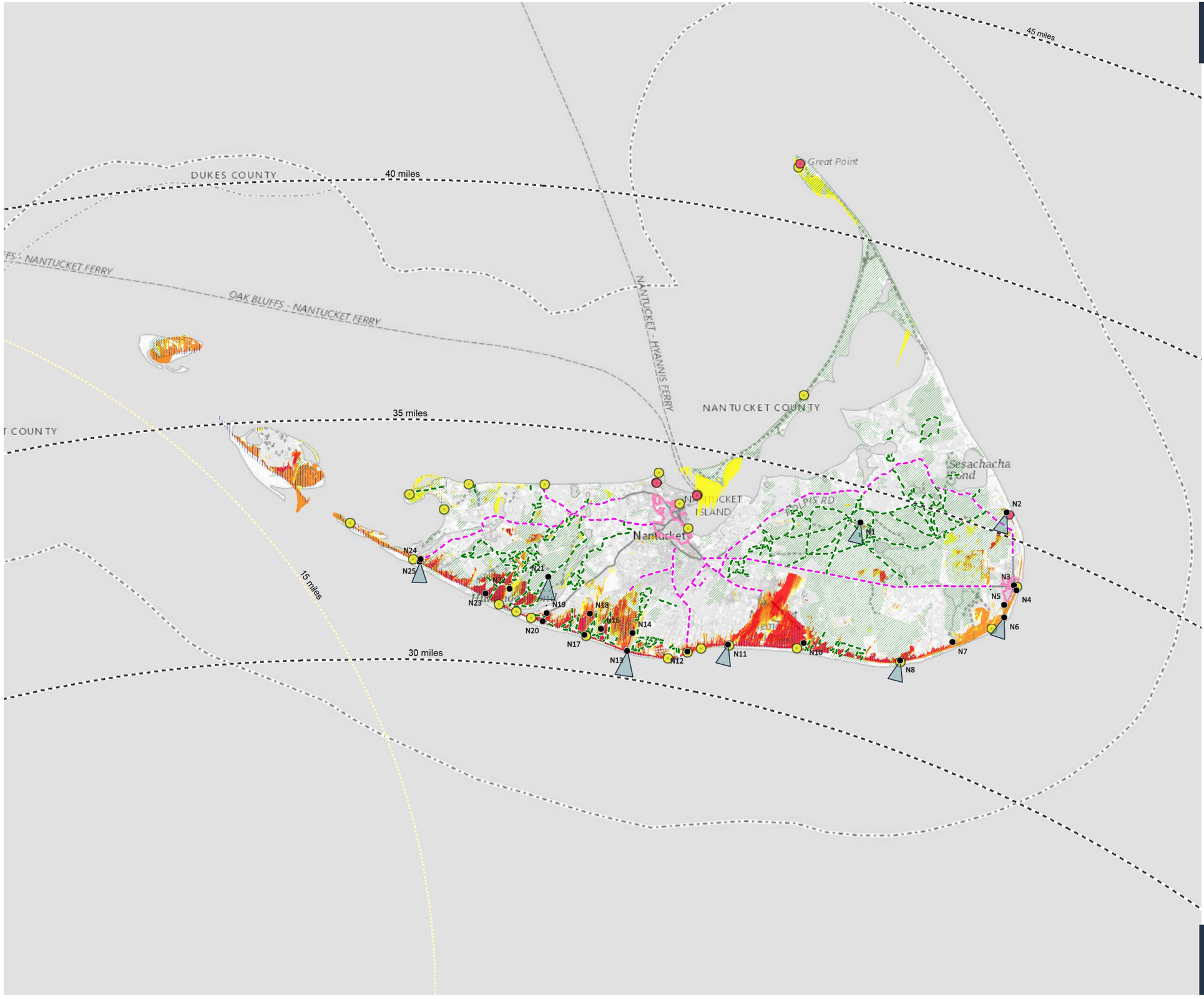


Figure 8

Visually Sensitive Resource (VSR) and Key Observation Point (KOP) Map

Nantucket

Visually Sensitive Resources (VSRs)

- Public Parks/Openspace/Conservation Land
- Public Trails
- Lighthouse
- Public Beach

Zone of Likely Visibility (ZLV)

(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Photo Locations

- Photo Simulation Locations
- Key Observation Points (KOPs)

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

Key Observation Points (KOPs)

ID	KOP Name	Sea/Land Character Area
N01	Altar Rock	Sand Plain Grasslands/Heathlands
N02	Sankaty Head Lighthouse	Coastal Bluffs
N03	Front Street - Siasconset	Village/Town Center
N04	Siasconset Beach	Ocean Beach
N05	Low Beach Residential Area	Shoreline Residential
N06	Low Beach	Ocean Beach
N07	Wanoma Way Residential Area	Shoreline Residential
N08	Tom Nevers Field	Coastal Dunes, Ocean Beach
N10	Madequecham Beach	Coastal Dunes, Ocean Beach
N11	Nobadeer Beach	Ocean Beach
N12	Surfside Beach	Ocean Beach
N13	Miacomet Beach	Ocean Beach
N14	Miacomet Pond	Salt Pond/Tidal Marsh
N16	Moxies Pond Road	Sand Plain Grasslands/Heathlands
N17	Ladies Beach	Ocean Beach
N18	Cudweed Road	Sand Plain Grasslands/Heathlands
N19	Cisco Bike Path	Coastal Scrub Brush
N20	Cisco Beach	Ocean Beach
N21	Sanford Farm Barn Walk/Ram Pasture	Agricultural Open Field
N22	Clark Cover Pond	Salt Pond/Tidal Marsh
N23	Head of Plains Beach	Sand Plains/Heathlands
N24	Madaket Residential Area	Shoreline Residential
N25	Madaket Beach	Ocean Beach

0 km 2 km 4 km 6 km 8 km

0 mi 1 mi 2 mi 3 mi 4 mi 5 mi 6 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

6.2 Baseline Photography

On April 10 through 14, and May 5 and 6, 2022 a visual analyst visited each the 32 KOPs listed in Table 10 to document the existing view in the direction of the Lease Area and the booster station. All photographs were taken at a high megapixel resolution in uncompressed "RAW" format using a tripod mounted digital SLR camera. A 50 mm (full frame) "normal" lens was used to most closely approximate human perception of spatial relationships and scale in the landscape.

At each location, single frame photographs were taken in the direction of the Lease Area and the booster station. At all locations a series of overlapping photographs were also taken for the development of panoramic scenes (see Appendix C).

The location selected for each photograph was judged by the visual analyst to be the most unobstructed and representative line-of-sight to the Lease Area from the subject KOP. Effort was made to take photographs under generally clear weather conditions to maximize visual contrast. Due to daily, and often hourly variation in weather conditions, several photographs were taken under partly to mostly cloudy sky conditions. These conditions accurately represent variations in weather conditions that commonly occur on Martha's Vineyard and Nantucket.

The precise coordinates of each photo location were recorded in the field using a handheld Global Positioning System (GPS) unit. The direction to the center of the Lease Area was determined in the field using the handheld GPS. Where practicable, survey flags were placed along the identified bearing marking the center of the Lease Area so that the camera could be accurately aimed to center the Lease Area within the photo field-of-view.

6.3 Photographic Simulations

To show anticipated visual changes associated with Vineyard Northeast, high resolution computer enhanced image processing was used to create realistic daytime photographic simulations of the completed offshore facilities from 12 KOPs: four on Martha's Vineyard and eight on Nantucket.

The KOPs selected for photo simulation represent a variety of viewing distances, viewer elevations, Seascape and Landscape Character Areas, and viewer types as well as overall geographic distribution and general intensity of use. Simulated KOPs were selected in consultation with BOEM (pre application meeting, March 28, 2022).

The 12 KOPs selected for photo simulation are listed in Table 11. Locations of the simulated views are depicted in Figure 10 and Figure 11.

Table 11 – KOPs Selected for Photo Simulations

Map ID	Name	Municipality	Relevant SLCA	Resource Type	Use Type	Relevant Viewer Groups	Dist. to nearest WTG	View Orientation	Horiz. Field of View	Elevation (ASL)	Dist. to booster station
MARTHA'S VINEYARD											
M08	Squibnocket Beach	Chillmark	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	72.3 km (44.9 mi)	SE	28.2	4.2 m (14 ft)	30.9 km (19.2 mi)
M06	Allen Farm Scenic Overlook	Chillmark	Shoreline Residential	Scenic Overlook	Scenic/Cultural Tourism	Scenery/Heritage-oriented Visitors	72.4 km (45.0 mi)	SE	28	14.3 m (47 ft)	30.7 km (19.1 mi)
M05	Long Point Beach	West Tisbury	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	69.0 km (42.9 mi)	SE	28.8	5.5 m (18 ft)	26.7 km (16.6 mi)
M01	Wasque Beach	Edgartown	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	63.2 km (39.3 mi)	SE	29.3	7.3 m (24 ft)	24 km (14.9 mi)
NANTUCKET											
N25	Madaket Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	51.5 km (32.0 mi)	S	31.4	6.4 m (21 ft)	28.2 km (17.5 mi)
N21	Sanford Farm Barn Walk/Ram Pasture	Nantucket	Sand Plain Grassland/Coastal Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	51.3 km (31.9 mi)	S	30.4	15.2 m (50 ft)	31.5 km (19.6 mi)
N13	Miacomet Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	49.2 km (30.6 mi)	S	30.6	7.3 m (14 ft)	33.0 km (20.5 mi)
N11	Nobadeer Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	50.1 km (31.1 mi)	S	29.3	5.5 m (18 ft)	36.2 km (22.5 mi)
N08	Tom Nevers Field	Nantucket	Ocean Beach/Coastal Dunes	Public Park, Beach	Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	51.2 km (31.8 mi)	SSW	27.1	9.4 m (31 ft)	41.5 km (25.8 mi)
N06	Low Beach	Nantucket	Ocean Beach/Coastal Dunes	Public Beach	Relaxation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	53.8 km (33.4 mi)	SSW	25.2	2.7 m (9 ft)	45.4 km (28.2 mi)
N02	Sankaty Head Light	Nantucket	Coastal Bluffs	Historic Site	Scenic/Cultural Tourism	Scenery/Heritage-oriented Visitors	57.1 km (35.5 mi)	SSW	24.4	45.7 m (150 ft)	46.5 km (28.9 mi)
N01	Altar Rock	Nantucket	Inland Sand Plain Grassland/Scrub	Trail	Scenic Recreation	Scenery/Heritage-oriented Visitors Recreation-oriented Visitors	55.2 km (34.3 mi)	SSW	26.3	30.8 m (101 ft)	41.8 km (26.0 mi)

Photo simulations were developed by superimposing a rendering of a to-scale 3-D computer model of Vineyard Northeast WTGs and booster station into a base photograph taken from each corresponding location. The 3-D computer model used for the simulations is based on the Vineyard Northeast maximum impact scenario described in Section 2.1.5 above. The model was developed using Autodesk Civil 3D® and 3D Studio Max Design® software (3-D Studio Max).

Simulated perspectives (camera views) were then matched to the corresponding base photograph for each simulated view by replicating the precise coordinates of the field camera position (as recorded by GPS) and the focal length of the camera lens used (e.g., 50 mm). Precisely matching these parameters assures scale accuracy between the base photograph and the subsequent simulated view. The camera's target position is set to match the bearing of the corresponding existing condition photograph. With the existing conditions photograph displayed as a "viewport background," and the viewport properties set to match the photograph pixel dimensions, minor camera adjustments were made (horizontal and vertical positioning) to align the horizon in the background photograph with the corresponding features of the 3-D model.

Once the camera alignment was established, the to-scale 3-D model of Vineyard Northeast was merged into the model space. Because the exact WTG model has not been determined at the time of this VIA, a hypothetical model was prepared for Vineyard Northeast, using the maximum WTG size included in each Phase (See Section 2.1.1). The 3-D model of the WTGs and booster station is intended to accurately convey the current design intent. To the extent practicable, and to the extent necessary to reveal impacts, design details of the proposed WTGs and booster station were built into the 3-D model and incorporated into the photo simulation. Consequently, the scale, alignment, elevations, and location of the visible elements of the proposed facilities are true to the conceptual design.

As described in Section 2.1.3, the WTGs will be no lighter than pure white (RAL 9010) and no darker than light grey (RAL 7035) in color. Although the Proponent expects that the WTGs will be off-white/light grey to reduce their visibility against the horizon, the exact color of the WTGs within this range (between RAL 9010 and RAL 7035) is unknown at this time. Therefore, the visual simulations assume that the WTGs are pure white (RAL 9010), which represents a worst-case scenario, although the difference between WTGs colored RAL 9010 and RAL 7035 is likely indiscernible from coastal vantage points given the WTGs' distance from shore.

Because of the extreme distances at which the Vineyard Northeast WTGs and booster station will be viewed, the development of photo simulations must account for earth's curvature and atmospheric refraction. To address this issue, a spherical surface equal to 0.13 times the radius of the earth was created in 3-D Studio Max. All WTG model units were "snapped" to this surface for each specific camera view. For each simulated view, WTG elevations were spot checked by comparing the "snapped" elevation with the predicted degree of earth curvature screening as calculated using WaBis Advanced Earth Curvature Calculator (WaBis, n.d.) with elevation and distance variables set for the specific KOP.

6.3.1 Daytime Simulations

With the model in place, a daylight system was then created based on the date and time of the photograph; inputs such as time zone and location were also applied to the daylight system. To accurately depict "reflected light," the spherical earth surface model element was assigned a gray-blue color allowing upward light refraction to affect the rendering model elements.

The rendered view was then imported into the baseline photo in Adobe Photoshop software for overlay. In addition, minor adjustments were made to the WTG and booster station color and contrast to match the lighting conditions of the baseline photograph so that the final rendering appears as realistic as possible. Photo Simulations are provided in Appendix D.

6.3.2 Atmospheric Condition Simulations

Recognizing that atmospheric conditions are not always clear, supplemental photo simulations were prepared for KOP N13 – Miacomet Beach to illustrate the effect of reduced visibility under varying degrees of fog, haze, and/or marine conditions that may obscure distant views. These supplemental visualizations approximate a moderate and heavy haze condition. Atmospheric condition simulations are provided as Figures D-7c and D-7d in Appendix D.

6.3.3 Daylight Condition Simulations

Recognizing that lighting conditions change throughout the day, supplemental photo simulations were prepared for KOP N13 – Miacomet Beach to illustrate the visual characteristics of the view throughout the day: early morning (7am), mid-morning (10am), mid-day (1pm), late afternoon (4pm), and sunset (7pm). Daylight condition simulations are provided in Appendix E.

6.3.4 Viewing Photo Simulations

Arm's Length Rule—The single frame photo simulations included in Appendices D and E have been formatted to be printed on an 11 x 17-inch page format. At this image size, the page should be held at approximately arm's length[10] so that the scene appears at the correct scale. Viewing the image closer would make the scene appear too large and viewing the image from a greater distance would make the scene appear too small compared to what an observer would actually see in the field.

For viewing photo simulations at other page sizes (i.e., computer monitor, projected image, or other hard copy output) the viewing distance/page width ratio is approximately 1.5/1. For

[10] Viewing distance is calculated based a 39.6-degree field-of-view for the 50 mm camera lens used, and the 15.5-inches-wide image presented in Appendices D and E. "Arm's length" is assumed to be approximately 22.5 inches from the eye. Arm lengths vary for individual viewers.

example, if the simulation were viewed on a 42-inch-wide poster size enlargement, the correct viewing distance would be approximately 63 inches (5.25 ft).[11]

Monitor Calibration—Uncalibrated computer monitors vary in brightness, contrast, and color. Photo simulations were finalized using a color calibrated monitor. When viewing these simulations, digital monitor calibration is recommended to assure images appear with the intended brightness, contrast, and color clarity.

Field Viewing—The photo simulations present an accurate depiction of the appearance of the proposed WTGs and booster station suitable to provide a general understanding of how much of Vineyard Northeast may be visible, as well as the character of its visibility. However, these images are a two-dimensional representation of a 3-D landscape, and the human eye is capable of recognizing a greater level of detail than can be illustrated in a two-dimensional image. Decision makers and interested parties may benefit from viewing the photo simulations in the field from any or all of the simulated resources. In this manner, observers can directly compare the level of detail visible in the base photograph with actual field observed conditions.

[11] The VIA (see Section 8.0) is based, in part, on review of the photo simulations provided in Appendix D. For this evaluation, the visual analyst viewed the photo simulations in an uncompressed format (e.g., at the simulated image's highest resolution) on a 27.5" wide computer at a viewing distance of approximately 40".

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7.0 SEASCAPE/LANDSCAPE IMPACT ASSESSMENT (SLIA)

7.1 SLIA Methodology

This section explains the methodology used to evaluate seascape and landscape impacts and the factors that are considered in the evaluation. This methodology is based "Section 6.4 Evaluation of Impacts" in BOEM's SLVIA guidelines (Sullivan R. G., 2021, pp. 29-34).

The SLIA consists of two separate but interrelated components: sensitivity and magnitude of the effect. The sensitivity factor has two components: susceptibility and value. The magnitude factor has three components: the size and scale of the change to existing conditions caused by the project, the geographic extent of the area subject to the project's effects, and the effect's duration and reversibility. Each factor and its components are rated on an ordinal scale with three levels, which in some cases use different terms for semantic reasons but are considered equal in importance; in other words, a rating of "high" is considered equivalent in importance to a rating of "large" or "good." Similarly, a rating of "low" is considered equivalent to a rating of "small" or "poor" (Sullivan R. G., 2021, p. 29)..

Although the factors of sensitivity and magnitude are evaluated on an ordinal scale, assessing the qualities of each character area and arriving at an ordinal rating are a matter of professional judgment (Sullivan R. G., 2021, p. 29). The following descriptions, tables, and matrices provide general definitions to assist the professional visual analyst in determining the degree of impact on individual Seascape, Landscape, and Ocean Character Areas.

7.1.1 Sensitivity of Seascape/Landscape Receptors

The evaluation of seascape/landscape sensitivity is derived from an understanding of the susceptibility of the Character Area to change and the recognized values attached to the scenic resources within the Character Area. A rating (ranging from low to high) was assigned to both a Character Area's susceptibility to change and scenic resource value to form a resource sensitivity rating. Highly scenic Character Areas with a low capacity to absorb change and high scenic value are considered most sensitive to visual change. Likewise, Character Areas with a high capacity to absorb change and low user sensitivity are considered least sensitive to visual change (TJD&A, 2022, p. 29).

Susceptibility to Change – The susceptibility of a seascape/landscape to change is its ability to accommodate the impacts of the proposed project without substantial change to the basic existing characteristics of the seascape/landscape (Sullivan R. G., 2021, p. 30). A Character Area's susceptibility to change is a measure of how much visual change a landscape can absorb before the key characteristics of the landscape are altered. Indicators are based on existing development patterns; shoreline complexity; topographic features; expanse of ocean view; landscape distinctiveness; natural patterns; quality of the built environment; and primary use. A Character Area that is more common or highly developed tends to have more capacity for

visual change and is rated as low. Likewise, a Character Area that has unique, distinctive, or high-quality features may be more impacted through visual change and is rated as high. Table 12 provides guidance on the assessment of a Character Area's susceptibility to change (Cape Cod Commission, 2012, p. 17).

Table 12 - Character Area Susceptibility to Change*

	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Shoreline or Landform	Very simple/straight shoreline or landform.	Simple/straight shoreline or landform.	Moderately complex shoreline or landform.	Complex shoreline or landform.	Highly complex shoreline or landform.
Visible Topography	Flat. No variation in elevation, such as a beach, marsh, fields, or open water.	Slight variation in elevation, such as a beach, marsh, fields, or open water.	Some elevation variation, such as medium sized dunes or moderate hills.	Notable elevation changes, such as prominent dunes.	Significant elevation changes, such as steep hills or bluffs.
Expanse of Ocean View	Little or no view of open ocean or salt ponds/bays.	Limited view of open ocean or salt ponds/bays.	Moderate view of open ocean or salt ponds/ bays.	Extensive view of open ocean or salt ponds/bays.	Expansive view of open ocean or salt ponds/bays.
Landscape Distinctiveness	Insignificant: Indistinct landscape character.	Common landscape character.	Noteworthy landscape character. A landscape of local importance.	Noteworthy landscape character of regional importance.	Rare: Unusual, unique, or distinctive landscape character. A landscape of state or national importance.
Natural Patterns	Limited natural areas. Man-made structures are dominate in the landscape.	Some natural areas or highly manicured landscape. Man-made structures are co-dominant.	Moderately sized natural area of regional significance. May include beach and dunes. Man- made structures are widespread, but not dominant in the landscape.	Large natural area that is not remote or isolated. State-wide conservation significance. Man-made structures are limited.	Remote or semi-isolated natural areas. Conservation area of state or national significance. Minimal evidence of man-made development.
Development Patterns	Urban, industrial, or heavily commercial development patterns. Large scale infrastructure or structures may be common or dominant.	Commercial or suburban development patterns. Moderate scale infrastructure or structures may be common or dominant.	Residential and commercial areas of local importance. Moderate scale buildings and infrastructure visible but not dominant. Development may be visible in midground.	Residential villages, downtowns, and properties of state or regional importance. May include identified or eligible historic properties. Large-scale infrastructure if present is limited and scattered. Development may be visible in the background.	High quality-built environment. May include historic properties or districts on the NRHP. Large scale infrastructure is limited or inconspicuous. Development may not be visible or visible in the background.
Primary Use	No recreational activity. Heavy commercial or industrial use.	Minimal recreational activity. Residential use is common.	Recreational activity is present with some commercial or residential use. Recreation is not water related.	Recreational activity is the predominant use, but not water related.	Water dependent or oriented recreation is the predominant use.

*The definitions of LOW to HIGH offer general guidance in assigning a Susceptibility to Change Value. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on observed field conditions and professional judgement.

Scenic Resource Value – Seascapes, landscapes, and their features/elements and aspects have values associated with them by society, and these values are identified as part of the seascape and landscape assessments. In general, areas of seascape/landscape are likely to be highly valued when their character is judged to be distinctive and where scenic quality, wildness or tranquility, and natural or cultural heritage features make a particular contribution to the seascape or landscape (Sullivan R. G., 2021, p. 30).

The scenic resource value of a Character Area is based on its recognition as a high quality or unique visual landscape. At the high end of the scenic resource value spectrum, Character Areas include resources recognized nationally for their scenic value, such as National Parks or National Seashores. These sites are likely to receive heavy visitation or recreational use and have high value attached to the site. At the low end of the spectrum are areas without any formal scenic designation. These sites may have low visitation or may not offer recreation amenities to the public. Table 13 provides guidance on the assessment of a Character Area's scenic resource value (TJD&A, 2022, pp. 31-32).

Table 13 – Character Area Scenic Resource Value*

LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
The Character Area does not include sites with formal recognition or designation as a scenic resource. Little or no public amenity or recreational value.	The Character Area includes public sites that may be identified in guidebooks but have no formal designation as a scenic resource.	The Character Area includes sites with local or regional recognition/ ownership. May include local parks, central downtowns, community resources, or local historic sites.	The Character Area includes sites with state recognition/ownership. May include State Parks and Recreation Areas, Wildlife Management Areas, Land Trust properties, or sites identified or eligible for the NHRP or SRHP.	The Character Area includes sites with state or national recognition for their scenic and/or recreational value. May include State Parks and recreation areas, National Parks, National Seashores, or sites on the NHRP that derive significance from their landscape setting.
*The definitions of LOW to HIGH offer general guidance in assigning a Scenic Resource Value. The visual analyst may place more or less emphasis on these ordinal values based on professional judgement.				

Character Area Sensitivity Rating - The sensitivity of each Character Area is determined by combining the Character Area's susceptibility to change with the scenic value of the resources in the Character Area. Table 14 is used to determine the overall sensitivity of the Character Area.

Table 14 - Character Area Sensitivity Matrix

SCENIC RESOUCE VALUE RATING (refer to Table 13)	**SUSCEPTIBILITY RATING** (refer to Table 12)				
	HIGH	**MEDIUM-HIGH**	**MEDIUM**	**LOW-MEDIUM**	**LOW**
HIGH	HIGH	HIGH	HIGH	MEDIUM	MEDIUM
MEDIUM-HIGH	HIGH	MEDIUM-HIGH	MEDIUM-HIGH	MEDIUM	LOW-MEDIUM
MEDIUM	HIGH	MEDIUM	MEDIUM	LOW-MEDIUM	LOW
LOW-MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	LOW-MEDIUM	LOW
LOW	MEDIUM	LOW-MEDIUM	LOW	LOW	LOW
This sensitivity matrix is based on Table 6.4-1 in BOEM's SLVIA guidelines (Sullivan R. G., 2021, p. 32).					

7.1.2 Magnitude of Visual Impacts

The magnitude of an impact on a seascape or landscape depends on the size or scale of the change associated with the proposed project, the geographic extent of the change, and the duration and reversibility of the change (Sullivan R. G., 2021, p. 30).

Size or Scale of Change - This evaluation considers the anticipated degree of visual change from the project on the Character Area. The rating (small to large) is based upon measurable or observable physical factors that contribute to project visibility from the Character Area. Factors include distance to the nearest WTG, Vertical Field-of-View (VFOW), Horizontal Field-of-View (HFOV) covered by the project, and landscape contrast caused by the project. This evaluation is based on a general assessment of all KOP visualizations provided from within each Character Area, with the understanding that the size and scale of change caused by the project will vary based on where one is located within the Character Area and may change based on conditions related to lighting, weather, and atmospheric effects. Table 15 provides guidance on the assessment of the size/scale of visual change within a Character Area.

Table 15 - Character Area Size/Scale of Visual Change*

	SMALL	SMALL-MEDIUM	MEDIUM	MEDIUM-LARGE	LARGE
Distance to nearest visible WTG **	Intermittently noticed features in the onshore to offshore view between 49.9 and 68.4 km (31.0 and 42.5 mi) distance	Low on the horizon, but persistent features in the onshore to offshore view between 45.1 and 49.9 km (28 and 31 mi) distance	Clearly visible features in the onshore to offshore view between 19.3 and 45.1 km (12 and 28 mi) distance	Strongly pervasive features in the onshore to offshore view between 8 and 19.3 km (5 and 12 mi) distance	Unavoidably dominant features in the boat and ship ocean view between 0 and 8 km (0 and 5 mi) distance
Viewer Elevation	Near sea level vantage point (e.g., beach or dune)			High elevated vantage point (e.g., hilltop or high bluff)	
Vertical Field of View	Upper ½ of rotor blade nearest WTG visible above horizon, or project not visible	Full rotor blade (but not nacelle top) of nearest WTG at, or just above horizon	Nacelle top (but not tower mid-point) of nearest WTG tower visible above horizon	Tower mid-point (but not foundation) of nearest WTG tower visible above horizon	Foundation of nearest WTG visible above horizon
Horizontal Field of View	<5 degrees of the horizon, or project not visible	5 to 15 degrees of the horizon	15 to 30 degrees of the horizon	30 to 45 degrees of the horizon	> 45 degrees of the horizon
Landscape Contrast	**Faint**: Visible only after extended, close viewing; otherwise invisible.	**Apparent:** Visible when scanning in the general direction of study subject; otherwise likely to be missed by a casual observer.	**Conspicuous:** Visible after brief glance in the general direction of study subject and unlikely to be missed by a casual observer.	**Prominent:** Plainly visible, could not be missed by a casual observer, but does not strongly attract visual attention or dominate the view because of apparent size, for views in the general direction of study subject.	**Dominant:** Strongly attracts visual attention of views in the general direction of study subject. Attention may be drawn by strong contrast in form, line, color, or texture, luminance, or motion.

*The definitions of LOW to HIGH offer general guidance in assigning value to the Size/Scale of Visual Change. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on professional judgement.

**Distances are provided for guidance purposes only. Site specific conditions, such as viewer elevation may influence classification of the Distance Factor.

Geographic Extent – The assessment of impact magnitude also considers the geographic extent over which the impact will be experienced. For seascape/landscape impacts from offshore wind projects, the geographic extent of most impacts (which ultimately is associated with visibility of the project) is related to the project ZLV. (Sullivan R. G., 2021, p. 31).

This evaluation is based on the extent of potential visibility based on the computer-based ZLV analysis (refer to Section 3.2 above). A Character Area with a high percentage of potential visibility will be rated as large and a Character Area with a small percentage of potential visibility will be rated as small. The viewshed analysis only indicates if a single WTG is theoretically visible from a point in the landscape. It does not account for atmospheric conditions, visual acuity, or provide additional information about the level of visibility. The

assessment is based on the percentage of a Character Area with potential project visibility, as identified in Table 16.

Table 16 - Character Area Geographic Extent of Visibility*

	SMALL	SMALL-MEDIUM	MEDIUM	MEDIUM-LARGE	LARGE
Percentage of Area with Potential Visibility (refer to Table 6)	0% - 15% of Character Area has potential visibility	15% - 30% of Character Area has potential visibility	30% - 45% of Character Area has potential visibility	45% - 60% of Character Area has potential visibility	60% - 100% of Character Area has potential visibility
Total of Character Area within ZLV (refer to Table 6)	<100 hectares (247 acres)				>1,000 hectares (2,471 acres)
Contiguous Affected ZLV Areas Refer to Appendix B	Affected ZLV is found in small non-contiguous areas.			Affected ZLV is found in large contiguous areas.	
*The definitions of LOW to HIGH offer general guidance in assigning value to the Geographic Extent of Visibility. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on professional judgement.					

Duration and Reversibility of Impacts – The third element of assessing the magnitude of a particular impact is the consideration of its duration and reversibility, that is, the length of time over which the impact is likely to occur and the degree to which the currently existing conditions are restored after the impact ceases (Sullivan R. G., 2021, p. 31).

In the assessment of impact level, duration and reversibility are considered together and recorded on a scale of poor, fair, or good, based on the length of time the project will be visible (i.e., a permanent / irreversible visual change would receive a poor rating). Vineyard Northeast is expected to operate for approximately 30 years and thus is considered a long-term installation. While Vineyard Northeast is a utility scale renewable energy generating facility, it is fully reversible. In all cases, Vineyard Northeast received a fair rating.

Magnitude of Visual Impact - The magnitude of visual impact for a Character Area is determined by combining the Size or Scale of Change, the Geographic Extent of potential visibility in the Character Area, and the Duration and Reversibility of Impacts.

Table 17 provides guidance in the determination of the magnitude of visual impact. This matrix is weighted slightly to place a greater emphasis on the size/scale of change. This was done to temper the reliance on viewshed analysis. The geographic extent may indicate a large area of potential visibility, but if the level of visibility is small, the visual impact remains small as well. Vineyard Northeast's fair rating for the duration and reversibility of impacts is not included in Table 17 below because it is a constant variable.

Table 17 - Character Area Magnitude Rating Matrix

	GEOGRAPHIC EXTENT RATING (refer to Table 16)				
SIZE/SCALE RATING (refer to Table 15)	**LARGE**	**MEDIUM-LARGE**	**MEDIUM**	**SMALL-MEDIUM**	**SMALL**
LARGE	LARGE	LARGE	LARGE	MEDIUM-LARGE	MEDIUM
MEDIUM-LARGE	LARGE	MEDIUM-LARGE	MEDIUM-LARGE	MEDIUM	MEDIUM
MEDIUM	LARGE	MEDIUM	MEDIUM	SMALL-MEDIUM	SMALL
SMALL-MEDIUM	MEDIUM	SMALL-MEDIUM	SMALL-MEDIUM	SMALL-MEDIUM	SMALL
SMALL	MEDIUM	SMALL	SMALL	SMALL	SMALL
This magnitude matrix is based on Table 6.4-2 in BOEM's SLVIA guidelines (Sullivan R. G., 2021, p. 32). Note, the duration/reversibility of impacts factor identified in Table 6.4-2 is not included in Table 25 because it is a constant variable (i.e., "Fair," long term/fully reversable) for all SCAs/LCAs.					

7.1.3 Overall Impact to Character Areas

Once the sensitivity and magnitude factors for an individual SCA, LCA, or OCA have been determined, they are combined into an overall finding of major, moderate, minor, or negligible impact for each SCA, LCA, or OCA. Table 18 combines sensitivity and magnitude of visual impacts in a matrix to determine the overall impact to the Character Area. While this table provides guidance on how to rate the evaluations, the definitions of the ratings below, summary narratives, and professional judgment support the evaluations. Any adjustments to the impact that are greater or less that the Magnitude of Impact rating must be accompanied by a written justification.

A finding of negligible impact is warranted when there are minimal impacts; that is the project is not visible or barely visible, or the potentially affected area is very small, and the other metrics are at medium or low values. (Sullivan R. G., 2021, p. 33)

Table 18 - Character Area Overall Impact Matrix

CHARACTER AREA SENSITIVITY (refer to Table 14)	**CHARACTER AREA VISUAL IMPACT MAGNITUDE** (refer to Table 17				
	LARGE	**MEDIUM-LARGE**	**MEDIUM**	**SMALL-MEDIUM**	**SMALL**
HIGH	MAJOR	MAJOR	MAJOR	MODERATE	MODERATE
MEDIUM-HIGH	MAJOR	MAJOR	MODERATE	MODERATE	MODERATE
MEDIUM	MAJOR	MODERATE	MODERATE	MODERATE	MINOR
LOW-MEDIUM	MODERATE	MODERATE	MINOR	MINOR	MINOR
LOW	MODERATE	MODERATE	MINOR	MINOR	MINOR
This magnitude matrix is based on Table 6.4-3 in BOEM's SLVIA guidelines (Sullivan R. G., 2021, p. 33).					

The overall impact definitions provided below characterize the findings of the SLIA process:

- Negligible – The project would have very little or no effect on the Character Area's features or qualities, either because there is minimal project visibility, the Character Area lacks value, or the Character Area is not sensitive to visual change.
- Minor - The project would introduce features that may have a noticeable to medium level of visual impact on the Character Area. The project may have a low to moderate level of visual prominence and would have a small to medium effect on the key features of the Character Area. While Character Area sensitivity/susceptibility/value is generally low, adjustments may be warranted depending upon the nature of the sensitivity.
- Moderate - The project would introduce features that would have a medium to large change to the Character Area. The project may have a moderate to large level of visual prominence and would have a moderate effect on the key features of the Character Area. While Character Area sensitivity/susceptibility/value is generally medium to low, adjustments may be warranted depending upon the nature of the sensitivity.
- Major - The project would introduce features that have a major level of change to the Character Area. The project would introduce a dominant visual element that is inconsistent with the key features of the Character Area. While Character Area sensitivity/susceptibility/value is generally medium to high, adjustments may be warranted depending upon the nature of the sensitivity.

7.2 SLIA Results

Based on the methodology described in Section 7.1 above, the following identifies the impact levels assigned to the factors of sensitivity and magnitude and the rationale behind these judgements for each seascape, landscape, and ocean character area within the VSA.

Assessing the level of seascape/landscape impacts is a matter of professional judgment. In general, a large loss or irreversible adverse impact over an extensive area on elements and/or aesthetic and perceptual aspects that are key to the character of highly valued seascapes or landscapes are likely to be considered a major impact. On the other hand, reversible adverse impacts of short duration over a restricted area on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the distinctive character of seascapes/landscapes of lower value are likely to be judged to be less important (Sullivan R. G., 2021, p. 29).

7.2.1 Seascape Character Areas Impact Levels

Ocean Beach/Coastal Dunes SCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	High	Beach views are highly scenic with a wide vista of the open bordered by rolling, natural dunes. Views are focused out to sea with secondary views extending up and down the coast. Inland views include grassy dunes, coastal scrub vegetation, and minimal human-made structures. Extended stretches of beachfront on Martha's Vineyard and Nantucket are located within protected open space areas with little to no development within the view. The primary use is water dependent traditional beach-oriented recreational activities.
Scenic Resource Value: (see Table 13)	Medium-High	Ocean beaches and dunes on Martha's Vineyard and Nantucket typically carry state or national recognition for scenic, environmental, and/or recreational value. Some beach/dune areas are within or adjacent to protected conservation land. Beaches and dunes maintain a unique aesthetic character strongly valued by residents and visitors. Views are almost exclusively focused on the open ocean.
SENSITIVITY RATING (see Table 14)	HIGH	Beaches and dunes are highly valued scenic, environmental, and recreational resources on Martha's Vineyard and Nantucket and are an irreplaceable component of the islands' t i t

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Vineyard Northeast's offshore facilities would be visible at great distance (49.1 km [30.5 mi] and further) from the nearest WTG. Although Vineyard Northeast occupies a moderate HFOV (up to approximately 30 degrees depending on vantage point) at its closest point only the mid-tower and higher of the nearest WTG will be visible above the horizon from this SCA. The vertical field-of view is less from more distant points in the SCA. On clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Medium	The ZLV analysis indicates that the offshore facilities will be visible from 763 hectares (1,886 acres), which represents 40.2% of this Character Area. Unobstructed views are found from virtually all southerly facing beaches on Martha's Vineyard and Nantucket. The affected viewshed area is substantially limited to the relatively narrow beachfront. Seaward views inland of the dune line are commonly screened by dunes, scrub vegetation and occasionally oceanfront buildings.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Although unobstructed views are found along extended beachfront areas Vineyard Northeast's offshore facilities will be viewed at great distance substantially reducing their conspicuity.

OVERALL IMPACT LEVEL (see Table 18)	**MINOR**	Table 18 indicates the overall impact level for this SCA will be MODERATE. Although the Sensitivity Rating for this SCA is High. Due to great distance (49.9km [31.0 mi] and farther) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (23.5 km [14.6 miles] and farther) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

Coastal Bluffs SCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Medium-High	The Coastal Bluff Character Area is defined by distinctive elevated topography rising steeply from sand or rocky beaches. The Coastal Bluff Character Area is also defined by panoramic vistas of the ocean and distant landscape from an elevated vantage point. Viewers frequently visit these areas to enjoy scenic vistas over the ocean and long-distance views up and down the coastline. Bluff vistas also commonly include man-made development including roads and vehicles, overhead utility lines, and residential development.
Scenic Resource Value: (see Table 13)	Medium-High	Discrete, elevated views along a visually variable seascape are highly valued. The Gay Head/ Aquinnah area on Martha's Vineyard has strong historic, cultural, and tribal significance. The Gay Head Cliffs are a designated National Natural Landmark and the Gay Head Lighthouse standing atop the bluff represents an important part of Massachusetts coastal communities' identity and the cultural and nautical history of the United States. On Nantucket, the culturally important Sankaty Head Light atop Sconset Bluff was built in 1850 and is still in operation.
SENSITIVITY RATING (see Table 14)	MEDIUM-HIGH	Coastal Bluffs are highly valued natural and scenic resources on Martha's Vineyard and Nantucket. These places are well visited and a memorable destination for island visitors.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Vineyard Northeast's offshore facilities would be visible at great distance (56.0 km [34.7 miles] from the nearest WTG. Although Vineyard Northeast occupies a moderate HFOV (up to approximately 30 degrees depending on vantage point) at its closest point only the mid-tower and higher of the nearest WTG will be visible above the horizon from this SCA. The vertical field-of-view is less from more distant points in the SCA. On clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. Although the offshore facilities would appear small on the horizon from this location, the unique elevation of the bluffs enhances the apparent size and scale compared to sea level views.
Geographic Extent: (see Table 16)	Small-Medium	The ZLV analysis indicates that the offshore facilities will be visible from 68 hectares (167 acres), which represents 71.8% of this Character Area. Affected areas are found in relatively small non-contiguous areas. Substantially unobstructed seaward views are common in this SCA on Martha's Vineyard (Gay Head Cliffs, Zacks Cliffs, Squibnocket Ridge, Nashaquitsa Cliffs, and Wequobsque Cliffs) and Nantucket (Sconset Bluff). The unique elevation allows for longer-distance views than other units.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Although the Coastal Bluff Character Area has a somewhat heightened magnitude of impact due to unique elevated vistas of the open ocean Vineyard Northeast's offshore facilities will be viewed at great distance substantially reducing their conspicuity.

OVERALL IMPACT LEVEL (see Table 18)	**MINOR**	Table 18 indicates the overall impact level for this SCA will be MODERATE. Due to great distance (56.0 km [34.7 miles] and farther) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (29.6 km [18.4 miles] and farther) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

Salt Pond/Tidal Marsh SCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Medium	Salt ponds and tidal marshes are common throughout the coastal area and are characterized by shallow open water, buffered by herbaceous grasses and other salt-tolerant vegetation, along with a mix of wildlife. Views over the waterbody and flat marshland extend to adjacent dunes and/or scrub vegetation. Salt ponds/tidal marshes are found as interstitial spaces between other units. Residences and associated docks and boats are often present along the edges of ponds. In other areas, little man-made development is within view. Long distance vistas across larger ponds and bays are common in this Character Area. Although rare, occasional views of the open ocean are found above intervening dunes in certain locations. Extensive ocean vistas are not common. In areas where the ocean is not directly visible, the proximity of the ocean is generally well recognized and contributes to a sense of anticipation. Recreational activities are typically focused on views of the tidal waterbody and include walking, biking, bird watching, and general nature appreciation. Water dependent recreation includes canoe/kayaking and shoreline fishing.
Scenic Resource Value: (see Table 13)	Medium	Large portions of this Character Area are designated as protected conservation land. These lands are typically open for passive recreation and nature appreciation.
SENSITIVITY RATING (see Table 14)	MEDIUM	This setting is highly valued for its scenic environmental character, public access, and proximity to the ocean.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Vineyard Northeast's offshore facilities would be visible at great distance (49.3 km [30.6 miles] from the nearest WTG). Although Vineyard Northeast occupies a moderate HFOV (up to approximately 30 degrees depending on vantage point) at its closest point only the mid-tower and higher of the nearest WTG will be visible above the horizon from this SCA. The vertical field-of-view is less from more distant points in the SCA. On clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 1,199 hectares (2,968 acres), which represents 19.4% of this Character Area. Much of this affected area is on the surface of larger bays where long vistas across an expanse of open water are found. Because salt ponds and tidal marshes are generally at sea level and surrounded by slightly higher landform and coastal dunes, views of Vineyard Northeast's offshore facilities are typically screened. Views are primarily focused inward toward the foreground waterbody. When meteorological conditions permit, most of this impact is limited to potential blade tip visibility, with the larger nacelle and rotor hub falling below intervening landform and vegetation. Such views are low to the horizon but not readily distinguishable and not readily distinguishable above intervening edge scrub vegetation.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Due to intervening landform and vegetation, extended viewing distance, and small VFOV, the magnitude of impact in the Salt Pond/Tidal Marsh Character Area is small.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to great distance (49.3 km [30.6 miles] and farther) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (23.8 km [14.8 miles] and farther) but will be low to the horizon and occupy a very small portion of the horizontal field of view. WTGs are not readily distinguishable above perimeter dunes and edge vegetation. Extensive ocean vistas are not common. Views are primarily focused inward toward the foreground waterbody. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Sand Plain Grassland/Coastal Scrub SCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Medium	At varying distances inland from the Ocean Beach/Coastal Dunes and Salt Pond/Tidal Marsh Character Areas, the coastal landscape transitions into a broad open space comprised of relatively flat terrain or small hills and eroded hollows. Vegetation communities are dominated by low growing herbaceous vegetation or woody and often impenetrable scrub brush. Although rare, occasional views of the open ocean are found above intervening dunes in certain locations. Extensive ocean vistas are not common. In areas where the ocean is not directly visible, the proximity of the ocean is generally well recognized and contributes to a sense of anticipation. Residential structures are often present along the perimeter of this Character Area. In other areas, little man-made development is within view. Recreational activities are typically focused on enjoyment of the unique natural landscape and include walking, biking, bird watching, and general nature appreciation.
Scenic Resource Value: (see Table 13)	Medium	Portions of this Character Area are designated as protected conservation land. These lands are typically open for passive recreation and nature appreciation.
SENSITIVITY RATING (see Table 14)	MEDIUM	This setting is highly valued for its scenic environmental character, public access, and proximity to the ocean.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Because sand plains and scrub areas are generally at low elevations, distant vistas in the direction of Vineyard Northeast's offshore facilities are often screened by intervening vegetation. Views are primarily focused inward toward the foreground landscape. The potential for distant vistas toward the ocean is found in elevated locations across open plains. Vineyard Northeast's offshore facilities would be visible at great distance (49.1 km [30.5 miles] from the nearest WTG). Although Vineyard Northeast occupies a moderate HFOV (up to approximately 30 degrees depending on vantage point) at its closest point only the mid-tower and higher of the nearest WTG will be visible above the horizon from this SCA. The vertical field-of-view is less from more distant points in the SCA. On clear air days the offshore facilities will be apparent to focused observers. At other times, the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 879 hectares (2,172 acres), which represents 27.1% of this Character Area. Much of this affected area is within sand plain heath land on the south coast of Nantucket where long vistas over a planar meadow-like landscape are found. Views of the WTG blades and nacelle tops are possible low to the horizon but not readily distinguishable when viewed through or above foreground scrub vegetation.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Foreground vegetation dominates this character area and dictates available views. Small view corridors break up the scale and overall geographic extent of Vineyard Northeast.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to great distance (49.1 km [30.5 miles] and farther) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (23.8 km [14.8 miles] and farther) but will be low to the horizon and occupy a very small portion of the horizontal field of view. WTGs and the booster station are not readily distinguishable above intervening scrub vegetation. Extensive ocean vistas are not common. Views are primarily focused on the foreground landscape. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Shoreline Residential SCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Medium	Shoreline residential land use is a mix of moderately developed areas organized in suburban style neighborhood clusters and lower density secluded residential properties. Architecture is a mixture of old and new construction and traditional/historic and contemporary styles. Man-made development (at varying density) is an integral feature and is either dominant or co-dominant with the natural landscape. Shoreline residential homes are often used seasonally by owners or offered as vacation rentals. While public recreational opportunities are limited, visitors to these properties enjoy views of the ocean or beachfront landscape and frequently walk or drive from the residential property to the beach and other scenic coastal locations as part of their vacation routine. Although sometimes screened by coastal scrub vegetation and other residential structures, shoreline residences often have panoramic or framed views of the ocean, salt ponds/tidal marshes, and/or dune landscape. When screened, ocean views are typically found in nearby areas and are recognized as contributing factors to the unique and valued character of the neighborhood.
Scenic Resource Value: (see Table 13)	Low-Medium	Properties in this unit have often been developed to take advantage of ocean views and beachfront landscape. Property values are heavily influenced by direct or proximate ocean views. Although human-made structures are common, the scenic quality of the local landscape is high. Shoreline residential areas may be adjacent to, or have visual access to, protected public or private conservation lands. Recreational amenities, conservation areas, or other formally designated scenic resources are not typically found in the Shoreline Residential Character Area.
SENSITIVITY RATING (see Table 14)	LOW-MEDIUM	Shoreline Residential properties have highly valued direct or proximate ocean views as well as recognized architectural and landscape quality. However, the Shoreline Residential Character Area does not typically carry any type of formal recognition or designation as a visually sensitive resource.
MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Shoreline residential development tends to be situated to take best advantage of ocean views either directly from individual residences, or proximate to residential properties. Vineyard Northeast's offshore facilities would be visible at great distance (49.1 km [30.5 miles] from the nearest WTG). Although Vineyard Northeast occupies a moderate HFOV (up to approximately 30 degrees depending on vantage point) at its closest point only the mid-tower and higher of the nearest WTG will be visible above the horizon from this SCA. The vertical field-of-view is less from more distant points in the SCA.. On clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 396 hectares (979 acres), which represents 7.7% of this Character Area. Much of this affected area is within developed land on the south coast of Nantucket, where long vistas over the planar landscape are found. In these slightly elevated areas, views of the WTG blades, nacelle tops and mid-tower are possible. Foreground buildings and vegetation are common and dictate available views. Small view corridors break up the scale and overall geographic extent of Vineyard Northeast.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	This unit experiences static views, often from locations specifically designed to capture views outward over the ocean. However, due to extended distance and limited HFOV and VFOV, visible WTGs would be a minor element on the horizon.
OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to great distance (49.1 km [30.5 miles] and farther) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (23.7 km [14.7 miles] and farther) but will be low to the horizon and occupy a very small portion of the horizontal field of view. For all but seaside properties, extensive ocean vistas are not common. Views are primarily focused on the foreground landscape. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Coastal Village/Town Center SCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Low-Medium	Village and town centers are small coastal seaports with clusters of historic buildings focused around clearly defined and thriving downtown commercial districts. These maintain a quaint coastal New England character with a strong visual access to the ocean, bay, or harbor. Vegetation most commonly includes street trees and residential landscaping yard trees. Buildings (typically two to three stories tall) and other man-made features dominate the landscape. Architecture is highly variable in size, style, and arrangement. Each town center on Martha's Vineyard and Nantucket maintains an individual and distinctive New England character.
Scenic Resource Value: (see Table 13)	Medium-High	All coastal villages and town centers on Martha's Vineyard and Nantucket include intact and well-maintained historic districts of State and National significance.
SENSITIVITY RATING (see Table 14)	MEDIUM	Due to widely recognized intact historic and architecturally significant historic downtown and waterfront areas, the overall sensitivity rating for the Coastal Village/Town Center Character Area is medium-high.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Vineyard Northeast is visible from only one coastal village/town center: Siasconset on Nantucket. Vineyard Northeast's offshore facilities would be visible at great distance (54.3 km [33.7 miles] from the nearest WTG). Although Vineyard Northeast occupies a moderate HFOV (up to approximately 30 degrees depending on vantage point) at its closest point only the nacelle top tower and higher of the nearest WTG will be visible above the horizon from this SCA. The vertical field-of-view is less from more distant points in the SCA. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. Foreground buildings typically limit views to the immediate foreground. Distant vistas across the open ocean are limited to discrete perimeter vantage points.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 11 hectares (26 acres), which represents 0.6% of this Character Area. From Siasconset, the offshore facilities are largely screened from interior areas by existing structures. Small view corridors looking outward to the ocean are found between buildings and landscape vegetation. Perimeter properties have more exposed vistas.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Restricted views along narrow corridors would limit discernibility of Vineyard Northeast's size, WTG scale, and geographic extent.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to great distance (54.3 km [33.7 miles] and farther) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (28.2 km [17.5 miles] and farther) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Due to intervening structures and vegetation very few viewing opportunities are found in this SCA. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

7.2.2 Landscape Character Areas Impact Levels

Forest LCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Medium	Inland from various Seascape Character Areas are extended wooded areas including both deciduous and coniferous species. The understory is comprised of mixed shrubs, vines, and saplings. In areas exposed to coastal winds, trees are often irregular in form and stunted; trees located in better shielded inland areas are taller and more regular in form. The topography in the Forest LCA is typically level to rolling with distinct ridges and gullies. A variety of land use activities exist in the Forest LCA, including residential development, roads, small open yards and fields, and other land uses. Although this landscape type once dominated the interior of Martha's Vineyard and Nantucket, various forms of human development extensively encroach upon this area, and only a patchwork of mature forest remains. Recreational uses include hiking, biking, bird watching, and general nature appreciation along local roadways and designated nature trails. Views are largely focused inward within the forest. External/more distant views are restricted to openings in the forest canopy and axial views along roadways. Views of the ocean are uncommon and recreational activities typically have little or no association with water.
Scenic Resource Value: (see Table 13)	Low-Medium	Large forest areas on Martha's Vineyard and Nantucket are protected open space, either by public agencies, private land trusts, or non-profit organizations, with little to no manmade development in immediate view. The unique visual features of the Forest Character Area are distinct from adjacent Sand Plain/Scrub Brush Character Areas but are similarly valued for sensitive environmental and aesthetic qualities.
SENSITIVITY RATING (see Table 14)	LOW-MEDIUM	Although large portions of this Character Area are protected conservation lands and highly valued for their natural scenic quality, distant views outward toward the ocean are almost always obscured by vegetation. Occasional unique vistas are found at higher elevations (i.e., Peaked Hill on Martha's Vineyard); however, such conditions are not common.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	In rare circumstances where Vineyard Northeast is visible from the Forest Character Area, the offshore facilities would be visible at great distance and would occupy a moderate HFOV with a small VFOV. Where visible, on clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 0.4% of this Character Area. Affected areas are generally at the forest edge or from small isolated open areas within the Forest LCA.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Limited viewing opportunities result in a magnitude of impact rating of small.
OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to intervening vegetation very few viewing opportunities are found in this SCA. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Inland Sand Plain Grassland/Scrub LCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Medium	Large interior areas in east central and west central Nantucket include broad open space in relatively flat land or small hills dominated by low growing herbaceous vegetation or woody and often impenetrable scrub brush. In these interior areas ocean views are not found, although long vistas across the open plain to the distant horizon are common in some areas. In other areas, distant views are more localized and framed by rolling inland dunes, taller brush, and transitional forest vegetation. Residential structures are often present along the perimeter of this Character Area. In other areas, little man-made development is within view. Recreational activities are typically focused on enjoyment of the unique natural landscape and include walking, biking, bird watching, and general nature appreciation. Recreational uses are not water dependent.
Scenic Resource Value: (see Table 13)	Medium	Portions of this Character Area are designated as protected conservation land. These lands are typically open for passive recreation and nature appreciation.
SENSITIVITY RATING (see Table 14)	MEDIUM	Although this Character Area is highly valued for its scenic environmental character and public access, distant vistas views toward the ocean are typically obscured by vegetation.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	In rare circumstances where Vineyard Northeast's offshore facilities are visible from the Inland Sand Plain Grassland/Scrub Character Area, the offshore facilities would be visible at great distance and would occupy a moderate HFOV with a small VFOV. Where visible, on clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 3.5% of this Character Area. Much of this affected area is found in Middle Moors landscape of east central and west central Nantucket. In these areas opportunities for views from public roads or trails are limited.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Limited viewing opportunities result in a magnitude of impact rating of small.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to intervening vegetation very few viewing opportunities are found in this SCA. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Rural Residential LCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Low-Medium	The Rural Residential Character Area is found along the frontage of rural roads throughout Martha's Vineyard and Nantucket, outside of the Coastal Village/Town Center and Suburban Residential Character Areas and inland from coastal areas. Structures are typically single-family homes that vary widely in age and architectural style, from the traditional Cape style house to modern modular homes and historic farmhouses. Residences tend to be larger and well-maintained, often with a traditional New England character. On Martha's Vineyard and Nantucket, older homes vary in size while newer, seasonal homes are larger estates located on large lots. Many rural roads on the islands are unpaved. Residential structures are often set back from the road and interspersed with hedgerows and small woodlots. Topography is characterized by relatively level to gently rolling landforms typical of inland areas on Martha's Vineyard and Nantucket. Rural residences are commonly situated within wooded areas similar in character to the Forest Character Area. Views are largely focused inward within the property. Extended distance views are often restricted to open fields and axial views along roadways. Public recreational opportunities are limited. Residents and visitors may enjoy walks and bike rides along rural roadways.
Scenic Resource Value: (see Table 13)	Low	Although human-made structures are common, the scenic quality of the local landscape is high. Rural Residential areas may be adjacent to, or have visual access to, protected public or private conservation lands. Recreational amenities, conservation areas, or other formally designated scenic resources are not typically found in the Rural Residential Character Area. Rural residential uses are not typically oriented toward ocean views. Views of the ocean are rare.
SENSITIVITY RATING (see Table 14)	LOW	Rural Residential properties are highly valued for privacy and tranquility. The Rural Residential Character Area does not typically carry any type of formal recognition or designation as a visually sensitive resource. Distant views outward toward the ocean are almost always obscured by vegetation.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	In rare circumstances where Vineyard Northeast's offshore facilities are visible from the Rural Residential Character Area, the offshore facilities would be visible at great distance and would occupy a moderate HFOV with a small VFOV. Where visible, on clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 0.9% of this Character Area. Visibility is found in limited areas along the south facing perimeter of this LCA.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Limited viewing opportunities and distance result in a magnitude of impact rating of small.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to intervening structures and vegetation very few viewing opportunities are found in this SCA. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Suburban Residential LCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Low-Medium	Suburban residential development includes medium- to high-density single-family residential neighborhoods that typically occur on the outskirts of villages and town centers, along secondary roads and cul-de-sacs. Buildings are most often one- and two-story wood frame structures with peaked roofs and clapboard or shingle siding. House styles are primarily Capes, ranches, bungalows, salt boxes, and colonial residential structures. Suburban residential developments generally have regularly spaced homes surrounded by landscaped yards. Residential subdivisions are commonly located within forest areas or have pockets of remnant forest vegetation within developed areas. Streets are well-organized in layout and are often curvilinear in form with well-defined access to collector streets. Activities include normal residential uses and local travel. Views are largely focused inward within the property. Extended distance views are commonly restricted to the immediate neighborhood. The Suburban Residential Character Area includes several public and private golf courses. Long vistas across adjacent Sand Plain/Scrub Brush and Salt Pond/Tidal Marsh Character Areas toward the ocean are found from the Miacomet Golf Course, Siasconset Golf Course, and Sankaty Head Golf Club on Nantucket. Views of Vineyard Northeast are not identified at other golf courses on Martha's Vineyard or Nantucket. Other public recreational opportunities are limited in this Character Area.
Scenic Resource Value: (see Table 13)	Low	Although human-made structures are common, the scenic quality of the local landscape is moderate. Other than golf courses, public recreational amenities, conservation areas, or other formally designated scenic resources are not typically found in the Suburban Residential Character Area. Suburban residential uses are not typically oriented toward ocean views. Views of the ocean are rare.
SENSITIVITY RATING (see Table 14)	LOW	Suburban residential properties do not typically carry any type of formal recognition or designation as a visually sensitive resource. Distant views outward toward the ocean are almost always obscured by intervening vegetation or adjacent residential structures.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	In rare circumstances where Vineyard Northeast's offshore facilities are visible from the Suburban Residential Character Area (i.e., golf courses), the offshore facilities would be visible at great distance and would occupy a moderate HFOV with a small VFOV. Where visible, on clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Small	The ZLV analysis indicates that the offshore facilities will be visible from 3.9% of this Character Area. Areas of visibility include portions of the Miacomet Golf Couse, Siasconset Golf Course, and Sankaty Head Golf Club on Nantucket. On Martha's Vineyard, small areas of visibility is found in limited areas along the south facing perimeter of this LCA.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Limited viewing opportunities result in a magnitude of impact rating of small. From identified golf courses, distant vistas over a planar meadow-like landscape are found.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to intervening structures and vegetation very few viewing opportunities are found in this SCA. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

Industrial Open Space LCA

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 12)	Low	Commercial and industrial development on Martha's Vineyard and Nantucket is generally limited to relatively small commercial light manufacturing parks or individual properties on the outskirts of the Coastal Village/Town Center and Suburban Residential Character Areas. For this reason, commercial and industrial uses are not defined as a distinct LCA for the purpose of this visual assessment. Such areas are largely incorporated as incidental uses within the surrounding Coastal Village/Town Center and Suburban Residential Character Areas. Because the ZLV analysis has identified a relatively large area of potential project visibility within the boundary of the Nantucket Airport, located along the south shore of the island, and on the southerly facing slopes of the Nantucket Landfill, located in the west central portion of the island, these areas are separately delineated as the Industrial Open Space LCA. For consistency, the Martha's Vineyard Airport, located in the central portion of the island, is included in the Industrial Open Space LCA. However, the ZLV analysis demonstrates that Vineyard Northeast will not be visible from the Martha's Vineyard Airport. Human-made structures, streets, utilities, and other utilitarian infrastructure dominate. Views of the seascape or open ocean occur due to long vistas across open land.
Scenic Resource Value: (see Table 13)	Low	Lands within the Industrial Open Space Character Area maintain utilitarian transportation and waste management visual quality. These lands carry no special designation as visually sensitive resources and are not considered to hold any scenic sensitivity. These areas have no recreational uses, and the land use is not water dependent.
SENSITIVITY RATING (see Table 14)	LOW	The Industrial Open Space Character Area is dominated by generally unattractive land uses and are not considered to be visually sensitive.

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Small	Although only visible from utilitarian transportation and waste management land uses, the offshore facilities would be visible at great distance and would occupy a moderate HFOV with a small VFOV. Where visible, on clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions.
Geographic Extent: (see Table 16)	Medium	The ZLV analysis indicates that the offshore facilities will be visible from 38.8% of this Character Area. Affected areas include the Nantucket Airport and on the southerly facing slopes of the Nantucket Landfill. Vineyard Northeast will not be visible from the Martha's Vineyard Airport.
MAGNITUDE IMPACT RATING (see Table 17)	SMALL	Visual impacts only occur within this Character Area where there are generally unattractive land uses.

OVERALL IMPACT LEVEL (see Table 18)	**NEGLIGIBLE**	Table 18 indicates the overall impact level for this SCA will be MINOR. Due to a very low sensitivity rating and very few public viewing opportunities this impact is reduced one ordinal level to NEGLIGIBLE.

7.2.3 Ocean Character Area Impact Levels

As with the above impact analyses, the following assessment of impacts to the Ocean Character Area conservatively considers the unlikely scenario that no other offshore wind projects have been constructed at the time of Vineyard Northeast construction. However, as described in Section 10, multiple projects throughout the MA WEA and RI/MA WEA are in various stages of design or review within the vicinity of Vineyard Northeast. It is very unlikely that the Ocean

Character Area will be a blank slate devoid of visible development at the time of Vineyard Northeast construction.

Ocean Character Area

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility:	High	The open ocean is a blank slate; any activity or permanent change will be noticeable and will contrast with the color, form, line, texture, and scale of the ocean. Open water with a generally flat horizon (depending on sea state, weather, and atmospheric conditions) dominates the view and is the focal element in all directions. Away from the shore, the unit has minimal human intrusion, nearly all of which is temporary, in the form of vessel traffic. Closer to shore, human-made features such as jetties, buoys, and other coastal infrastructure are more common but not dominant. The man-made characteristics of the WTGs, ESPs and booster station are incongruent with the character of the Ocean Character Area.
Scenic Resource Value: (see Table 13)	High	The ocean is a major attraction for all types of uses where the scenic value of the ocean plays a role. The open ocean is distinctive for many reasons: the lack of visible development, the 360-degree views, the distance that viewers can see in all directions, the presence of ocean-going vessels and fishing boats, and the changes in appearance that occur over the course of a day. On the other hand, beyond the point where the shoreline is visible, the open ocean lacks scale, reference points, defining edges, vegetation, or other features that an observer can relate to. The unique 360-degree conditions cannot be experienced from land-based vantage points.
SENSITIVITY RATING (see Table 14)	HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 15)	Variable Small to Large	Vineyard Northeast would add an obvious human-made element to otherwise undisturbed natural-appearing views. The degree of change will be a function of the viewers' distance from the offshore facilities. As observers approach the offshore facilities, the open ocean would become increasingly dominated by the scale and horizontal extent of the WTGs. From a foreground distance, viewers typically recognize a very high level of detail. Contrast and color intensity are at their greatest and human scale is an important cognitive factor in judging spatial relationships and the relative size of objects. Visual impact is likely to be considered the greatest at a foreground distance. At background distances, visible elements lose detail and become less distinct. As the distance between an observer and a visible object increases, color intensity and contrast between light and dark diminish making objects appear "washed out."
Geographic Extent: (see Table 16)	Large	There is a large area within this unit with unscreened views of Vineyard Northeast's offshore facilities.
MAGNITUDE IMPACT RATING (see Table 17)	VARIABLE SMALL TO LARGE	Impact magnitude would vary based on the exact position of the viewer within this Character Area. Impacts would be highest close to or within the Lease Area, where WTGs, ESPs, and the booster station (if used) would be dominant and entirely out of character. These impacts would diminish to a negligible level with distance.

OVERALL IMPACT LEVEL (see Table 18)	**VARIABLE NEGLIGIBLE TO MAJOR**	Vineyard Northeast's effect on the Ocean Character Area will be highly variable due to the nature and extent of the ocean environment and the unlimited number of viewpoints and distances at which the offshore facilities will be viewed.

7.2.4 Character Area Impact Level Summary

The SLIA evaluates the compatibility of the character of Vineyard Northeast with the aspects that contribute to the distinctive character of the seascape and landscape areas from which the offshore facilities are visible. The impact assessment is based on the sensitivity of the affected SCA, LCA, and OCA and the magnitude of the changes in visual character brought about by Vineyard Northeast. The overall impact level results of the SLIA for individual SCAs, LCAs, and the OCA are summarized in Table 19.

SCA and LCA Findings

Sensitivity Factor - As a practical reality, the entire seascape within the VSA is highly scenic and of great aesthetic importance to the social, cultural, and economic well-being of the region. Due in large part to extensive ocean views, noteworthy landscape distinctiveness, water dependent or water related recreational uses, and enhanced scenic resource value, SCA ratings trend toward the middle or higher end of the Sensitivity Factor scale. Being further inland with minimal visual access to the seascape, LCAs trend toward the lower end of the Sensitivity Factor scale.

Magnitude Factor – Given the distance of the offshore facilities from shore, the HFOV will be relatively limited within the context of a typically wide panorama of seascape. Vineyard Northeast's offshore facilities will be viewed very low on the horizon and blade movement will be difficult to detect. On clear air days, the offshore facilities may be visually apparent to focused observers. Under other atmospheric conditions, the offshore facilities will be faint and difficult to detect. As a result, the magnitude factor for SCAs and LCAs trend toward the "Small" to "Small-Medium" impact level.

Overall Impact Level - With the sensitivity and magnitude factors combined, all five LCAs and four of the six SCAs have an overall impact level of "Negligible." Negligible indicates that Vineyard Northeast will have very little or no effect on the Character Area's features or qualities, either because: a) there is minimal visibility of the offshore facilities, b) the Character Area lacks value, or c) the Character Area is not sensitive to visual change.

Two SCAs have an overall impact level of "Minor," indicating that Vineyard Northeast would introduce features that may have a noticeable to medium level of visual impact on the Character Area. Vineyard Northeast may have a low to moderate level of visual prominence and would have a small to medium effect on the key features of the Character Area.

OCA Findings

The ocean is a major attraction for all types of uses where the scenic value of the ocean plays a role. The open ocean is a blank slate; any activity or permanent change will be noticeable and will contrast with the color, form, line, texture, and scale of the ocean. As such, the man-made characteristics of the WTGs, ESPs and booster station are incongruent with the visual character of the Ocean Character Area.

Recreational boating is typically concentrated within several miles of the coastline. However recreational mariners may venture many miles offshore, including on water vantage points near or within Lease Area. Recreational mariners may be particularly sensitive to man-made structures within the seascape since views are commonly limited to open ocean and horizon when venturing far offshore, and distant coastal land masses when closer to shore. Recreational mariners may have prolonged visual exposure to the seascape and coastal environment.

While the unique character of open ocean views is an important part of the recreational experience for most recreational mariners, viewers may also be cognizant of waterfront development visible from near shore vantage points. While the sensitivity of recreational mariners will vary, to most viewers, the unique visual character of the open ocean, bays, harbors, and inlets is an important and integral part of the recreational experience.

Vineyard Northeast's effect on the Ocean Character Area will be variable due to the nature and extent of the ocean environment and the unlimited number of viewpoints where the offshore facilities may be visible. Within the foreground viewing distance, the large-scale structures will be visually dominant. The clear contrast in color, form, line, texture, and scale will act as a focal point drawing the viewer's attention. The overall impact is likely to be considered major from foreground distances within the Ocean Character Area.

However, visual contrast will diminish with increasing distance. As the apparent height (VFOV) and the extent of the horizon occupied by the offshore facilities (HFOV) decreases, the contrasting elements of color, form, line, texture, and scale will become increasingly muted and less visually distinct, rendering the overall impact negligible.

Table 19 – Seascape, Landscape, and Ocean Character Areas Impact Summary

	SENSITIVITY FACTOR			MAGNITUDE FACTOR			OVERALL IMPACT LEVEL
	Susceptibility	Scenic Resource Value	SENSITIVITY RATING	Size or Scale of Change	Geographic Extent	MAGNITUDE IMPACT RATING	
SEASCAPE CHARACTER AREAS							
Ocean Beach/Coastal Dunes	High	Medium-High	HIGH	Small	Medium	SMALL	**MINOR***
Coastal Bluffs	Medium-High	Medium-High	MEDIUM-HIGH	Small	Small-Medium	SMALL	**MINOR***
Salt Pond-Tidal Marsh	Medium	Medium	MEDIUM	Small	Small	SMALL	**NEGLIGIBLE****
Sand Plain Grassland/Coastal Scrub	Medium	Medium	MEDIUM	Small	Small	SMALL	**NEGLIGIBLE****
Shoreline Residential	Medium	Low-Medium	LOW-MEDIUM	Small	Small	SMALL	**NEGLIGIBLE****
Coastal Village/Town Center	Low-Medium	Medium-High	MEDIUM	Small	Small	SMALL	**NEGLIGIBLE****
LANDSCAPE CHARACTER AREAS							
Forest	Medium	Low-Medium	LOW-MEDIUM	Small	Small	SMALL	**NEGLIGIBLE****
Inland Sand Plain Grassland/Scrub	Medium	Medium	MEDIUM	Small	Small	SMALL	**NEGLIGIBLE****
Rural Residential	Low-Medium	Low	LOW	Small	Small	SMALL	**NEGLIGIBLE****
Suburban Residential	Low-Medium	Low	LOW	Small	Small	SMALL	**NEGLIGIBLE****
Industrial Open Space	Low	Low	LOW	Small	Medium	SMALL	**NEGLIGIBLE****
OCEAN CHARACTER AREA							
Ocean	High	High	HIGH	Small to Large	Large	SMALL TO LARGE	**NEGLIGIBLE TO MAJOR**

*Table 18 indicates the overall impact level will be MODERATE. Based on observed site conditions and professional judgement this impact is reduced to MINOR. Justification is provided in the analysis for this SCA/LCA is provided in Sections 7.2.1 and 7.2.2.

**Table 18 indicates the overall impact level will be MINOR. Based on observed site conditions and professional judgement this impact is reduced to NEGLIGIBLE. Justification is provided in the analysis for this SCA/LCA in Sections 7.2.1 and 7.2.2.

8.0 VISUAL IMPACT ASSESSMENT (VIA)

8.1 VIA Methodology

This section explains the methodology used to evaluate the potential visual impact on viewers. This methodology is based "Section 6.4 Evaluation of Impacts" in BOEM's SLVIA guidelines (Sullivan R. G., 2021, pp. 43-47).

As is the case for the SLIA, in the VIA, the key characteristics are referred to as the sensitivity of the receptor and the magnitude of the impact. Sensitivity is broken down into susceptibility and value, while magnitude is broken down into size/scale, geographic extent, and duration and reversibility of impacts. Although the general approach to determining impact levels is similar for the SLIA and the VIA, because the impact receptors are different, there are some differences in exactly what is assessed at the detailed level. The receptors for visual impacts are always people, while the receptors for SLIAs are the seascapes and landscapes themselves.

Although the factors of sensitivity and magnitude are evaluated on an ordinal scale, assessing the qualities of each evaluated KOP and arriving at an ordinal rating are a matter of professional judgment. The following descriptions, tables, and matrices provide general definitions to assist the professional visual analyst in determining the degree of impact on a visual impact receptor (a person or group of people).

8.1.1 Sensitivity of Visual Impact Receptors

The sensitivity of a visual impact receptor (a person or group of people) depends on their susceptibility to change in particular views and also on the value they place on those views (Sullivan R. G., 2021, p. 44).

The evaluation of viewer sensitivity is derived from an understanding of: a) the susceptibility of viewers to changes in the landscape/seascape and b) the values attached to the views. A rating (low to high) was assigned to viewers' sensitivity. Viewers with a low capacity to absorb change and high values attached to the viewpoint are considered most sensitive to visual change. Likewise, viewers with high tolerance to change and low value viewpoints are considered least sensitive to visual change (TJD&A, 2022, p. 36).

Susceptibility to Change – Impacts on people who are particularly sensitive to changes in views are more likely to be considered important than the same impacts would be to someone who is less sensitive to the quality of views. The relative susceptibility of viewers to changes in views is primarily a function of the degree to which the activities in which the viewers are engaged focus attention or interest on the seascape/landscape view (Sullivan R. G., 2021, p. 44).

A viewer's susceptibility to change is based on visitor use patterns at a KOP and the relationship between the viewpoint to the ocean. The indicators are based on the primary recreation or scenic use of the site; the value of the ocean setting to the activity; visitor expectations; the

duration of the view; and viewer elevation. Places where visitor activities are dependent on ocean views with high visitor expectations are rated as high. Likewise, a place without recreational activity, low viewer expectations, and minimal views of the ocean are likely to absorb substantial visual change and are rated as low. Table 20 provides guidance on the assessment of a viewer's susceptibility to change.

Table 20 - Viewer Susceptibility to Change*

	LOW	MEDIUM	HIGH
Local Residents	Residents do not have views of the proposed project from their homes or place of employment, or do not regard visual the visual environment as an important asset to their community.	Residents have views of the proposed project from their homes and regard visual the visual environment as an important asset to their community.	
Cultural Importance	A culturally important site is not present.	A culturally important site is present, but appreciation of the resource is not dependent on views of the landscape/seascape.	A culturally important site is present and appreciation of the cultural resource is dependent on views of the landscape/seascape.
Outdoor Recreation	Minimal recreational activity present or recreational activity is present; however enjoyment of the activity is not focused on views of the landscape/seascape.	Recreational activity is present and enjoyment of the activity is focused on views of the landscape/seascape.	
Transient Views	Travelers/commuters in transit to a destination without regard to the scenic quality of the landscape.	People traveling on scenic highways, railroads, or other transport specifically for enjoyment of views.	
Visitor Expectations	Other people are constantly present, frequent distractions, lights.	Other people are noticeably present, distractions are present.	Limited presence of other people or infrastructure, little distraction, limited lights, night sky visible.
Viewer Elevation	At water level.	Slightly elevated ground plane such as a dune or low bluff.	High bluff or lighthouse.
*The definitions of LOW to HIGH offer general guidance in assigning a Susceptibility to Change Value. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on observed field conditions and professional judgement.			

Value Attached to Views – Impacts on people at heavily visited, widely recognized, and highly valued viewpoints are more likely to be important (Sullivan R. G., 2021, p. 45).

The scenic value of a view is based on the site's recognition as a high quality or unique visual landscape. At the high end of the scenic resource value spectrum, KOPs may be located within areas recognized nationally for their scenic value, such as National Parks or National Seashores. These sites are likely to receive heavy visitation or recreational use and have high value attached to the site. At the low end of the spectrum are areas without any formal scenic designation. These sites may have low visitation or may not offer recreation amenities to the public. Table 21 provides guidance on the assessment of a KOP's scenic value.

Table 21 - KOP Scenic Resource Value*

LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
A site without formal recognition or designation as a scenic resource. Little or no public amenity or recreational value.	A site that may be identified in guidebooks but has no formal designation as a scenic resource.	A site with local or regional recognition/ ownership. May include local parks, central downtowns, community resources, or local historic sites.	A site with state recognition/ownership. May include State Parks and Recreation Areas, Wildlife Management Areas, Land Trust properties, or sites identified or eligible for the NHRP or SRHP.	A site with state or national recognition for its scenic and/or recreational value. May include State Parks and recreation areas, National Parks, National Seashores, or sites on the NHRP that derive significance from their landscape setting.
Low number of viewers	Moderate visitation		High number of viewers	
No facilities for view enjoyment	Some site improvement for view enjoyment		Facilities for view enjoyment (parking, restrooms, interpretive panels, telescopes, etc.)	
*The definitions of LOW to HIGH offer general guidance in assigning a Scenic Resource Value. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on observed field conditions and professional judgement.				

Viewer Sensitivity Rating - The sensitivity of each viewpoint is determined by combining viewer susceptibility to change with the scenic resource value of the viewpoint/KOP. Table 22 provides guidance in the form of a matrix to determine the overall sensitivity of the viewer.

Table 22 – Viewer Sensitivity Matrix

SCENIC RESOURCE VALUE RATING (refer to Table 21)	SUSCEPTIBILITY RATING (refer to Table 20)				
	HIGH	MEDIUM-HIGH	MEDIUM	LOW-MEDIUM	LOW
HIGH	HIGH	HIGH	HIGH	MEDIUM	MEDIUM
MEDIUM-HIGH	HIGH	MEDIUM-HIGH	MEDIUM-HIGH	MEDIUM	LOW-MEDIUM
MEDIUM	HIGH	MEDIUM	MEDIUM	LOW-MEDIUM	LOW
LOW-MEDIUM	MEDIUM	MEDIUM	LOW-MEDIUM	LOW-MEDIUM	LOW
LOW	MEDIUM	LOW-MEDIUM	LOW	LOW	LOW
This sensitivity matrix is based on Table 6.4-1 in BOEM's SLVIA guidelines (Sullivan R. G., 2021, p. 32).					

8.1.2 Magnitude of Visual Impact

Large-scale changes that introduce new, non-characteristic, discordant, or intrusive elements into the view are likely to be more important than small changes or changes involving features already present within the view. The magnitude of visual impacts expected from the proposed project is similar to that used for the SLIA and is based on the size or scale of the change, the geographic extent of its effects, and its duration and reversibility (Sullivan R. G., 2021, p. 45).

Size or Scale of Change - This evaluation considers the anticipated degree of visual change from the project at the KOP. The rating (small to large) is based upon measurable or observable physical factors that contribute to project visibility. Factors include distance to the nearest WTG, VFOW, HFOV covered by the project, curvature of the earth, landscape contrast, and the

level of visual alteration caused by the project. Table 23 provides guidance on the assessment of the size/scale of visual change from the KOP.

Table 23 - KOP Size/Scale of Visual Change*

	SMALL	SMALL-MEDIUM	MEDIUM	MEDIUM-LARGE	LARGE
Distance to nearest visible WTG **	Intermittently noticed features in the onshore to offshore view between 31 and 42.5 miles (49.9 and 68.4 kilometers) distance	Low on the horizon, but persistent features in the onshore to offshore view between 28 and 31 miles (45.1 and 49.9 kilometers) distance	Clearly visible features in the onshore to offshore view between 12 and 28 miles (19.3 and 45.1 kilometers) distance	Strongly pervasive features in the onshore to offshore view between 5 and 12 miles (8 and 19.3 kilometers) distance	Unavoidably dominant features in the boat and ship ocean view between 0 and 5 miles (0 and 8 kilometers) distance
Vertical Field of View	Upper ½ of rotor blade nearest WTG visible above horizon, or project not visible	Full rotor blade (but not nacelle top) of nearest WTG at, or just above horizon	Nacelle top (but not tower mid-point) of nearest WTG tower visible above horizon	Tower mid-point (but not foundation) of nearest WTG tower visible above horizon	Foundation of nearest WTG visible above horizon
Horizontal Field of View	<5 degrees of the horizon, or project not visible	5 to 15 degrees of the horizon	15 to 30 degrees of the horizon	30 to 45 degrees of the horizon	> 45 degrees of the horizon
Landscape Contrast	**Faint**: Visible only after extended, close viewing; otherwise invisible.	**Apparent:** Visible when scanning in the general direction of study subject; otherwise likely to be missed by a casual observer.	**Conspicuous:** Visible after brief glance in the general direction of study subject and unlikely to be missed by a casual observer.	**Prominent:** Plainly visible, could not be missed by a casual observer, but does not strongly attract visual attention or dominate the view because of apparent size, for views in the general direction of study subject.	**Dominant:** Strongly attracts visual attention of views in the general direction of study subject. Attention may be drawn by strong contrast in form, line, color, or texture, luminance, or motion.

*The definitions of LOW to HIGH offer general guidance in assigning value to the Size/Scale of Visual Change. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on observed field conditions and professional judgement.

**Distances are provided for guidance purposes only. Site specific conditions, such as viewer elevation may influence classification of the Distance Factor.

Geographic Extent - This evaluation is based on the extent of potential visibility from the KOP. This includes any visual obstructions between the KOP and the project, the angle of view toward the project relative to the primary view axis, and the area in the vicinity of the KOP with potential project visibility. KOPs with unobstructed, central views toward the project and where the project is seen over a wide associated area are considered to have a large geographic extent. Alternatively, KOPs where the project is outside the primary view axis or where there are obstructions to the view are rated as small. Table 24 provides guidance on the assessment of the geographic extent of project visibility from the KOP.

Table 24 - KOP Geographic Extent of Visibility*

	SMALL	SMALL-MEDIUM	MEDIUM	MEDIUM-LARGE	LARGE
Apparent size	Project appears very small (nearly indistinguishable) to the viewer.		Project appears large enough to be visually apparent but is not the primary focus of attention.		Project appears very large and physically dominant to the viewer.
Extent of the area where the same changes would be visible.	The project is visible only in the immediate vicinity of the KOP (e.g., visual exposure is specific to the KOP location).		The degree of project visibility varies in the vicinity of the KOP (e.g., visual exposure changes as the viewer moves though the landscape in the vicinity of the KOP).		The project is visible over a wide area in and around the KOP (e.g., visual exposure changes little as the viewer moves though the landscape in the vicinity of the KOP).
Visual obstructions	The HOFV is substantially obstructed.		The HOFV is partially obstructed.		The HFOV is substantially unobstructed.
View angle in relation to the primary view axis	The project appears well outside the primary view axis.		The HFOV is off the primary view axis causing the viewer to turn away from the primary view to look in the direction of the project. This rating applies for panoramic vista views where the primary view is not well defined (e.g., 360° lighthouse view).		The most prominent project components are aligned with the primary view axis.
*The definitions of LOW to HIGH offer general guidance in assigning value to the Geograhphic Extent of Visibility. The determination of this value should collectively consider all indicator categories. The visual analyst may place more or less emphasis on these ordinal values based on observed field conditions and professional judgement.					

Duration and Reversibility of Impacts – "Duration" refers to the length of time the impact is likely to occur (from short term to considered permanent), and "reversibility" refers to the degree to which the currently existing conditions are restored after the impact ceases (i.e., nonreversible, partially reversible, or fully reversible, and taking into consideration any residual impacts remaining after decommissioning) (Sullivan R. G., 2021, p. 46).

In the assessment of impact level, duration and reversibility are considered together and recorded on a scale of poor, fair, or good based on the length of time the project will be visible (i.e., a permanent / irreversible visual change would receive a poor rating). Vineyard Northeast is expected to operate for approximately 30 years and thus is considered a long-term installation. While Vineyard Northeast is a major utility scale renewable energy generating facility, it is fully reversible. In all cases, Vineyard Northeast received a fair rating.

Magnitude of Visual Impact Rating - The magnitude of visual impact to the viewer is determined by combining the Size or Scale of Change, the Geographic Extent of potential visibility from the KOP, and the Duration and Reversibility of Impacts. Table 25 provides guidance in the determination of the magnitude of visual impact.

Table 25 – KOP Magnitude Rating Matrix

	GEOGRAPHIC EXTENT RATING (refer to Table 24)				
SIZE/SCALE RATING (refer to Table 23)	**LARGE**	**MEDIUM-LARGE**	**MEDIUM**	**SMALL-MEDIUM**	**SMALL**
LARGE	LARGE	LARGE	LARGE	MEDIUM-LARGE	MEDIUM
MEDIUM-LARGE	LARGE	MEDIUM-LARGE	MEDIUM-LARGE	MEDIUM	MEDIUM
MEDIUM	LARGE	MEDIUM	MEDIUM	SMALL-MEDIUM	SMALL
SMALL-MEDIUM	MEDIUM	SMALL-MEDIUM	SMALL-MEDIUM	SMALL-MEDIUM	SMALL
SMALL	MEDIUM	SMALL	SMALL	SMALL	SMALL
This magnitude matrix is based on Table 6.4-2 in BOEM's SLVIA guidelines (Sullivan R. G., 2021, p. 32). Note, the duration/reversibility of impacts factor identified in Table 6.4-2 is not included in Table 25 because it is a constant variable (i.e., "Fair", long term/fully reversable) for all KOPs.					

8.1.3 Overall Impact to Viewer

Once the sensitivity and magnitude factors have been determined, they are combined into an overall finding of major, moderate, or minor impact for each KOP. Table 26 combines the sensitivity and magnitude of visual impact to determine the overall impact on viewers at the KOP. While this table provides guidance on how to rate the evaluations, the definitions of the ratings below, summary narratives, and professional judgment support the evaluations. Any adjustments to the impact that are greater or less that the Magnitude of Impact rating must be accompanied by a written justification.

Table 26 - KOP Overall Impact Matrix

KOP SENSITIVITY (refer to Table 22)	**KOP VISUAL IMPACT MAGNITUDE** (refer to Table 25)				
	LARGE	**MEDIUM-LARGE**	**MEDIUM**	**SMALL-MEDIUM**	**SMALL**
HIGH	MAJOR	MAJOR	MAJOR	MODERATE	MODERATE
MEDIUM-HIGH	MAJOR	MAJOR	MODERATE	MODERATE	MODERATE
MEDIUM	MAJOR	MODERATE	MODERATE	MODERATE	MINOR
LOW-MEDIUM	MODERATE	MODERATE	MINOR	MINOR	MINOR
LOW	MODERATE	MODERATE	MINOR	MINOR	MINOR
This magnitude matrix is based on Table 6.4-3 in BOEM's SLVIA guidelines (Sullivan R. G., 2021, p. 33).					

The overall impact definitions provided below characterize the findings of the VIA process:

- Negligible - The project would have very little or no effect on viewer experience, either because there is minimal project visibility, the magnitude or contrast to the view is low, or viewers are relatively insensitive to visual change.
- Minor - The project would introduce features that have a small but noticeable to medium level of change to the character of the view. The project may have a low to moderate level of visual prominence but may or may not hold the viewer's attention and would have a small to medium effect on viewer experience. While viewer

sensitivity/susceptibility/value is generally low, adjustments may be warranted depending upon the nature of the sensitivity.

- Moderate - The project would introduce features that may have a medium to large change to the character of the view. The project may have a moderate to large level of visual prominence, would attract and hold the viewer's attention, and would have a moderate effect on viewer experience. While viewer sensitivity/susceptibility/value is generally medium to low, adjustments may be warranted depending upon the nature of the sensitivity.
- Major - The project would introduce features that would have a major level of change to the character of the view. The project would attract, hold, and dominate the viewer's attention and would have a moderate to major effect on viewer experience. While viewer sensitivity/susceptibility/value is generally medium to high, adjustments may be warranted depending upon the nature of the sensitivity.

8.2 VIA Results

8.2.1 KOP Impact Levels

Based on the methodology described in Section 8.1 above, the following identifies the impact levels assigned to the factors of sensitivity and magnitude and the rationale behind these judgements for each of the 12 KOPs for which photo simulations were prepared (see Section 6.1).

The KOPs selected for the VIA are representative of affected SCAs/LCAs and are publicly accessible places considered to be of high visual sensitivity and/or recreational value. Evaluated KOPs also represent a geographic distribution across the VSA, illustrating a range of distances to the Lease Area. Four KOPs are on Martha's Vineyard and eight KOPs are on Nantucket.

Assessing the impact level on viewer experience is a matter of professional judgment. In general, a large loss or irreversible adverse impact on elements and/or aesthetic and perceptual aspects that are key to the character of highly valued resources are likely to be considered a major impact. On the other hand, reversible adverse impacts of short duration on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the viewer experience are likely to be judged to be less important (Sullivan R. G., 2021, p. 47).

The following evaluation is based on direct in-the-field observations of KOP views by the visual analyst, as well as review of the KOP photo log provided in Appendix C and photographic simulations provided in Appendix D. The analysis considers all Vineyard Northeast offshore facilities including the WTGs, ESP(s), and booster station.

KOP - M08: Squibnocket Beach (Ocean Beach/Coastal Dunes and Shoreline Residential SCA)

Refer to: KOP Photo Log: Appendix C, Figure C2 and Photo Simulation: Appendix D, Figure D-1a and D-1b

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	Medium-High	Squibnocket Beach is a public beach administered by the Town of Chillmark. The beach is a relatively narrow strip of gravelly sand with areas of weathered rock outcroppings embedded in the sand and within the surf zone. The coastline is a gentle crescent form with a 180º view of the ocean and sharp demarcation at the edge of the low coastal dunes. The beach is accessed by a paved 45 car parking lot immediately adjacent to and visible from the beach. Views are typically focused out to sea with secondary peripheral views extending along the somewhat rocky coast and including the Nashaquitsa Cliffs to the northeast. Inland views include grassy dunes, coastal scrub vegetation, and a small tidal lobe of nearby larger Squibnocket Pond. Low density shoreline residential development is visible on the gently sloping hillside behind the viewer. From the beach, the primary view axis is southeasterly toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The ocean view duration for visitors may range from a few minutes as town residents and visitors enjoy brief glimpses of ocean vistas from the parking lot and adjacent natural areas to several hours or longer for beach goers, fisherman, bird watchers, or other passive recreation users. The KOP is within the Ocean Beach/Coastal Dunes SCA but is immediately adjacent to single family residential properties with the Shoreline Residential SCA. Views from this KOP are also representative of the visual character of beachfront properties within the Shoreline Residential SCA.
Scenic Resource Value: (see Table 21)	Medium-High	Squibnocket Beach is a Town of Chillmark designated public beach. During peak summer season, beach access is limited to Town residents only. A greater number of recreational users will be present at Squibnocket Beach during the summer and on sunny days, when the weather is clear and warm. Fewer visitors spend time at beachfront locations during the off-season. At off-peak times, the resource will appear more secluded.
SENSITIVITY RATING (see Table 22)	MEDIUM-HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small	Vineyard Northeast's WTGs would be visible at a great distance (72.3 km [44.9 miles]). At this distance, the nacelle of the nearest WTG falls below the horizon as viewed from beach elevation. Blade movement will not be apparent. All ESPs fall below the horizon. The upper 34.0 m (111 ft) of the booster station could be visible above the horizon at a distance of 30.9 km (19.2 mi). The HFOV (including the booster station) is approximately 28 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.09 degrees VFOV). Even on clear air days the WTG will appear virtually undetectable. The booster station may appear as a relatively small rectilinear geometric mass very low on the distant horizon. The booster station is closer to this KOP and is more visually apparent than the WTGs. With the nacelle of the nearest WTG below the horizon, marine navigation lighting and FAA obstruction lights (when activated) would not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points. Additionally, Squibnocket Beach is open 9am to 5pm, limiting the number of viewers who may enjoy this resource after dark.
Geographic Extent: (see Table 24)	Medium	The HFOV from beachfront vantage points is unobstructed and is generally aligned with the primary view axis. Seaward views are increasingly screened by intervening vegetation and dunes inland of the KOP.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL	As seen in the photographic simulation for this KOP (Appendix D, Figure D-1b) Vineyard Northeast WTGs are virtually undetectable.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this KOP will be MODERATE. Due to great distance (72.3 km [44.9 miles]) WTGs will be virtually undetectable. The upper portion of the booster station will be visible on axis at a closer distance (30.9 km [19.2 miles]) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – M06: Allen Farm Scenic Overlook (Shoreline Residential SCA)

Refer to: KOP Photo Log: Appendix C, Figure C4 and Photo Simulation: Appendix D, Figure D-2a and D-2b

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	Medium	The Allen Farm Scenic Overlook is a small unpaved (3-4 car) roadside parking area offering a wide vista of the open ocean across a foreground sheep pasture, with Chillmark Upper Pond and coastal dunes in the middleground. There are no trails or other recreation facilities available at this KOP. Inland views include woodland and hedgerow vegetation. The Barn House (aka Skiff-Mayhew-Vincent House) NRHP site is immediately behind this road-side vantage point across South Road. Low density rural residential development is found along South Road. A private residence is visible behind a naturalistic evergreen hedge at the right margin of the scenic vista field of view. The primary southeasterly vista is framed by perimeter foreground hedgerow vegetation to the east and south. The total vista field of view is approximately 70-80 degrees. View duration at this resource is very brief as visitors may only spend a few minutes enjoying the view before moving on. Momentary views from passing vehicles are possible at 90 degrees to the direction of travel. Views for passing bicyclists would be longer; bicyclists may frequently stop to enjoy the vista at this KOP.
Scenic Resource Value: (see Table 21)	Medium-High	The Allen Farm Scenic Overlook is a locally designated resource maintained by the Martha's Vineyard Land Bank; a not-for profit land conservancy which maintains dozens of properties throughout Martha's Vineyard for public benefit.
SENSITIVITY RATING (see Table 22)	MEDIUM-HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small	Vineyard Northeast WTGs would be visible at great distance (72.4 km [45.0 miles]). From this vantage point, the nacelle of the nearest WTG rises slightly above the horizon. At this distance, blade movement will not be apparent. All ESPs fall below the horizon. The upper 52.0 m (170 ft) of the booster station could be visible above the horizon at a distance of 30.7 km (19.1 mi). The HFOV (including the booster station) is approximately 28 degrees, which represents a relatively small amount of the 70–80-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.11 degrees VFOV. Even on clear air days the offshore facilities will appear faint and difficult to detect by focused observers. The booster station may appear as a relatively small rectilinear geometric mass very low on the distant horizon. The booster station is closer to this KOP and is more visually apparent than the WTGs. With the nacelle of the nearest turbine just above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. WTG/ESP marine navigation lighting would fall below the horizon and will not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station are expected to be inconspicuous to observers. Additionally, visitation to this scenic overlook after dark is likely minimal.
Geographic Extent: (see Table 24)	Small	The HFOV is partially obstructed by foreground scrub brush, although most of the expansive vista is intact. The HFOV is generally aligned with the primary view axis. The project is visible only in the immediate vicinity of this KOP.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL	As seen in the photographic simulation for this KOP (Appendix D, Figure D-2b), the offshore facilities are virtually undetectable.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this KOP will be MODERATE. Due to great distance (72.4 km [45.0 miles]) WTGs will be virtually undetectable. The upper portion of the booster station will be visible on axis at a closer distance (30.7 km [19.1 miles]) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – M05: Long Point Beach (Ocean Beach/Coastal Dunes SCA)

Refer to: KOP Photo Log: Appendix C, Figure C5 and Photo Simulation: Appendix D, Figure D-3a and D-3b

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	Medium-High	The predominant visual characteristic of Long Point Beach is its relatively wide expanse of sand and sharp demarcation at the edge of the rolling frontal dunes that rise 4 to 7 m (13 to 23 ft) in height. At the KOP location, the beach is generally oriented east-west with a 180º view of the ocean. While the KOP was selected due to its location at a prominent access point, the location is representative of an extended stretch of beach along the south shore of Martha's Vineyard. Long Point Beach is a part of the Long Point Wildlife Refuge conservation area. The beach is accessed by a 0.4 km (0.25 mile) walking trail from the Refuge parking lot. Views along the trail include unobstructed vistas across the Great Tisbury Pond salt marsh bordered by a large expanse of sand plain grassland. From the beach, the primary view axis is southward toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The ocean view duration for Refuge visitors may range from a few minutes as walkers enjoy brief glimpses of ocean vistas from the Wildlife Refuge trail network to several hours or longer (more common) for beach goers, bird watchers, or other passive recreational users. The beach is a common destination for visitors enjoying the scenic and natural character of the Wildlife Management Area. Little or no man-made development is visible along the trail network or beachfront, providing a unique sense of solitude and adding a heightened level of sensitivity to this resource.
Scenic Resource Value: (see Table 21)	Medium-High	Long Point Beach is within the Long Pont Wildlife Refuge managed by the Trustees of Reservations, a not-for-profit land conservation and stewardship organization. Due in part to the long walk from the small parking lot—seemingly far from man-made development—combined with the scenic quality of the natural landscape along the way, Long Point Beach offers a unique sense of solitude. During peak summer season, advance purchase of passes to the Long Point Wildlife Refuge is required. The limited number of visitors at any given time enhances the sense of remoteness of this KOP.
SENSITIVITY RATING (see Table 22)	MEDIUM-HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small	Vineyard Northeast's WTGs would be visible at a great distance (69.0 km [42.9 miles]). At this distance, the nacelle of the nearest WTG falls below the horizon as viewed from beach elevation. Blade movement will not be apparent. The upper 48.5 m (159 ft) of the booster station could be visible above the horizon at a distance of 26.7 km (16.6 mi). The HFOV (including the booster station) is approximately 29 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.13 degrees VFOV). Even on clear air days the offshore facilities will appear faint and difficult to detect by focused observers. The booster station may appear as a relatively small rectilinear geometric mass very low on the distant horizon. The booster station is closer to this KOP and is more visually apparent than the WTGs. With the nacelle of the nearest turbine below the horizon, marine navigation lighting and FAA obstruction lights (when activated) would not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points. Additionally, the gates at the Refuge close at 7pm. Visitation to this resource after dark is likely minimal.
Geographic Extent: (see Table 24)	Medium-Large	The HFOV from beachfront vantage points is unobstructed and approximately 30 degrees to the primary view axis. Similar views are found along the beachfront up and down the coast. Views become screened inland of the dune line.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL	As seen in the photographic simulation for this KOP (Appendix D, Figure D-3b), the offshore facilities are virtually undetectable.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this KOP will be MODERATE. Due to great distance (69.0 km [42.9 miles]) WTGs will be virtually undetectable. The upper portion of the booster station will be visible on axis at a closer distance (26.7 km [16.6 miles]) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP - M01: Wasque Beach (Ocean Beach/Coastal Dunes SCA)

Refer to: KOP Photo Log: Appendix C, Figure C9 and Photo Simulation: Appendix D, Figure D-4a and D-4b

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	High	The predominant visual characteristic of Wasque Beach is the wide expanse of sand and sharp demarcation at the edge of the eroded frontal dunes that rise 4 to 7 m (13 to 23 ft) in height. The beach is generally oriented east-west with a 180º view of the ocean. The beach is accessed by a short oceanfront nature trail from the Wasque Reservation parking lot. Views along the trail include gnarled scrub oak forest and intermittent ocean vistas. Other inland areas of Wasque Reservation include oak and pine forest, sandplain grasslands, and heathlands. From the beach, the primary view axis is southward toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The ocean view duration for Reservation visitors may range from a few minutes as walkers enjoy ocean vistas from the Wasque Reservation trail network to several hours or longer (more common) for beach goers. The beach is a common destination for visitors enjoying the scenic and natural character of the Reservation. Little or no man-made development is visible along the trail network or the beachfront, providing a unique sense of solitude and adding a heightened level of sensitivity to this resource.
Scenic Resource Value: (see Table 21)	Medium-High	Wasque Beach is within the Wasque Reservation managed by the Trustees of Reservations. During peak summer season, advance purchase of passes to Wasque Reservation is required. The limited number of visitors at any given time enhances the sense of solitude of this KOP. Further, Wasque Reservation is on Chappaquiddick Island, accessible only by a short auto ferry from Edgartown, Martha's Vineyard, further adding to the remoteness of this KOP.
SENSITIVITY RATING (see Table 22)	HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (63.2 km [39.3 miles]). As viewed from the ocean front trail, the nacelle of the nearest WTG rises slightly above the horizon. At this distance, blade movement will not be apparent. All ESPs fall below the horizon. The upper 57.3 m (188 ft) of the booster station could be visible above the horizon at a distance of 24.0 km (14.9 mi). The HFOV (including the booster station) is approximately 29 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.19 degrees VFOV). On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. The booster station may appear as a relatively small rectilinear geometric mass very low on the distant horizon. The booster station is closer to this KOP and is more visually apparent than the WTGs. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting on the WTGs/ESP(s) would fall below the horizon and will not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points. The gates at the Reservation close at 7pm. Thus, visitation to this resource after dark is likely minimal.
Geographic Extent: (see Table 24)	Medium	The HFOV from beachfront vantage points is generally aligned with the primary view axis. Similar views are found along the beachfront up and down the coast. Views are intermittent though shoreline vegetation along the walking trail in this vicinity.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-4b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this KOP will be MODERATE. Due to great distance (63.2 km [39.3 miles]) WTGs will off axis, faint and difficult to detect. The upper portion of the booster station will be visible on axis at a closer distance (24.0 km [14.9 miles]) but will be low to the horizon and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N25: Madaket Beach (Ocean Beach/Coastal Dunes and Shoreline Residential SCA)

Refer to: KOP Photo Log: Appendix C, Figure C10 and Photo Simulation: Appendix D, Figure D-5a through D-5b

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	High	The predominant visual characteristic of Madaket Beach is the relatively wide expanse of sand and sharp demarcation at the edge of the eroded frontal dunes that rise 4 to 7 m (13 to 23 ft) in height. At the KOP location the beach is generally oriented northwest-southeast with a 180º view of the ocean. Views are typically focused out to sea with secondary peripheral views extending along the coastline. The Madaket shoreline residential neighborhood borders the beachfront area. This residential area is comprised of small to moderately sized bungalow-style beach houses and larger well-maintained vacation homes. Residents and visitors enjoy views of the ocean or beachfront landscape and frequently walk or drive from the residential property to the beach and other scenic coastal locations as part of their vacation routine. The primary view axis is southwesterly toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The view duration may range from a few minutes as visitors enjoy brief glimpses of ocean vistas to several hours or longer (more common) for beach goers. The KOP is within the Ocean Beach/Coastal Dunes SCA but is immediately adjacent to single family residential properties within the Shoreline Residential SCA. Thus, views from this KOP are also representative of the visual character of beachfront properties within the Shoreline Residential SCA.
Scenic Resource Value: (see Table 21)	Medium-High	Madaket Beach is a public beach at the west end of Nantucket and is open to the public without restriction. Beach parking is extremely limited. Access is available via paved bike path or shuttle bus from inland locations. Madaket Beach is within the Nantucket Historic District, which encompasses the entire island. A greater number of recreational users will be present at Madaket Beach during the summer and on sunny days, when the weather is clear and warm. Fewer visitors spend time at beachfront locations during the off-season. At off-peak times the resource will appear more secluded.
SENSITIVITY RATING (see Table 22)	HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (51.5 km [32.0 miles]). As viewed from the edge of the beach parking lot overlooking the beach, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The upper 46.6 m (153 ft) of the booster station could be visible above the horizon at a distance of 28.2 km (17.5 mi). The HFOV of the Lease Area (excluding the booster station) is approximately 31 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.31 degrees VFOV). The booster station will appear as a stand-alone element approximately 40 degrees to the west of the Lease Area and may appear as a relatively small rectilinear geometric mass very low on the distant horizon. On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting on the WTG/ESP(s) would fall below the horizon and will not be visible. Although conceivably visible,
Geographic Extent: (see Table 24)	Medium-Large	The HFOV from beachfront vantage points is unobstructed and is generally aligned with the primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-5b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this KOP will be MODERATE. Due to great distance (51.5 km [32.0 miles]) WTGs will be off axis, faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (28.2 km [17.5 miles]) but will be off axis, low to the horizon, and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N21: Sanford Farm/Ram Pasture - Barn Walk Overlook (Sand Plain Grassland/Coastal Scrub SCA)

Refer to: KOP Photo Log: Appendix C, Figure C14 Photo Simulation: Appendix D, Figure D-6a through D-6d

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	Medium-High	The Sanford Farm Barn Walk is a 5 km (3.1 mi) mile loop trail within conservation lands within the Sanford Farm & Ram Pasture property protected by the Nantucket Conservation Foundation. The KOP is at the barn overlook at Ram Pasture. From this hilltop vantage point, a wide vista extending from Cisco Beach to Madaket overlooks sand plain grasslands and Hummock Pond in the foreground and extends outward to the open ocean. Inland views include woodland and sand plain grassland and coastal scrub vegetation. Shoreline residential development is also visible in the middle ground. The nearly 270-degree vista is framed by perimeter foreground woodland vegetation to the southeast and the historic Sanford Barn to the west. View duration at this resource is generally brief as visitors may only spend a few minutes enjoying the view before moving on. Other viewers may choose to spend more time in this location to rest and appreciate the unique vista.
Scenic Resource Value: (see Table 21)	Medium-High	The Sanford Farm Barn Walk trail is within conservation lands within the 780-acre Sanford Farm & Ram Pasture preserve. The property, protected by the Nantucket Conservation Foundation, includes shrub thickets and woodlands that have a rich cultural history and provide habitat for many species of rare plants and animals.
SENSITIVITY RATING (see Table 22)	MEDIUM-HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at great distance (51.3 km [31.9 miles]). As viewed from the KOP location at the Ram Pasture vista, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The upper 51.0 m (167 ft) of the booster station could be visible above the horizon at a distance of 31.5 km (19.6 mi). The HFOV of the Lease Area (excluding the booster station) is approximately 30 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.35 degrees VFOV). The booster station will appear as a stand-alone element approximately 42 degrees to the west of the Lease Area and may appear as a relatively small rectilinear geometric mass very low on the distant horizon. On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting on the WTG/ESP(s) would fall below the horizon and will not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station are expected to be inconspicuous to observers. Additionally, the gates of the preserve close at dusk. Thus, visitation to this resource after dark is likely minimal.
Geographic Extent: (see Table 24)	Small-Medium	The HFOV is partially obstructed by middle ground coastal residential structures and vegetation, although most of the expansive vista is intact. Because this KOP is a panoramic vista across coastal scrub vegetation toward the open ocean, this location does not have a defined primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-6b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this KOP will be MODERATE. Due to great distance (51.3 km [31.9 miles]) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (31.5 km [19.6 miles]) but will be off axis, low to the horizon, and occupy a very small portion of the horizontal field of view. Where visible, WTGs and the booster station will be viewed above foreground structures and vegetation. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N13: Miacomet Beach (Ocean Beach/Coastal Dunes SCA)

Refer to: KOP Photo Log: Appendix C, Figure C21 and Photo Simulation: Appendix D, Figure D-7a and D-7f

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	High	The predominant visual characteristic of Miacomet Beach is its relatively wide expanse of sand and sharp demarcation at the edge of the rolling frontal dunes that rise 4 to 7 m (13 to 23 ft) in height. The beach is generally oriented northwest-southeast with a 180º view of the ocean. Miacomet Beach is separated from scenic Miacomet Pond by a narrow dune strip. Miacomet Pond lies within a unique environmental area comprised of sand plain grasslands and heathlands, shrub thickets, wetlands, and woodland habitats. Low meadow vegetation and open salt pond/tidal marsh offers extended vistas inland from the beach. The primary view axis is southwesterly toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The ocean view duration for beach visitors may range from a few minutes as walkers enjoy brief glimpses of ocean vistas from the adjacent unimproved sand roads to several hours or longer (more common) for beach goers. The beach is a common destination for visitors enjoying the scenic and natural character of Nantucket's sand plain grasslands. Little or no man-made development is visible along the trail network or beachfront, providing a unique sense of solitude and adding a heightened level of sensitivity to this resource.
Scenic Resource Value: (see Table 21)	Medium-High	Due in part to an extended drive along unimproved sand roads to reach Miacomet Beach, this KOP offers a unique sense of solitude. Miacomet Beach is within the Nantucket Historic District, which encompasses the entire island. A greater number of recreational users will be present at Miacomet Beach during the summer and on sunny days, when the weather is clear and warm. Fewer visitors spend time at beachfront locations during the off-season. At off-peak times the resource will appear more secluded.
SENSITIVITY RATING (see Table 22)	HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (49.2 km [30.6 miles]). As viewed from the beach elevation, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The upper 27.1 m (89 ft) of the booster station could be visible above the horizon at a distance of 33.0 km (20.5 mi). The HFOV of the Lease Area (excluding the booster station) is approximately 31 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.33 degrees VFOV). The booster station will appear as a stand-alone element approximately 45 degrees to the west of the Lease Area and may appear as a relatively small rectilinear geometric mass very low on the distant horizon. On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting on the WTGs/ESP(s) would fall below the horizon and will not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points.
Geographic Extent: (see Table 24)	Medium-Large	The HFOV from beachfront vantage points is unobstructed and is generally aligned with the primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-7b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this SCA will be MODERATE. Due to great distance (49.2 km [30.6 miles]) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (33.0 km [20.5 miles]) but will be off axis, low to the horizon, and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N11: Nobadeer Beach (Ocean Beach/Coastal Dunes and Shoreline Residential SCAs)

Refer to: KOP Photo Log: Appendix C, Figure C23 and Photo Simulation: Appendix D, Figure D-8a and D-8d

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	High	The predominant visual characteristic of Nobadeer Beach is the wide expanse of sand and sharp demarcation at the edge of the rolling frontal dunes that rise 4 to 7 m (13 to 23 ft) in height. The beach is generally oriented east-west with a 180º view of the ocean. Views are typically focused out to sea with secondary peripheral views extending along the coastline. Beach access is limited. A small unpaved turnaround adjacent to the beach serves as a drop-off point. The beach may also be accessed by four-wheel-drive vehicles which park (with beach driving permit) directly on the beach. The Nobadeer Avenue shoreline residential neighborhood borders the beachfront area. This residential area is comprised of small to moderately sized bungalow-style beach houses. From the beach, the primary view axis is to the south toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The view duration for visitors may range from a few minutes as residents and visitors enjoy brief glimpses of ocean vistas to several hours or longer (more common) for beach goers. The KOP is within the Ocean Beach/Coastal Dunes SCA but is immediately adjacent to single family residential properties within the Shoreline Residential SCA. Thus, views from this KOP are also representative of the visual character of beachfront properties within the Shoreline Residential SCA.
Scenic Resource Value: (see Table 21)	Medium-High	Nobadeer Beach is a public beach on the south-central coast of Nantucket. The beach is open to the public without restriction. Nobadeer Beach is within the Nantucket Historic District, which encompasses the entire island. A greater number of recreational users will be present at Nobadeer Beach during the summer and on sunny days, when the weather is clear and warm. Fewer visitors spend time at beachfront locations during the off-season. At off-peak times the resource will appear more secluded.
SENSITIVITY RATING (see Table 22)	HIGH	

MAGNITUDE	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (50.1 km [31.1 miles]). As viewed from the beach elevation, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The upper 19.0 m (64 ft) of the booster station could be visible above the horizon at a distance of 36.2 km (22.5 mi). The HFOV of the Lease Area (excluding the booster station) is approximately 29 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.33 degrees VFOV). The booster station will appear as a stand-alone element approximately 45 degrees to the west of the Lease Area and may appear as a relatively small rectilinear geometric mass very low on the distant horizon. On clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting on the WTGs and ESP(s) would fall below the horizon and will not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points.
Geographic Extent: (see Table 24)	Medium-Large	The HFOV from beachfront vantage points is unobstructed and is generally aligned with the primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-8b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this SCA will be MODERATE. Due to great distance (50.1 km [31.1 miles]) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (36.2 km [22.5 miles]) but will be off axis, low to the horizon, and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N08: Tom Nevers Beach (Ocean Beach/Coastal Dunes and Shoreline Residential SCAs)

Refer to: KOP Photo Log: Appendix C, Figure C25 and Photo Simulation: Appendix D, Figure D-9a and D-9d

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	High	The predominant visual characteristic of Tom Nevers Beach is the moderately wide expanse of sand and sharp demarcation at the edge of the eroded frontal dunes that rise 4 to 10 m (13 to 32 ft) in height. The beach is generally oriented east-west with a 180º view of the ocean. Views are typically focused out to sea with secondary peripheral views extending along the coastline. Tom Nevers Beach is adjacent to the Tom Nevers Field municipal recreation complex. The recreation facility includes baseball/softball fields, basketball court, picnic areas, and a playground. The recreation complex borders a large sand plain/costal scrub landscape and a coastal residential neighborhood. The primary view axis is to the south toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The ocean view duration for visitors may range from a few minutes as visitors enjoy brief glimpses of ocean vistas to several hours or longer (more common) for beach goers and other recreational users. The KOP is within the Ocean Beach/Coastal Dunes SCA but is immediately adjacent to single family residential properties with the Shoreline Residential SCA. Thus, views from this KOP are also representative of the visual character of beachfront properties within the Shoreline Residential SCA.
Scenic Resource Value: (see Table 21)	Medium-High	Tom Nevers Beach is a public beach on the south-central coast of Nantucket. The beach is open to the public without restriction. Tom Nevers Beach is within the Nantucket Historic District, which encompasses the entire island. A greater number of recreational users will be present at Tom Nevers Beach during the summer and on sunny days, when the weather is clear and warm. Fewer visitors spend time at beachfront locations during the off-season. At off-peak times the resource will appear more secluded.
SENSITIVITY RATING (see Table 22)	HIGH	

MAGNITUDE	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (51.2 km [31.8 miles]). As viewed from the edge of the beach parking lot overlooking the beach, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The upper 9.7 m (32 ft) of the booster station could be visible above the horizon at a distance of 41.5 km (25.8 mi). The HFOV of the Lease Area (excluding the booster station) is approximately 27 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.33 degrees VFOV). The booster station will appear as a stand-alone element approximately 45 degrees to the west of the Lease Area and. may appear as a relatively small rectilinear geometric mass very low on the distant horizon. On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting on the WTGs and ESP(s) would fall below the horizon and will not be visible. Although conceivably visible, low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points. Additionally, Tom Nevers Field closes at 8pm, limiting the number of viewers who may enjoy this resource after dark.
Geographic Extent: (see Table 24)	Medium-Large	The HFOV from beachfront vantage points is unobstructed and approximately 30 degrees to the primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-9b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this SCA will be MODERATE. Due to great distance (51.2 km [31.8 miles]) WTGs will be faint and difficult to detect. The upper portion of the booster station will be visible at a closer distance (41.5 km [25.8 miles]) but will be off axis, low to the horizon, and occupy a very small portion of the horizontal field of view. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N06: Low Beach (Ocean Beach/Coastal Dunes and Shoreline Residential SCAs)

Refer to: KOP Photo Log: Appendix C, Figure C27 and Photo Simulation: Appendix D, Figure D-10a and D-10d

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	High	The predominant visual characteristic of Low Beach is the wide expanse of sand and sharp demarcation at the edge of the rolling frontal dunes that rise 4 to 7 m (13 to 23 ft) in height. The beach is generally oriented northeast-southwest with a 180º view of the ocean. Views are typically focused out to sea with secondary peripheral views extending along the coastline. Beach access is limited. A small unpaved turnaround adjacent to the beach serves as a drop-off point. The beach may also be accessed by four-wheel-drive vehicles which park (with beach driving permit) directly on the beach. The Low Beach Road shoreline residential neighborhood borders the beachfront area. This residential area is comprised of moderate to large oceanfront homes. From the beach, the primary view axis is to the southeast toward the breaking surf and unbroken ocean horizon. People are drawn to the beach for a variety of reasons including relaxation, sunbathing, ocean swimming, and other traditional beach-oriented activities. The view duration for visitors may range from a few minutes as residents and visitors enjoy brief glimpses of ocean vistas to several hours or longer (more common) for beach goers. The KOP is within the Ocean Beach/Coastal Dunes SCA but is immediately adjacent to single family residential properties with the Shoreline Residential SCA. Thus, views from this KOP are also representative of the visual character of beachfront properties within the Shoreline Residential SCA.
Scenic Resource Value: (see Table 21)	Medium-High	Low Beach is a public beach on the eastern coast of Nantucket. The beach is open to the public without restriction. Low Beach is within the Nantucket Historic District, which encompasses the entire island. A greater number of recreational users will be present at Low Beach during the summer and on sunny days, when the weather is clear and warm. Fewer visitors spend time at beachfront locations during the off-season. At off-peak times the resource will appear more secluded.
SENSITIVITY RATING (see Table 22)	HIGH	
MAGNITUDE	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (53.8 km [33.4 mi]). As viewed from the beach elevation, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The line-of-sight to the booster station is screened from view by foreground landform. The HFOV of the Lease Area (excluding the booster station) is approximately 29 degrees, which represents a relatively small amount of the 180-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.33 degrees VFOV). On clear air days the offshore facilities will be apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting would fall below the horizon and will not be visible.
Geographic Extent: (see Table 24)	Medium	The HFOV from beachfront vantage points is unobstructed and approximately 90 degrees to the primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-10b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this SCA will be MODERATE. Due to great distance (53.8 km [33.4 miles]) WTGs will be faint and difficult to detect. The booster station will not be visible. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N02: Sankaty Head Light (Coastal Bluffs SCA)

Refer to: KOP Photo Log: Appendix C, Figure C31 and Photo Simulation: Appendix D, Figure D-11a and D-11d

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	Medium-High	The 21-meter (70-foot) tall Sankaty Head Lighthouse was built in 1850, was automated in 1965, and is still in operation. It was one of the first lighthouses in the United States to receive a Fresnel lens. The lighthouse sits atop Sankaty Head Bluff, which rises steeply more than 30 meters (100 feet) above beach elevation at the eastern most point in Nantucket. Views from the top of the lighthouse command a 360-degree panorama of the Atlantic Ocean, Nantucket Sound, and much of Nantucket. The lighthouse grounds are open to the public. The lighthouse itself is only open to the public twice a year. Private tours may be arranged on request. Extended vistas are also found at ground level from the lighthouse grounds; however, southerly views toward the Atlantic Ocean are obstructed by middleground landform and vegetation.
Scenic Resource Value: (see Table 21)	High	The Sankaty Head Lighthouse is maintained by the Sconset Trust. The structure was listed on the National Register of Historic Places in 1987. The lighthouse property is also within the Nantucket Historic District, which encompasses the entire island.
SENSITIVITY RATING (see Table 22)	HIGH	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small-Medium	Vineyard Northeast's WTGs would be visible at a great distance (57.1 km [35.5 miles]). As viewed from the top of the lighthouse, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. If an ESP is located at the nearest position, the upper 3 meters (11 feet) would be visible above the horizon. Any ESP located greater than 57.8 km (35.9 mi) from the lighthouse would fall below the horizon. The booster station will be visible above the horizon at a distance of 46.5 km (28.9 mi). The offshore facilities are not visible from ground level at the base of the lighthouse. The HFOV of the Lease Area (excluding the booster station) is approximately 24 degrees, which represents a relatively small amount of the 360-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.33 degrees VFOV). The booster station will be nominally visible above intervening landform and vegetation approximately 39 degrees to the west of the Lease Area. The booster station will appear very low to the horizon and will be difficult to distinguish amongst the textural form of the existing tree line and built structures. On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. The lighthouse is not regularly open to the public and is not accessible at night. Potential visibility of FAA aviation obstruction or marine navigation lighting is not a relevant consideration for this KOP.
Geographic Extent: (see Table 24)	Medium-Large	From the top of the lighthouse, the HFOV is unobstructed. Because this KOP is a 360-degree panoramic vista, this location does not have a defined primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL-MEDIUM	As seen in the photographic simulation for this KOP (Appendix D, Figure D-11b), the offshore facilities are faint and difficult to detect.

OVERALL IMPACT LEVEL (see Table 26)	**MINOR**	Table 26 indicates the overall impact level for this SCA will be MODERATE. Due to great distance (57.1 km [35.5 miles]) WTGs will be faint and difficult to detect. The booster station will be virtually undetectable off axis above intervening landform and vegetation. Based on professional judgement this impact is reduced one ordinal level to MINOR.

KOP – N01: Altar Rock (Inland Sand Plain Grassland/Scrub LCA)

Refer to: KOP Photo Log: Appendix C, Figure C32 and Photo Simulation: Appendix D, Figure D-12a and D-12d

SENSITIVITY FACTOR	RATING	RATIONALE
Susceptibility: (see Table 20)	Medium	Altar Rock is a hilltop vista within the Middle Moors conservation lands in the east central portion of Nantucket. The 1308-hectare (3,233-acre) Middle Moors is protected by the Nantucket Conservation Foundation. The KOP is at one of the highest points on Nantucket with a 360-degree panorama across the island. Altar Rock is accessible by four-wheel drive vehicle as well as a network of walking trails. The area immediately surrounding Altar Rock contains some of the best examples of coastal heathland habitat on Nantucket. This association of plants is characterized by low growing shrubs such as huckleberry and low bush blueberry, interspersed with patches of Pennsylvania sedge, bearberry, reindeer moss, and false heather. View duration at this resource is generally brief as visitors may only spend a few minutes enjoying the view before moving on. Other viewers may choose to spend more time in this location to rest and appreciate the unique vista.
Scenic Resource Value: (see Table 21)	Medium	Altar Rock is within conservation lands within the 1308-hectare (3,233-acre) Middle Moors protected by the Nantucket Conservation Foundation. Due in part to an extended drive (or walk) along unimproved trails to reach Altar Rock, this KOP offers a unique sense of solitude. The Middle Moors conservation area is within the Nantucket Historic District, which encompasses the entire island. Although this area is popular with hikers and mountain bicyclists, the extensive trail network and large land area allows for privacy and solitude at most times.
SENSITIVITY RATING (see Table 22)	MEDIUM	

MAGNITUDE FACTOR	RATING	RATIONALE
Size or Scale of Change: (see Table 23)	Small	Vineyard Northeast's WTGs would be visible at a great distance (55.2 km [34.3 miles]). As viewed from the Alter Rock high point, the nacelle of the nearest WTG rises above the horizon. Blade movement will not be apparent. All ESPs fall below the horizon. The line-of-sight to the booster station is screened from view by foreground landform. The HFOV of the Lease Area (excluding the booster station) is approximately 26 degrees, which represents a relatively small amount of the 360-degree ocean vista. The offshore facilities will be viewed very low on the horizon (approximately 0.33 degrees VFOV). On clear air days the offshore facilities may be visually apparent to focused observers. At other times the offshore facilities will be substantially or completely obscured by haze, fog, and other marine atmospheric conditions. With the nacelle of the nearest turbine above the horizon, when activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon. The intensity of the lights will diminish for WTGs further in the distance. Marine navigation lighting would fall below the horizon and will not be visible.
Geographic Extent: (see Table 24)	Small-Medium	The HFOV is partially obstructed by foreground and middleground scrub brush and woodland vegetation, although most of the expansive vista is intact. Because this KOP is a panoramic vista across coastal scrub vegetation toward the open ocean, this location does not have a clear primary view axis.
MAGNITUDE IMPACT RATING (see Table 25)	SMALL	As seen in the photographic simulation for this KOP (Appendix D, Figure D-12b), the offshore facilities are nearly undetectable.

OVERALL IMPACT LEVEL (see Table 26)	**NEGLIGIBLE**	Table 26 indicates the overall impact level for this SCA will be MINOR. Due to great distance (55.2 km [34.3 miles]) and the HFOV partially obstructed by middleground vegetation WTGs will be nearly undetectable. The booster station will not be visible. Based on professional judgement this impact is reduced one ordinal level to NEGLIGIBLE.

8.2.2 KOP Impact Level Summary

The VIA evaluates the possible effect that Vineyard Northeast may have on viewers who live, work, recreate, and enjoy the landscape, seascape, and open ocean. The key characteristics considered are the sensitivity of the receptor and the magnitude of the impact. Sensitivity is broken down into susceptibility and value, while magnitude is broken down into size/scale, geographic extent, and duration and reversibility of impacts. The VIA overall impact levels for individual KOPs are summarized in Table 27.

Sensitivity Factor - As a practical reality, the entire seascape within the VSA is highly scenic and of great aesthetic importance to the social, cultural, and economic well-being of the region. Due in large part to the significant cultural, scenic, natural, and recreational importance of places selected as KOPs, all evaluated vantage points have a "Medium" to "High" Sensitivity Factor.

Magnitude Factor - From all evaluated KOPs, Vineyard Northeast's WTGs would be visible at a great distance (more than 49.1 km [30.5 mi] from the nearest WTG position). Blade movement will not be apparent. All ESPs will fall below the horizon. In all cases, the HFOV of the Lease Area (excluding the booster station) is less than 32 degrees, which represents a relatively small amount of available ocean vista, and the WTGs will be viewed very low on the horizon (less than 0.35 degrees VFOV). On clear air days, the offshore facilities may be visually apparent to focused observers. Under other atmospheric conditions, the offshore facilities will be faint and difficult to detect.

The booster station would be viewed very low on the horizon (less than 0.01 degrees VFOV). The booster station may appear as a relatively small rectilinear geometric mass very low on the distant horizon. The booster station is closer to shore and is more visually apparent than the WTGs.

When activated, FAA aviation obstruction lights will be seen as small points of light just above the horizon (if the nacelle is visible above the horizon). The intensity of the lights will diminish for WTGs farther in the distance. Except for the booster station, marine navigation lighting would fall below the horizon and will not be visible. Even when not screened by the horizon, low intensity lights on the booster station would be inconspicuous to observers from coastal vantage points.

Although the HFOV is unobstructed and is often aligned with the primary view axis from most seascape vantage points, the sheer distance of Vineyard Northeast from all KOPs results in a Magnitude Impact Rating of "Small" or "Small-Medium."

Overall Impact Rating - With the sensitivity and magnitude factors combined, one KOP has an overall impact level of "Negligible." Negligible indicates that Vineyard Northeast would have very little or no effect on viewer experience, either because there is minimal project visibility, the magnitude or contrast to the view is low, or viewers are relatively insensitive to visual change.

Eleven KOPs have an overall impact level of “Minor,” indicating that Vineyard Northeast would introduce features that have a small but noticeable to medium level of change to the character of the view. Vineyard Northeast may have a low to moderate level of visual prominence but may or may not hold the viewer’s attention and would have a small to medium effect on viewer experience.

Table 27 – Key Observation Point (KOP) Impact Summary

	SENSITIVITY FACTOR			MAGNITUDE FACTOR			OVERALL IMPACT LEVEL
KEY OBSERVATION POINTS	**Susceptibility**	**Scenic Resource Value**	**SENSITIVITY RATING**	**Size or Scale of Change**	**Geographic Extent**	**MAGNITUDE IMPACT RATING**	
MARTHA'S VINEYARD							
M08: Squibnocket Beach	Medium-High	Medium-High	MEDIUM-HIGH	Small	Medium	SMALL	**MINOR***
M06: Allen Farm Scenic Overlook	Medium	Medium-High	MEDIUM-HIGH	Small	Medium-large	SMALL	**MINOR***
M05: Long Point Beach	Medium-High	Medium-High	MEDIUM-HIGH	Small	Medium-large	SMALL	**MINOR***
M01: Wasque Beach	High	Medium-High	HIGH	Small-Medium	Medium-Large	SMALL-MEDIUM	**MINOR***
NANTUCKET							
N25: Madaket Beach	High	Medium-High	HIGH	Small-Medium	Medium-Large	SMALL-MEDIUM	**MINOR***
N21: Sanford Farm/Ram Pasture - Barn Walk Overlook	Medium-High	Medium-High	MEDIUM-HIGH	Small-Medium	Small-Medium	SMALL-MEDIUM	**MINOR***
N13: Miacomet Beach	High	Medium-High	HIGH	Small-Medium	Medium-Large	SMALL-MEDIUM	**MINOR***
N11: Nobadeer Beach	High	Medium-High	HIGH	Small-Medium	Medium-Large	SMALL-MEDIUM	**MINOR***
N08: Tom Nevers Beach	High	Medium-High	HIGH	Small-Medium	Medium-Large	SMALL-MEDIUM	**MINOR***
N06: Low Beach	High	Medium-High	HIGH	Small-Medium	Medium	SMALL-MEDIUM	**MINOR***
N02: Sankaty Head Light	Medium-High	High	HIGH	Small-Medium	Medium-Large	SMALL-MEDIUM	**MINOR***
N01: Altar Rock	Medium	Medium	MEDIUM	Small	Small-Medium	SMALL	**NEGLIGIBLE***

*Table 26 indicates the overall impact level will be MODERATE. Based on site conditions this impact is reduced to MINOR. Justification is provided in the analysis for this SCA/LCA is provided in Section 8.2.1.
**Table 26 indicates the overall impact level will be MINOR. Based on site conditions this impact is reduced to NEGLIGIBLE. Justification is provided in the analysis for this SCA/LCA is provided in Section 8.2.1.

8.2.3 Evaluating Additional (Non-Simulated) KOPs

The VIA evaluated 12 of the 32 KOPs identified in Section 6.1. The VIA methodology described in Section 8.1 can be applied to the remaining 20 KOPs to make an informed judgement concerning the sensitivity, magnitude of impact, and overall impact level likely to be experienced by viewers who live, work, recreate, and enjoy the landscape, seascape, and open ocean at these additional visually sensitive places.

Appendix C – Key Observation Point (KOP) Photo Log provides information necessary to understand the sensitivity and magnitude factors, which contribute to the overall impact level at each additional KOPs. Information provided in Appendix C includes:

Sensitivity Factors

- Existing condition panorama view photographs illustrating a 124-degree horizontal human field-of-view of the seascape looking in the direction of the Lease Area;
- A series of context images offering an understanding of the natural and built character found in this visual setting; and
- A table summarizing the general information necessary to determine the sensitivity factors of susceptibility and scenic resource value (i.e., SCA/LCA type, resource type and uses, and viewer types).

Magnitude Factors

- A vicinity map identifying the HFOV, and directions and distances to the nearest WTG and booster station;
- A table identifying viewer elevation, distance to the nearest/farthest WTG, distance to the booster station, and Lease Area HFOV;
- A view compass indicating the primary view orientation, HFOV, and available ocean horizon;
- A graphic indicating the degree of visibility of the nearest WTG; and
- Meteorological data summarizing the weather conditions at the time the panorama image was taken.

The 12 photo simulations provided in Appendix D were selected as representative examples of visually sensitive seascape views found in the VSA. These KOPs were selected in part based on their representation of a larger group of candidate KOPs of the same type or in the same geographic area. Although photo simulations were not prepared for the remaining 20 KOPs, the photo simulations prepared for the 12 evaluated KOPs may be used as surrogate images to help predict the visual conditions likely to be found at other KOPs of similar distance, elevation, and scenic character.

Where simulated and un-simulated KOPs are closely spaced and have very similar views, the level of impact is likely to be quite similar. With the overall impact to the viewer ranging from

"Negligible" to "Minor" for all evaluated KOPs (see Section 8.2.2), absent significant distinguishing sensitivity or magnitude factors, overall impact levels for nearby un-simulated KOPs will be in the same range.

8.2.4 Viewer Perception

Sullivan, in *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances* (2013), concludes that small- to moderately-sized facilities were visible to the unaided eye at distances greater than 41.8 km (26 mi), with WTG blade movement visible up to 38.6 km (24 mi). The observed wind facilities were judged to be a major focus of visual attention at distances up to 16.1 km (10 mi), were noticeable to casual observers at distances of almost 28.9 km (18 mi), and were visible with extended or concentrated viewing at distances beyond 40.2 km (25 mi). While Vineyard Northeast is larger in scale than the projects evaluated by Sullivan, these findings provide additional perspective concerning the effect of distance on human visibility of offshore wind energy facilities and further support the conclusion that the 83.7 km (52 mi) VSA is highly conservative.

Regardless of the viewer group, public reaction to Vineyard Northeast is likely to be variable. Not all viewers see the WTGs or booster station as having an adverse visual impact. A number of research studies examining the visual impacts of offshore and onshore wind energy developments indicate that wind power enjoys strong support among members of the public and, unlike most large-scale energy facilities, WTGs are, in some cases, viewed as a positive visual impact by significant portions of the public (BOEM, 2007).

While strong support for wind power development generally exists, local concerns relating to the aesthetics of planned wind facilities are not uncommon. The perceptions of visual impacts associated with wind energy development vary among potential viewers and may be positive or negative, can change over time, and, in some cases, possibly trend toward more positive perceptions after the installation of wind energy facilities (BOEM, 2007).

Warren et al. (2005) assessed pre- and post-development attitudes toward visual impacts associated with two onshore wind facilities in Ireland. Their survey found, for one location, that more than 90% of survey respondents supported the concept of wind power, but 66% of respondents were initially opposed to a local proposed wind facility. Contrary to expectations, individuals living closest to the onshore wind facility, who had originally opposed it on aesthetic grounds, actually increased their acceptance of the visual impacts after construction, with 62% regarding the visual impact as positive. Similar results were observed for a second onshore wind facility. The results in both cases suggest that familiarity with the wind facilities decreased aesthetic objections. Stated reasons for changing perceptions of visual impacts varied among respondents—some felt the WTGs were attractive while others felt that the actual impacts were less than had been anticipated (BOEM, 2007).

9.0 POTENTIAL VISUAL IMPACTS OF VINEYARD NORTHEAST

9.1 Construction and Installation[12]

9.1.1 Offshore Construction and Installation

Visual impacts during offshore construction would be limited to partially built WTGs and the booster station as well as construction vessels working offshore.

Offshore construction will require several types of vessels, including jack-up vessels and other large construction vessels with cranes. These vessels will transit within the Lease Area, along the OECCs, and along vessel routes between the Lease Area, OECCs, and various ports in Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Canada, and/or overseas. As shown on Figure 12, the ports that may be used to stage offshore components are primarily coastal, although some are located along inland waterways. These staging ports could be used for frequent crew transfer and to offload, store, pre-assemble, inspect, pre-commission, and/or load components onto vessels for delivery to the Lease Area and OECCs. While the Proponent has identified a wide range of potential staging ports, only a subset of these ports would be used. At this time, there is a high degree of uncertainty regarding the number of vessels, the ports that will ultimately be used, and the primary transit routes between the Lease Area, OECCs, and ports.

Although it is challenging to precisely quantify the number of vessels and vessel trips from each port at the early planning stages of Vineyard Northeast, Section 3.10.4 of COP Volume I provides a summary of anticipated construction vessel usage.[13] Assuming the maximum design scenario (see Section 3.11 of COP Volume I), it is estimated that an average of ~25 vessels would operate at the Lease Area or along the OECCs at any given time during offshore construction. During the most active period of construction, it is conservatively estimated that a maximum of approximately 61 vessels could operate in the Offshore Development Area at one time.[14] Up to approximately 3,800 total vessel round trips are expected to occur during the busiest year of offshore construction.

The large majority of these vessel trips would be smaller crew transfer vessels (CTVs) and support vessels that would not be visible from coastal vantage points. For example, it is estimated that approximately 80% of these trips would be CTVs, which are typically 20–30 m (66–98 ft) in length. Some larger construction vessels would be a visible feature within the VSA. However, the largest vessels used during the construction of Vineyard Northeast are expected to be of comparable size to vessels that currently transit through the Lease Area. Based on 2016–2021 AIS data, the largest vessels that currently transit the Lease Area are approximately

[12] Refer to Section 3 of COP Volume I for further information concerning construction and installation.

[13] The estimated number of vessels and vessel trips, which are based on current understanding of a potential construction schedule, are likely conservative and subject to change.

[14] This includes vessels at the Lease Area, at the OECCs, and in transit to, from, or within a port.

250–350 m (820–1,148 ft) in length overall, which exceeds the length of the largest vessels that that have been contemplated for use during the construction of Vineyard Northeast.[15] Vessel traffic associated with the construction of Vineyard Northeast is expected to result in a small percent increase in vessel traffic in the MA WEA, RI/MA WEA, and surrounding region. Based on a USCG analysis of Automatic Identification System (AIS) data for 2016–2018,[16] approximately 22,700 to 47,000 vessel transits occur annually in the MA WEA, RI/MA WEA, and surrounding region (USCG, 2020) . However, only commercial vessels greater than 20 m (65 ft) in length overall are required to carry AIS under USCG requirements. As a result, not all vessels, particularly fishing vessels and recreational vessels which comprise a large majority of vessel traffic in the region, are included in this estimate of current vessel traffic levels.

Construction is expected to occur during daylight hours, but nighttime activity may also occur. Construction vessels would have nighttime lights in accordance with USCG regulations. During dawn and dusk periods, particularly on cloudy days, work lights may be required for worker safety as well as to improve visibility on construction vessels. Work lights are generally downward directed and would not typically be oriented horizontally where visibility on shore would be increased. Additionally, during construction, temporary lighting will be used, including red aviation obstruction lights on each WTG, ESP, and booster station once (and if) they reach a height of 61 m (200 ft). The Proponent expects to install temporary yellow flashing marine navigation lights near the tops of the structures' foundations. Other lighting (e.g., helipad lights) may be utilized on the structures for safety purposes. Permanent lighting and marking of the WTGs, ESP(s), and booster station during the operational period are discussed in Section 9.2.4.

The Proponent will minimize lighting to the extent practicable by using best management practices while adhering to federal regulations for worker safety and complying with BOEM, FAA, and USCG guidance.

Because most offshore construction activities within the Lease Area will occur far offshore and construction vessels would be only in use temporarily, visual impacts associated with construction activities, as viewed from onshore vantage points, would be less than the impacts experienced during the operations and maintenance phase, which range from Minor to Negligible (refer to Table 19 and Table 27).

Offshore views from recreational and commercial vessels, which may view the Vineyard Northeast facilities from closer distances, will be highly variable, with an impact level ranging from Negligible to Major depending on viewing distance. Within the foreground distance zone the large-scale structures will be visually dominant. From background viewing distances visual

[15] As this stage of the development process, vessel data is highly speculative given that the Proponent has not selected the contractors or specific vessels that will carry out construction activities.

[16] Starting on March 2, 2016, USCG promulgated a requirement that commercial vessels greater than 20 m (65 feet) are required to be equipped with and use AIS. While USCG (2020) also reports transits based on 2015 AIS data, at that time, fewer vessels were required to use AIS.

impact will diminish with distance as linear perspective reduces the apparent size of the offshore facilities and atmospheric conditions reduce visual contrast (refer to Table 19).

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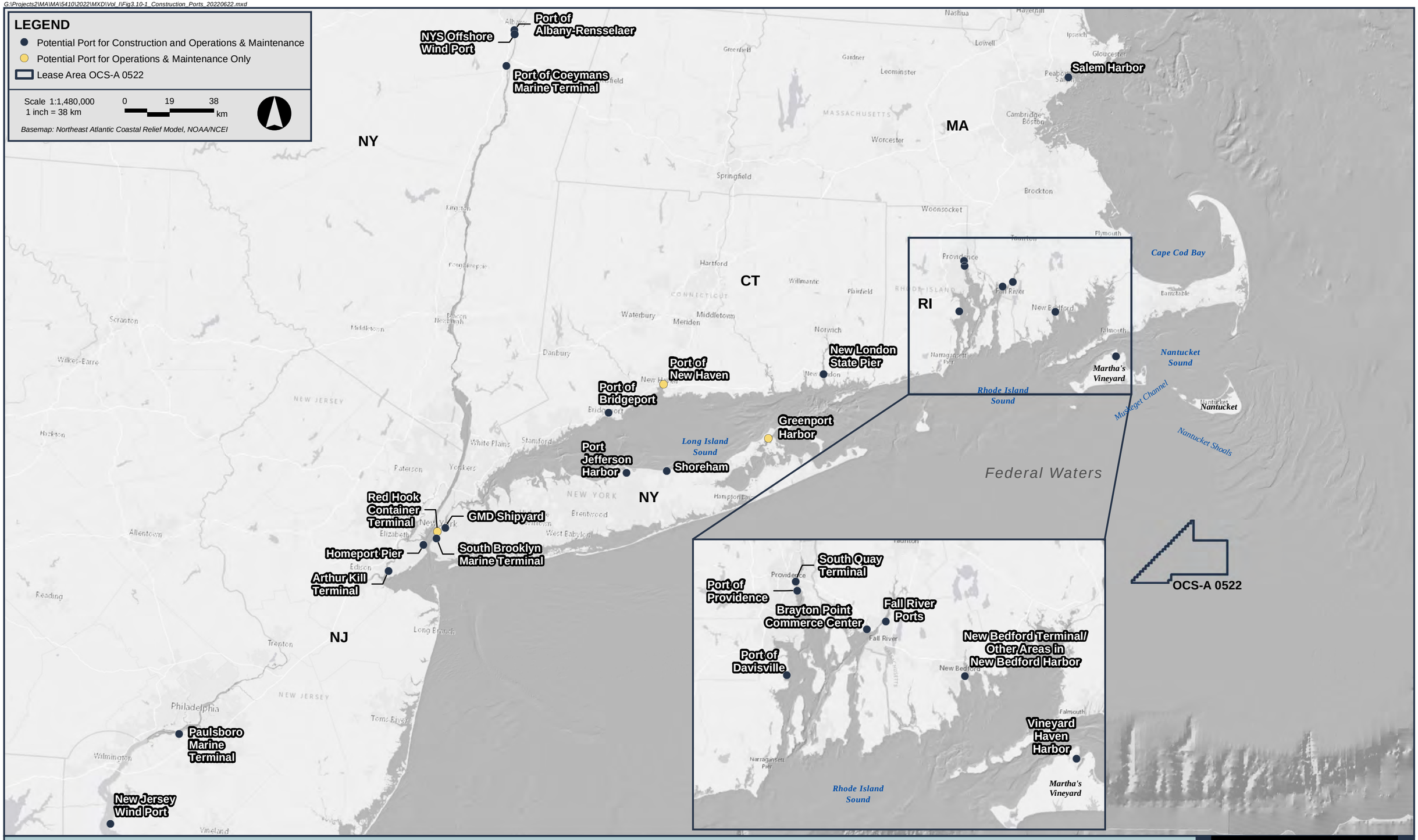

Figure 12
Potential Construction and O&M Ports in the US

9.1.2 Onshore Construction and Installation

Landfall Sites - As described in Section 2.2.1, the offshore export cables will transition onshore in a portion of paved parking areas at two landfall sites (one in Massachusetts and one in Connecticut). At the landfall sites, the offshore export cables will connect to the onshore export cables within underground transition vaults, which will not be visible (except for any at-grade manhole covers). At each landfall site, the offshore export cables are expected to transition onshore using horizontal directional drilling (HDD).[17] HDD is a trenchless installation method that avoids or minimizes impacts to the beach, intertidal zone, and nearshore areas. To support HDD activities, the Proponent will set up an approximately 4,500 m^2 (1.1 acre) HDD staging area in a parking lot or other previously disturbed area, which will contain the drilling rig and associated equipment. The Proponent will restore the onshore HDD staging area to match pre-existing conditions. Any paved areas that have been disturbed will be properly repaved.

Onshore Cables - The onshore cables (see Section 2.2.2) are expected to be installed primarily underground within public roadway layouts or within existing utility ROWs. The underground onshore cables may be installed in a duct bank (i.e., an array of plastic conduits encased in concrete) or within directly buried conduit(s). In most instances where the onshore cables cross wetlands, waterbodies, railroads, or busy roadways, underground trenchless crossing methods (such as horizontal directional drilling, pipe jacking, or direct pipe) are expected to be employed. However, as noted in Section 2.2.2, the northern crossing of the Taunton River [redacted] may require a segment of overhead transmission lines.

Both HVDC and HVAC onshore cables typically require splices approximately every 150-610 m (500–2,000 ft) or more. At each splice location, one or more underground splice vaults (typically pre-formed concrete chambers) will be installed. Along the majority of the onshore cable routes, manholes installed at the splice vaults and transition vaults (see Section 2.2.1) would be the only visible elements of the onshore cables.

The duct bank and splice vaults are expected to be installed in open trenches using conventional construction equipment (e.g., hydraulic excavator, loader, dump trucks, flatbed trucks, crew vehicles, cement delivery trucks, and paving equipment). The trench dimensions will vary along the onshore cable route (depending on the duct bank layout) but are expected to measure up to approximately 6.7 m (22 ft) in width at the bottom and 8.5 m (28 ft) in width at the top. In locations where splice vaults are necessary, the excavated area will be larger (up to approximately 13 m [43 ft] wide and 15 m [50 ft] long). Since the splice vaults may be

[17] Although not anticipated, if detailed engineering for the Connecticut landfall sites determines that HDD is technically infeasible, offshore open trenching may be used to bring the offshore export cables onshore.

installed anywhere along the onshore cable routes, the maximum extent of disturbance along the entire route is based on the dimensions of the area excavated for splice vaults.

Open trenching along existing public roadway layouts is expected to primarily occur within paved areas or within 3 m (10 ft) of pavement. Minimal tree trimming and/or tree clearing may be needed where the routes follow existing roadway layouts, depending on the final duct bank alignment.[18] Tree trimming, tree clearing, and/or grading may be required to facilitate onshore cable installation where the onshore cable routes follow existing utility ROWs, in limited areas where the routes depart from the public roadway layout (particularly near complex crossings), at trenchless crossing staging areas, and at the POIs. The work, however, will be confined to as narrow a corridor as possible.

Further detailed engineering and consultations with state and local agencies (e.g., Massachusetts Department of Transportation [MassDOT]) are needed to determine the extent and nature of tree clearing that may be required. The Proponent will endeavor to minimize tree clearing in consultation with state and local agencies. While the extent of surface disturbance and tree trimming/clearing required will depend on the final design of the onshore cable routes and consultation with agencies, the Proponent expects that potential visual impacts resulting from surface disturbance and removal of woody vegetation (shrubs/trees) during onshore cable installation will be minimal due to the temporary and likely sporadic nature of the impacts and expected regrowth of vegetation.

Construction staging areas (i.e., equipment laydown and storage areas) located along the onshore cable routes may be used to support onshore cable installation activities. With the exception of staging areas for trenchless crossings, the Proponent anticipates that the construction staging areas will either be in paved areas or at locations already utilized for similar activities and are therefore not expected to cause new ground disturbance.

Modifications may be required at the selected POIs to accommodate Vineyard Northeast's interconnection. The design and schedule of this work will be determined by the results of interconnection studies. Any required system upgrades at the POIs would be constructed by the existing substation's owner/operator. Based on negotiations with the substation's owner/operator, the Proponent may install onshore cables (i.e., perform ground disturbing activities) within the property line of the existing substation.

Onshore Substation Sites - Construction of the onshore substations (see Section 2.2.3) is expected to involve site preparation (e.g., land clearing and grading), installation of the substation equipment and cables, commissioning, and site clean-up and restoration. Although the Proponent intends to prioritize industrial/commercial sites that have been previously

[18] Subject to further engineering and consultations with local and state agencies (e.g., MassDOT).

disturbed, depending on the onshore substation sites ultimately selected, land clearing and grading may be needed prior to excavation and trenching (for equipment foundations, cable trenches, containment, drainage, and retaining walls). Some onshore substation sites may require up to approximately 0.06 km^2 (15 acres) of tree clearing and ground disturbance (per site) from grading, excavation, and trenching.[19] The periphery of the site (outside the security fencing) will be restored and revegetated (if required). Vegetative buffers for visual screening and sound attenuation walls may also be installed, if needed.

The Proponent will minimize lighting to the extent practicable by using best management practices (BMPs) while adhering to federal regulations for worker safety. The Proponent will consider the BMPs included in the Bureau of Land Management's Night Sky and Dark Environments: Best Management Practices for Artificial Light at Night on BLM-Managed Lands (Sullivan R., 2023). Potential BMPs that may be implemented include: avoiding uplighting where possible, using the lowest possible level of illumination that meets the lighting needs, and screening lighting where possible.

9.2 Operations and Maintenance

Visual impact is any modification in landforms, water bodies, or vegetation, or any loss or introduction of structures or other human-made visual elements, that negatively or positively affect specific views experienced by people. Visual impacts result from visual contrast, which is the opposition or unlikeness of different forms, lines, colors, or textures in a landscape (Sullivan R. G., 2021, p. 66). The following describes the compatibility of Vineyard Northeast's offshore facilities with regional seascape patterns within which it is contained and viewed. This evaluation is based on views depicted in the visual simulations provided in Appendix D.

The form of the regional landscape is comprised of the Atlantic Ocean, coastline, and upland portions of Martha's Vineyard and Nantucket. The patterns of the open water are temporal, changing with the wind, sun angle, cloud cover, and other factors that affect the texture and colors of the surface. Visible shorelines (mainland and islands) may vary from a subtle linear form low on the horizon to a low undulating landform where the coastline recedes into the distance. The horizontal layering of the water and sky is visually appealing and draws viewers' attention. The ocean is generally perceived as a broad expanse of dark open water that spans the view, with a sky that features a dynamic mix of partially illuminated cloud formations. The texture of the open water viewed out to the horizon is smooth.

9.2.1 Wind Turbine Generators

Daytime Visibility from Onshore Vantage Points - During daylight hours, a field of WTGs would be visible from coastal vantage points extending across a portion of the seascape. The WTGs

[19] The actual size of the onshore substation site parcel may be larger than the area cleared and disturbed to accommodate the onshore substation.

would introduce a contrasting pattern of geometric vertical lines into the strong horizontal planar form of the distant horizon, potentially heightened by contrast in texture, luminance, or motion. In the unexpected scenario that no other offshore wind projects have been constructed at the time of Vineyard Northeast construction (see Section 10), the proposed WTGs will be the tallest visible elements on the horizon, albeit at great distance (more than 49.1 km [30.5 mi] from the nearest WTG). The series of vertical, overlapping towers with rotating blades arrayed across an expanse of the visible horizon can create a strong contrasting element on the seascape.

With the nearest coastal vantage point just over 49.1 km (30.5 mi) from any WTG, the HFOV occupied by the Lease Area ranges from approximately 24 to 31 degrees on the visible horizon as viewed from land-based vantage points on Martha's Vineyard and Nantucket. This represents a relatively small amount of the 124-degree horizontal human field-of-view and of the 180-degree ocean vista visible from most coastal vantage points. Similarly, at this distance, the WTGs maintain a very low profile with a vertical-field-of-view of less than 0.33 degrees above the horizon.

The expected neutral off-white/light grey color[20] of the WTG tower, nacelle, and blades will always be viewed against the background sky. The color of the WTGs will be generally compatible with the hue, saturation, and brightness of the seascape. However, depending on sun angle, time of day, and the presence of cloud cover, the backdrop sky color may have different intensities and hues. The visual interplay and contrast of the form, line, color, and texture of WTG components would vary with the changing character of the backdrop. For example, front-lit WTGs may have strong color contrast against a darker sky, giving definition to the WTGs' vertical form and line contrast against the ocean's horizontal character and the line where the sea meets sky. WTG components would be more likely to visually dissipate against a lighter sky backdrop. Variable cloudiness or passing clouds can change lighting conditions and effects, placing some WTGs in the shadow and making them appear darker and less conspicuous while highlighting others with a bright color contrast. The level of noticeability would be directly proportional to the degree of visual contrast and scale of change between the WTGs and the backdrop. Color and texture contrast will further diminish or disappear completely during periods of haze, fog, or precipitation.

As noted above, the nearest Vineyard Northeast WTG is more than 49.1 km (30.5 mi) from the nearest vantage point on land. At this extended distance, linear perspective reduces the

[20] In accordance with BOEM and FAA guidance, the WTGs will be no lighter than pure white (RAL 9010) and no darker than light grey (RAL 7035) in color. Although the Proponent expects that the WTGs will be off-white/light grey, the exact color of the WTGs within this range (between RAL 9010 and RAL 7035) is unknown at this time. As clarified in Section 6.3, the visual simulations assume that the WTGs are pure white (RAL 9010), which represents a worst-case scenario, although the difference between WTGs colored RAL 9010 and RAL 7035 is likely indiscernible from coastal vantage points given the WTGs' distance from shore.

apparent size of the project components, curvature of the earth becomes a meaningful factor in screening significant portions of WTGs, and objects become less prominent in the overall seascape due to their relative size and occupation of the horizon. Notably, at and beyond this distance, the WTGs' yellow-colored foundations fall below the visible horizon and will not be visible from any coastal vantage point.

Additionally, at such an extended distance, atmospheric perspective changes colors to blue-grays and surface texture characteristics are lost. Even when visible under clear atmospheric conditions, the WTGs will be viewed very low on the horizon and would be visually subordinate to the expansive Atlantic Ocean. As an observer moves farther and farther from the WTGs, the smaller they appear. Beyond a certain distance, and depending upon the degree of contrast between the WTGs and its surroundings, the WTGs may not be a point of interest for most people.

The individual and cumulative effect of blade motion on the distant horizon may contribute to texturing of the seascape and appear in contrast with the horizontal line and rolling form of the open ocean. Although visible rotor movement could attract visual attention, this effect may diminish at distances of about 38.6 km (24 mi) (Sullivan R. G., 2013)[21]. Sullivan notes on page 12 of that study "Turbine blade movement was visible at distances as great as 42 km (26 mi) in 42 of the 49 daytime observations....", and on page 2 of that study, "[a]s the early distance-visibility studies do not account for turbines or projects of these sizes, it is inappropriate to use limits of visibility established in these studies as the basis for current visual impact assessments. Clearly, impact assessments and siting decisions must rely on accurate, up-to-date knowledge regarding the visibility of today's offshore wind facilities."

Given Vineyard Northeast is 49.1 km (30.5 mi) from the nearest coastal vantage point, (7 km [4.5 mi] further than Sullivan's observations) blade movement would be difficult to detect for the typical observer. Blade movement would be even more difficult to detect when viewed from vantage points where the nacelle falls below the horizon (a minimum of 65.5 km [40.7 mi] as viewed from beach elevation).

Daytime Visibility from Offshore Vantage Points - For offshore viewers closer to Vineyard Northeast, potential visual impacts will be greater than for onshore viewers because boats could closely approach or potentially move through the offshore facilities. In a close approach, the large form and geometric lines of both the individual WTGs and the array of WTGs would be visually dominant and the sweep of the moving rotors would attract visual attention. Structural details, such as surface textures, could become apparent, as could specular reflections from the WTG towers and moving rotor blades (BOEM, 2007).

[21] Note, Sullivan's observation of 24 miles was for WTGs that are considerably shorter with a smaller rotor diameter than the WTGs proposed for Vineyard Northeast.

There would be daily variation in the WTGs' color contrast against their surroundings as sun angles change from backlit to front-lit (sunrise to sunset) and the backdrop varies under different lighting and atmospheric conditions. The strongest daytime visual contrast would result from tranquil and flat seas combined with sunlit WTG towers and nacelles, rotating and flickering rotors, and a yellow foundation 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 against an overcast background sky and a foreground occupied by varied landscape elements.

The individual and cumulative effect of blade motion will contribute to texturing of the horizon and appear in contrast with the horizontal line and rolling form of the open ocean. The circular rotation and lack of synchronization between WTGs do not correspond with the natural back and forth motion of the ocean swells and smaller waves, further enhancing the contrast for offshore viewers with daytime views of Vineyard Northeast.

The potential visual impacts of nighttime lighting on the WTGs during operations is discussed in Section 9.2.4.

9.2.2 Electrical Service Platforms (ESPs)

Daytime Visibility from Onshore Vantage Points - Vineyard Northeast will include zero to three ESPs[22] that house step-up transformers and other electrical gear. The nearest possible ESP would be approximately 49.1 km (30.5 mi) from the nearest coastal vantage point. At this distance, an ESP located at any position in Lease Area OCS-A 0522 will fall below the visible horizon as viewed from any coastal vantage point.

Daytime Visibility from Offshore Vantage Points - From offshore vantage points, the potential visual impacts of an ESP will vary depending on the distance of the viewer to the Lease Area. When viewing an ESP from foreground distances, the viewer will be either within or immediately adjacent to WTG field. Structural details, such as the surface textures and colors will be apparent, and the ESP will appear as a large rectilinear form elevated above the ocean surface. Although the ESP will be visually dominant, in contrast to and substantially out of character with the horizontal expanse of the surrounding ocean, the ESP structure itself will be visually subordinate to the WTGs. The level of impact will diminish with increasing distance from the Lease Area as contrasting elements of form, line, color, and texture become more muted and the scale and dominance of the structure becomes more subordinate to the open ocean.

The potential visual impacts of nighttime lighting on the ESP(s) during operations are discussed in Section 9.2.4.

[22] "Zero" indicates the ESP equipment may be integrated onto WTG foundation(s).

9.2.3 Booster Station

Daytime Visibility from Onshore Vantage Points - The booster station is located approximately 41.7 km (25.9 mi) northwest of the Lease Area in the northwestern aliquot of Lease Area OCS-A 0534. The separate booster station is just over 23.5 km (14.6 mi) south of Martha's Vineyard (at South Beach State Park) and 25.6 km (15.9 mi) southwest of Nantucket (at Tuckernuck Island). At this distance, the booster station would be visible to some degree from most shoreline vantage points on the south coast of Martha's Vineyard and Nantucket.

At more than 23.5 km (14.6 mi) from the nearest vantage point on land, the booster station will be viewed in the far background distance zone from onshore vantage points. At this distance, it will appear as a relatively small rectilinear geometric mass very low on the distant horizon. Visibility of this shadow-like form will diminish with increasing distance as the structure becomes less prominent in the overall landscape due to relative size, occupation of the horizon, and the earth's curvature.

During the day, the clear vertical edge of the structure will contrast with the dominant horizontal line of the ocean horizon. The upper portion of the booster station (i.e., the topside) will be a grey color, which would appear muted and indistinct. Due to distance, the booster station will show minimal textural distinction and appear shadow-like low on the horizon. Color and texture contrast will further diminish or disappear completely during periods of haze, fog, or precipitation.

Daytime Visibility from Offshore Vantage Points – From offshore vantage points, the potential visual impacts of the booster station will vary depending on the distance of the viewer to the structure. When viewing the booster station from foreground distances, structural details, such as surface textures and colors will be apparent. The booster station will be visually dominant, in contrast to, and substantially out of character with the simple horizontal form of the surrounding expanse of open ocean. The level of impact will diminish with increasing distance as contrasting elements of form, line, color, and texture become more muted and the scale and dominance of the structure becomes more subordinate to the open ocean.

The potential visual impacts of nighttime lighting on the booster station during operations are discussed in Section 9.2.4.

9.2.4 Nighttime Lighting

The WTGs will include an aviation obstruction lighting system in compliance with FAA and/or BOEM requirements. Based on current guidance, the aviation obstruction lighting system will consist of two synchronized red flashing lights placed on the nacelle of each WTG. If the WTGs' total tip height is 213.36 m (699 ft) or higher, there will be at least three additional low intensity flashing red lights on the tower approximately midway between the top of the nacelle and sea level.

Whether or not the ESP(s) and booster station are required to have nighttime aviation obstruction (FAA) lights depends on the final height of the ESP(s) and booster station. If the height of an ESP or booster station exceeds 60.96 m (200 ft) above Mean Sea Level (MSL) or any obstruction standard contained in 14 CFR Part 77, it will include an aviation obstruction lighting system in compliance with FAA and/or BOEM guidelines. Other lighting (e.g., helipad lights) may be located on the ESP(s) and booster station for safety purposes. Temporary outdoor lighting on the ESP(s) and booster station may be necessary if any maintenance occurs at night or during low-light conditions; these lights would not be illuminated if no technicians are present. Nighttime work on the ESP(s) and booster station during operations would be limited.

Subject to BOEM approval, the Proponent will use an Aircraft Detection Lighting System (ADLS) or similar system that automatically activates all aviation obstruction lights present on the WTGs, ESP(s), and booster station when aircraft approach the structures. An ADLS utilizes surveillance radar to track aircraft operating in proximity to the structures. The ADLS will activate the obstruction lighting system when aircraft enter the light activation volume and will deactivate the system when all aircraft depart. As a result, the ADLS activates the aviation obstruction lights on an as-needed basis, thereby significantly reducing the amount of time that obstruction lights will be illuminated.

Appendix II-I of the COP provides an Aircraft Detection Lighting System Efficacy Analysis. This analysis utilized historic air traffic data obtained from the FAA to determine the total duration that an ADLS-controlled obstruction lighting system would have been activated. The results of this analysis can be used to predict an ADLS's effectiveness in reducing the total amount of time that an obstruction lighting system would be activated. Historical air traffic data for flights passing through the light activation volume surrounding the Lease Area in 2020 indicates that ADLS-controlled obstruction lights would have been activated for a total of 1 hour 14 minutes and 5 seconds over a one-year period for 400-meter (1,312-foot) tall WTGs. Of the 29 flights that passed through the ADLS activation volume in 2020, only six flights occurred at night (when a traditional obstruction lighting system would be activated). In most months, the ADLS-controlled obstruction lights would have been activated for less than four minutes total (or not at all). For two months in 2020, ADLS-controlled obstruction lights would have been illuminated for a total duration of approximately 30 minutes. Considering the local sunrise and sunset times, an ADLS-controlled obstruction lighting system could reduce the duration of nighttime lighting by over 99% as compared to a traditional always-on obstruction lighting system (Capitol Airspace Group, 2022).

When activated, aviation obstruction lights on the WTGs may be visible from all coastal locations where daytime views of WTG nacelles occur. Inland views are typically screened by dunes, low hills, and existing vegetation. When visible from inland locations, nighttime views often include existing coastal light sources (including residential light sources, streetlights, and vehicle headlights), offshore vessels, and marine navigation aids.

The introduction of aviation obstruction lights in the night sky may be noticeable from beach areas, coastal bluffs, and other near coast inland areas within the ZLV, especially under clear weather conditions. The contrast of aviation obstruction lights in the night sky may be appreciable in the dark setting of the Martha's Vineyard and Nantucket shoreline where few manmade light sources currently exist. Viewer attention may be drawn by the slow flashing of the red lights.

Nighttime visibility of Vineyard Northeast will be most noticeable from beachfront areas in clear air conditions. Recreational beaches are primarily visited during daytime hours, minimizing the number of affected viewers. From beach level vantage points (assuming a viewer eye level of 1.83 meters [6 feet] asl), the nacelle (and FAA aviation obstruction lights) will fall below the horizon at approximately 65.5 km (40.7 mi).

The impact of FAA lighting is substantially limited by the distance of Vineyard Northeast from vantage points. At distances 49.1 km (30.5 mi) or greater from the closest costal vantage point for the WTGs, aviation obstruction lights may be visible very low on the horizon and will appear to shimmer and vary in intensity due to the slow flash rate, intermittent shadowing as rotating blades pass in front of the light source, and atmospheric variations. Visibility can be frequently reduced or blocked by fog, snow, particulate matter, smog, or any combination thereof.

For each WTG, ESP, and booster station (if used), marine navigation lighting will include yellow flashing lights that are visible in all directions at a distance of 3.7 to 9.5 km (2.3 to 5.9 mi [2 to 5 NM]), in accordance with USCG guidance (see Section 2.1.3). The intensity of the lights will depend on the location of the structure within the Lease Area. Marine navigation lighting will be mounted on each foundation (or near the bottom of the ESP and booster station topsides). At this low mounting height (assuming 35 m [114 ft] asl), marine navigation lights will fall below the horizon at a distance of approximately 27.9 km (17.3 mi) as viewed from beach elevation (assuming an observer eye level of 1.83 m [6 ft] asl). With the nearest coastal vantage point over 49.1 km (30.5 mi) from the nearest WTG or ESP, marine navigation lights on the WTGs and ESP(s) will not be visible from any coastal vantage point. At approximately 23.5 km (14.6 mi) from the nearest coastal vantage point, booster station marine navigation lights could conceivably be visible from locations along the southeastern coast of Martha's Vineyard. Even when not screened by the horizon, these low intensity lights would be inconspicuous to observers from coastal vantage points.

The Proponent will minimize lighting to the extent practicable by using best management practices (BMPs) while adhering to federal regulations for worker safety and complying with BOEM, FAA, and USCG guidance. In addition to the use of ADLS, additional BMPs for nighttime lighting listed in Sullivan (2023) will be considered and may include: avoiding uplighting where possible, using the lowest possible level of illumination that meets the lighting needs, and avoiding up-lighting where possible.

While ocean beaches on Nantucket and Martha's Vineyard are typically dark, they are not unaffected by manmade light sources. Existing lights from coastal residential and commercial properties, streetlights, boats, aircraft, and other sources contribute to existing light pollution. Upward dispersion of light generated from more densely populated areas also creates a distant sky glow to some degree depending on atmospheric conditions at any given time.

9.3 Decommissioning Impacts

Decommissioning of Vineyard Northeast would involve the disassembly and removal of WTGs, ESP(s), booster station, associated foundations and scour protection (if required), offshore cables and cable protection (if required), and the shipment of these materials to shore for reuse, recycling, or disposal (see Section 5 of COP Volume I). In terms of expected visual impacts, decommissioning activities would be similar to construction activities. However, activities would generally proceed in the reverse order from construction, and may proceed more quickly than construction; thus, any associated impacts may be shorter in duration. During decommissioning, all offshore facilities would be removed to a depth of at least 4.5 m (15 ft) below the mudline and the Lease Area would be returned to pre-construction condition, unless otherwise authorized by BOEM. Impacts associated with any new or expanded permanent onshore facilities resulting from Vineyard Northeast may remain, subject to discussions with local agencies on the decommissioning approach that best meets agency expectations and has the fewest environmental impacts.

10.0 IMPACTS OF REASONABLY FORESEEABLE PLANNED ACTIONS

Vineyard Northeast occupies one of nine offshore wind energy lease areas in the contiguous Massachusetts Wind Energy Area (WEA) and Rhode Island/Massachusetts Wind Energy Area (RI/MA WEA), as illustrated in Figure 1 and Figure 13. As BOEM points out in its SLVIA guidelines, NEPA requires that projects be considered within the context of reasonably foreseeable additional projects. Multiple projects throughout the MA WEA and RI/MA WEA are in various stages of design or review within the vicinity of Vineyard Northeast. Ultimately, more than one project will likely be in view from some or all of the KOPs considered in this SLVIA (see Figure 13). In some cases, WTGs from one project may fully or partially "hide" the WTGs from another. Vineyard Northeast is the farthest offshore wind development from shore in the region; therefore, it may have less visibility and impact than several other projects.

To address cumulative impacts, the Proponent will provide cumulative simulations to BOEM that show Vineyard Northeast as well as other reasonably foreseeable projects, for their use in determining cumulative impacts in the Environmental Impact Statement (EIS) for Vineyard Northeast. Based on current (Spring 2022) guidance from BOEM, it is expected that cumulative simulations will be provided several months prior to the preparation of the Draft EIS for Vineyard Northeast.

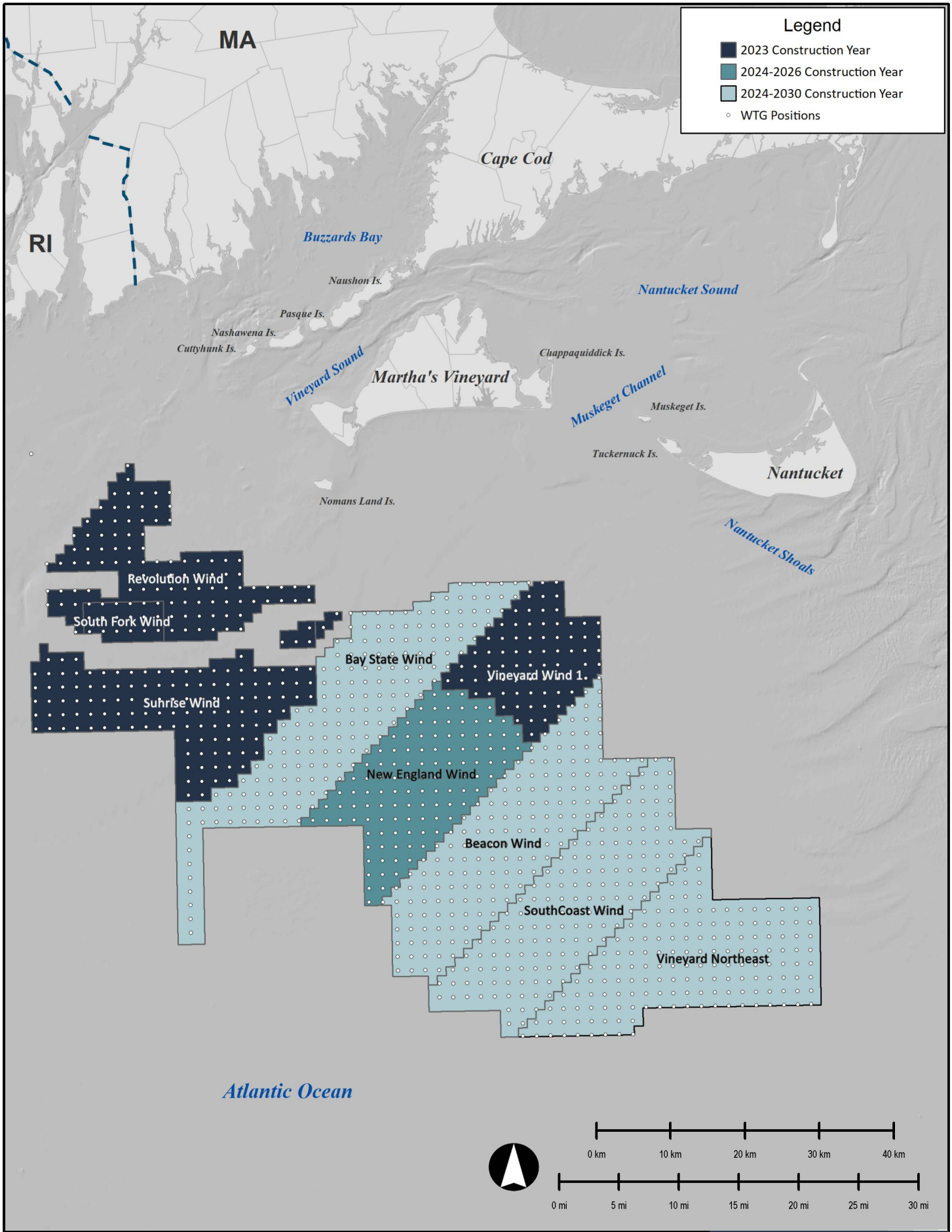

Figure 13
Reasonably Foreseeable Planned Actions

VINEYARD NORTHEAST
VINEYARD OFFSHORE

11.0 MINIMIZATION AND MITIGATION MEASURES

The sheer distance of Vineyard Northeast from the nearest coastal vantage point—greater than 49.1 km (30.5 mi) from the closest WTG to Nantucket—serves to minimize visibility of Vineyard Northeast's offshore facilities from sensitive visual resources. For a development of this type, mitigation options are limited due to the size and structural requirements of WTGs, the number of WTGs necessary to meet energy production requirements, and their location on an unscreened seascape. However, Vineyard Northeast is applying important minimization and mitigation techniques, such as using an ADLS or similar system, to minimize potential visual impacts to the maximum extent practicable.

Visual Screening—Nearly all views of Vineyard Northeast's offshore facilities occur from beachfront vantage points or elevated overlooks where the existing landscape is highly scenic. Localized screening, such as berms, vegetative barriers, or fences, would not be practical for screening miles of beachfront views, or even welcomed in places where such screening would block scenic vistas.

Design and Appearance—The WTGs are uniform in shape, design, and color, which serves to minimize visual contrast. Tubular tower designs are similarly used throughout, and components are in proportion to one another. The design and appearance of Vineyard Northeast is consistent with best practices to minimize visual impact (BOEM, 2007).

Color Selection or Camouflage— As described in Section 2.1.3, the WTGs will be no lighter than pure white (RAL 9010) and no darker than light grey (RAL 7035) in color; the Proponent expects that the WTGs will be off-white/light grey to reduce their visibility against the horizon.[23] This color is not offered as mitigation, but is used in compliance with BOEM's marking and lighting guidance. However, when viewed from ground or sea level the off-white/light grey color blends well with the background sky to minimize visual contrast of the WTGs with the sky under most conditions.

The ESP and booster station topsides are expected to be light grey in color, which would appear muted and indistinct. Measures including alternate color selection or camouflaging the WTGs, ESP(s), or booster station are unlikely to reduce the visibility of Vineyard Northeast. No commercial/advertising messages will be placed on WTGs.

Reduction in Night Lighting—Visual analysis demonstrates that the marine navigation lights on WTGs and ESP(s) will not be visible from any land-based vantage point and will not be an

[23] The exact color of the WTGs within this range (between RAL 9010 and RAL 7035) is unknown at this time. As clarified in Section 6.3, the visual simulations assume that the WTGs are pure white (RAL 9010), which represents a worst-case scenario, although the difference between WTGs colored RAL 9010 and RAL 7035 is likely indiscernible from coastal vantage points given the WTGs' distance from shore.

impact. Low intensity marine navigation lights on the booster station would be inconspicuous to observers from coastal vantage points.

Where visible above the horizon, aviation obstruction lights on the WTGs, ESP(s), and booster station (if needed) contribute to their visual impact. However, such lighting is required as a safety measure and cannot be eliminated. Lighting-related impacts can be reduced by limiting aviation obstruction lighting to the minimum duration allowable by the FAA. As described in Section 9.2.4, subject to BOEM approval, the Proponent will use an ADLS or similar system that automatically activates all aviation obstruction lights present on the WTGs, ESP(s), and booster station when aircraft approach the structures. This technology would substantially reduce the amount of time such lights would be visible. An assessment of the activation frequency of an ADLS indicates that it would be activated approximately 1.25 hours per year (see Appendix II-I of the COP).

12.0 SUMMARY AND CONCLUSIONS

Vineyard Northeast includes up to 160 WTG/ESP positions. Up to three of those positions will be occupied by ESPs and the remaining positions will be occupied by WTGs. The nearest Vineyard Northeast WTG is 49.1 km (30.5 mi) off the coast of Nantucket (Long Joseph Point) and 63.2 km (39.3 miles) off the coast of Martha's Vineyard (Wasque Point). If used, the booster station will be located approximately 41 km (25.9 mi) northwest of the Lease Area in the in the northwestern aliquot of Lease Area OCS-A 0534, just over 23.5 km (14.6 mi) south of Martha's Vineyard and 25.6 km (15.9 miles) southwest of Nantucket.

Visual impacts are contingent on a viewer's distance from shore, the viewer's elevation, and atmospheric conditions that could screen some or all of Vineyard Northeast's WTG towers, nacelles, and rotors. Due to extended distance and the earth's curvature, there are no land-based vantage points where WTG foundations would be visible above the horizon. In addition, given the narrow width of the WTG tower and rotor, combined with the distance from land-based viewpoints, these elements of the WTG would be minimally discernible by the naked eye in the best visibility conditions (a clear, low humidity day) and not detectable in the haze or fog typical for this marine landscape. The overall impact level to onshore viewers of Vineyard Northeast's offshore facilities is expected to be minor to negligible (refer to Table 27).

Zone of Likely Visibility (ZLV) — Excluding open ocean vantage points surrounding Lease Area OCS-A 0522, the primary areas where the WTGs and booster station may be seen are largely limited to the southern coastlines of Martha's Vineyard and Nantucket. There are no land-based vantage points where ESPs would be visible above the horizon.

In most circumstances, visibility of Vineyard Northeast will be quickly screened from inland vantage points by coastal topography and vegetation. Most views of the offshore facilities will be limited to immediate waterfront locations. Few publicly accessible vantage points with views of the Atlantic Ocean are found inland. Areas of likely visibility are also found on south-facing beaches and unvegetated inland areas on uninhabited Esther Island, Tuckernuck Island, Muskeget Island (all at distances greater than 53.1 km [33.0 mi] to the nearest WTG), and Nomans Land Island (68.6 km [42.6 mi] to the nearest WTG).

All portions of Cape Cod and the Elizabeth Islands, as well as mainland Massachusetts, Rhode Island (including Block Island), Connecticut, and New York's Long Island fall outside of the 83.7 km (52 mi) radius Visual Study Area. At distances greater than 65.5 km (40.7 mi), the top of the nacelle will fall below the visible horizon as viewed from sea level vantage points (assuming an observer eye level of 1.83 m [6 ft] asl). The blade tip will fall below the horizon at distances greater than 81.6 km (50.7 mi).

Open views toward the Lease Area from locations within the Ocean Beach/Coastal Dunes, Coastal Bluffs, Salt Pond/Tidal Marsh, Sand Plain Grassland/Coastal Scrub, Shoreline

Residential, and Coastal Village/Town Center Seascape Character Areas on Martha's Vineyard and Nantucket will be visually impacted by Vineyard Northeast, due to their proximity to the shoreline and/or lack of screening by vegetation and topography. These Seascape Character Areas contain visually sensitive resources including historic sites, open space/wildlife conservation areas, public beaches, and recreation areas that will have views of Vineyard Northeast. Additionally, shoreline vacation homes and private residences which currently have ocean views will have distant views of Vineyard Northeast.

Greater numbers of tourists, vacationers, and recreational users will be present in the coastal area during the summer and on sunny days, when the weather is clear and warm, as compared to overcast, rainy, or cold days. In addition, more recreational users will be present in the coastal area on weekends and holidays than on weekdays. Also, fewer visitors spend time at beachfront locations during the off-season.

Meteorological Visibility—Visibility is reduced by fog, snow, particulate matter, smog, or any combination thereof. Additionally, different factors affect visibility, including air quality, sea spray and salts over the ocean's surface, and the angle of the sun. Although the presence of sea spray and salts affects visibility, it is not likely captured by measurements of visibility taken at airports (see Section 5.3). Therefore, calculated visibilities should be considered conservative since they do not account for these light-reducing factors.

Additionally, the WTGs are expected to be off-white/light grey and the ESP and booster station topsides are expected to be light grey, which combined with normal atmospheric conditions, will minimize daytime visibility of the ocean-based elements of Vineyard Northeast. Due to reduced visibility caused by atmospheric conditions, the WTGs and booster station will not be visible most of the time for viewers along the Martha's Vineyard and Nantucket coastlines.

Distance of Visibility— The WTGs are over 49.1 km (30.5 mi) and the booster station is over 23.5 km (14.6 mi) from the nearest coastal vantage point. From all land-based vantage points, the WTGs and booster station are in the far background distance zone where atmospheric perspective causes elements to lose detail and become less distinct. At these extended distances, the curvature of the earth will affect visibility of Vineyard Northeast. As distance increases, the portion of offshore facilities (i.e., WTGs and booster station) visible above the horizon decreases exponentially. From the closest land point on Nantucket (49.1 km [30.5 mi] to the nearest WTG), for a standing observer at beach elevation (assuming an observer eye level of 1.83 m [6 ft] asl), the lower 131 m [432 ft] of the offshore facilities will fall below the visible horizon. From the closest land point on Martha's Vineyard (63.2 km [39.3 miles] to the nearest WTG), the lower 229 m (754 ft) will be screened by the horizon.

HFOV occupied by the Lease Area ranges from approximately 24 to 31 degrees on the visible horizon as viewed from land-based vantage points on Martha's Vineyard and Nantucket. This represents a relatively small amount of the 124-degree horizontal human field-of-view and of the 180-degree ocean vista visible from most coastal vantage points. Similarly, at this distance,

the WTGs maintain a very low profile with a vertical-field-of-view of less than 0.33 degrees above the horizon.

As an observer moves along the coast farther from the Lease Area, the smaller the WTGs will appear. Beyond a certain distance, depending upon the size and degree of contrast between the WTGs and its surroundings, the WTGs may cease to be a point of interest for most people or become indistinguishable.

At 49.1 km (30.5 mi) and farther from shore, there is no land-based vantage point that will view an entire WTG. Some portion of the structures will always fall below the visible horizon. Because atmospheric conditions reduce visibility, sometimes significantly, and the presence of waves obscure objects very low on the horizon, maximum theoretical viewing distances typically exceed what is experienced in reality. Furthermore, limits to human visual acuity reduce the ability to discern objects at great distances, suggesting that a WTG may not be discernible at the maximum distances, although they theoretically would be visible (BOEM, 2007).

At 23.5 km (14.6 mi) from the nearest coastal vantage point (assuming a standing observer at beach elevation with an eye height of 1.83 meters [6 feet] asl), the lower 23 m (75 ft) of the booster station will similarly fall below the visible horizon. The upper 47 m (154 ft) of this structure will be visible above the horizon.

Sullivan, in *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances* (2013), concludes that small- to moderately-sized facilities were visible to the unaided eye at distances greater than 41.8 m (26 mi), with WTG blade movement visible up to 38.6 m (24 mi). At night, aviation obstruction lighting was visible at distances greater than 38.6 (24 mi). The observed wind facilities were judged to be a major focus of visual attention at distances up to 16 km (10 mi), were noticeable to casual observers at distances of almost 29 km (18 mi), and were visible with extended or concentrated viewing at distances beyond 40.2 km 25 (mi). While Vineyard Northeast is larger in scale than the projects evaluated by Sullivan, these findings provide additional perspective concerning the effect of distance on human visibility of offshore wind energy facilities and further support the conclusion that the 83.7 km (52 mi) VSA is highly conservative.

For offshore viewers closer to Vineyard Northeast, potential visual impacts could be much greater than for onshore viewers because boats could approach or potentially move through Lease Area OCS-A 0522. In a close approach, the very large form and geometric lines of both the individual WTGs and the array of WTGs could dominate views, and the large sweep of the moving rotors would command visual attention. Structural details, such as surface textures, could become apparent, and the ESP(s) could be visible as well, as could specular reflections from the towers and moving rotor blades (BOEM, 2007).

Visibility of Night Lighting—Night lighting may have an effect on residents and vacationers in beachfront settings where they currently experience dark skies. While many residences enjoy

ocean views, most year-round and vacation homes within the proposed maximum theoretical area of nacelle visibility are located inland where intervening landforms and vegetation provide substantial or complete screening of the ocean.

The impact of FAA lighting will be substantially limited by the distance of Vineyard Northeast from coastal vantage points. At a minimum distance of 49.1 km (30.5 mi) to the closest WTG, Vineyard Northeast's aviation obstruction lights may be visible very low on the horizon. Lights will appear to shimmer and vary in intensity due to the slow flash rate, intermittent shadowing as rotating blades pass in front of the light source, and atmospheric variations. Visibility will be frequently reduced or blocked by fog, snow, particulate matter, smog, or any combination thereof. Subject to BOEM approval, the Proponent will use an ADLS or similar system that automatically activates all aviation obstruction lights present on the WTGs, ESP(s), and booster station when aircraft approach the structures. This technology would substantially reduce the amount of time such lights would be visible. An assessment of the activation frequency of an ADLS indicates that it would be activated less than 1.25 hours per year (see Appendix II-I of the COP).

Based on current USCG guidance, yellow flashing marine navigation lights mounted on each foundation (or near the bottom of the ESP and booster station topsides) will be visible in all directions at a distance of 3.7 to 9.5 km (2.3 to 5.9 mi [2 to 5 NM]), depending on the structure's location. Due to sheer distance, the WTG and ESP marine navigation lights will not be visible from any coastal vantage point. Booster station marine navigation lights could conceivably be visible from locations along the southeastern coast of Martha's Vineyard. These low intensity lights would be inconspicuous to observers from coastal vantage points.

Human Perception—Public reaction to views of Vineyard Northeast is likely to be variable. Not all viewers see WTGs as having an adverse visual impact. While there is generally strong support for wind power development, there are often local concerns relating to the aesthetics of planned wind facilities. The perceptions of visual impacts associated with wind energy development vary among potential viewers and may be positive or negative. Perceptions can also change over time, in some cases possibly trending toward more positive perceptions after the installation of wind energy facilities (BOEM, 2007).

Minimization and Mitigation—Vineyard Northeast includes a number of measures that serve to reduce or mitigate visual impact:

- Vineyard Northeast is located in an area identified by BOEM as suitable for offshore wind power development, sited far from shore to minimize visual impacts.
- The location of the nearest WTG more than 49.1 (30.5 mi) offshore eliminates all foreground, mid-ground, and even near background views from visually sensitive public resources and population centers.

- When viewed from ground level vantage points, the expected off-white/light grey color of the WTGs generally blends well with the sky at the horizon. The ESP and booster station topsides are expected to be light grey in color, which would appear muted and indistinct. This color is not offered as mitigation, but is used in compliance with BOEM's marking and lighting guidance. However, when viewed from ground or sea level the off-white/light grey color blends well with the background sky to minimize visual contrast of the WTGs with the sky under most conditions.
- An ADLS or similar system will be used, subject to BOEM approval, which is estimated to be activated less than 1.25 hours per year (see Appendix II-I of the COP).
- Due to sheer distance, marine navigation lights on the WTGs and ESP(s) will not be visible from any coastal vantage point. The low intensity marine navigation lights on the booster station (if used) would be inconspicuous to observers from coastal vantage points.

Overall, Vineyard Northeast's offshore facilities will result in small change to landscape conditions for viewers along the Martha's Vineyard and Nantucket coastlines. Viewers on the islands will have limited visibility of the WTGs when weather conditions allow. However, at distances at or greater than 49.1 km (30.5 mi) for the WTGs and viewed within the context of the ocean that includes the vast expanse of water, extended beach views and dunes, as well as the sights and sounds of breaking surf and wind, Vineyard Northeast would likely be considered visually subordinate to the wider landscape. Vineyard Northeast will be virtually undetectable from the eastern portion of Martha's Vineyard.

All offshore cables will be submerged and will not be visible. The onshore cables are expected to be installed primarily underground; thus, along the majority of the onshore cable routes, manholes installed at the splice vaults and transition vaults would be the only visible elements of the onshore export cables. However, the northern crossing of the Taunton River [redacted] may require a short segment of overhead transmission lines.

Although the specific location and design of the Massachusetts and Connecticut onshore substations have not yet been determined, potential mitigation measures may be incorporated into the final design. Mitigation measures may include:

- Screening/Landscaping – To the degree practicable and where existing vegetation exists, onshore substation site development will maintain perimeter vegetation for visual screening. Where onshore substation components may be visible from offsite vantage points, vegetative buffers (e.g., supplemental plantings and other landscape elements) may be installed to minimize offsite visibility to the extent possible.
- Color Treatment - The design of the onshore substation will consider the color of materials used for buildings, fences, and specular steel structures to minimize visual

contrast. Neutral colors that tend to blend with the vernacular materials in the area can minimize the color contrast presented by the onshore substation. The Proponent will consider use of a black vinyl coating on chain-link fencing as an alternative to standard galvanized steel to reduce color contrast.

- Low Profile - The height of the electrical equipment and lightning masts within the onshore substation site must be designed to ensure the safe operation of the onshore substation and cannot be lowered.
- The design of the onshore substation will specify the lowest profile components practicable considering the engineering requirements of the selected design type.
- Downsizing and Alternate Technologies - The onshore substation will be designed to occupy the smallest footprint and vertical height practicable considering all electrical and safety requirements, feasible technologies, and the space available at the selected onshore substation site.
- Non-specular Materials - Where applicable and practicable, the onshore substation will utilize non-specular conductors and dulled galvanized metal materials to minimize glare.
- Lighting – Onshore substation site lighting will be designed and installed using best practice sustainable outdoor lighting specifications to minimize impact to natural night skies and light trespass and glare impact on offsite properties. During operations, the majority of the lights will only be used on an as-needed basis (e.g., if equipment inspection is needed at night). For security reasons, a few lights will typically be illuminated on dusk–to-dawn sensors and a few lights will likely be controlled by motion sensors. Outdoor lighting at the onshore substation sites will typically be equipped with light shields to prevent light from encroaching into adjacent areas. The Proponent will ensure that the lighting scheme complies with local requirements.
- Maintenance - The onshore substation components and site will be maintained to ensure a clean and orderly appearance.

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Appendix A

VIEWSHED MAPS

Seascape, Landscape, and Visual Impact Assessment

Figure A1
Viewshed Map
Visual Study Area

Zone of Theoretical Visibility (ZTV)
(Excludes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Theoretically Visible
- Booster Station (70m [230ft]) Theoretically Visible
- Foundation Top (35m [115ft]) and higher Theoretically Visible
- Mid-tower (124m [407ft]) and higher Theoretically Visible
- Nacelle Top (249m [817ft]) and higher Theoretically Visible

Zone of Likely Visibility (ZLV)
(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings
- Booster Station Location

0 km 5 km 10 km 15 km 20 km

0 mi 2 mi 4 mi 6 mi 8 mi 10 mi 12 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure A2
Viewshed Map
Martha's Vineyard

Zone of Theoretical Visibility (Land/Water Suface)
(Excludes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Theoretically Visible
- Booster Station (70m [230ft]) Theoretically Visible
- Mid-tower (124m [407ft]) and higher Theoretically Visible
- Nacelle Top (249m [817ft]) and higher Theoretically Visible

Zone of Likely Visibility (Land Surface)
(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 2 km 4 km 6 km 8 km

0 mi 1 mi 2 mi 3 mi 4 mi 5 mi 6 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure A3
Viewshed Map
Nantucket

Zone of Theoretical Visibility (Land/Water Suface)
(Excludes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Theoretically Visible
- Booster Station (70m [230ft]) Theoretically Visible
- Mid-tower (124m [407ft]) and higher Theoretically Visible
- Nacelle Top (249m [817ft]) and higher Theoretically Visible

Zone of Likely Visibility (Land Surface)
(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

45 miles
40 miles
35 miles
30 miles
15 miles
DUKES COUNTY
NANTUCKET COUNTY
Great Point
Sesachacha Pond
NANTUCKET ISLAND
Nantucket
POLPIS RD
NANTUCKET - HYANNIS FERRY
OAK BLUFFS - NANTUCKET FERRY
Top of Nacelle Horizon Fall-off (65.5 km [40.7 mi])
Booster Station Horizon Fall-off (37.1 km [23.1 mi])
Mid-Tower Horizon Fall-off (47.8 km [29.7 mi])
see Figure A7
see Figure A8

0 km 2 km 4 km 6 km 8 km
0 mi 1 mi 2 mi 3 mi 4 mi 5 mi 6 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure A4
Viewshed Map
Martha's Vineyard (West)



Zone of Likely Visibility
(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure A5

Viewshed Map

Martha's Vineyard (Center)

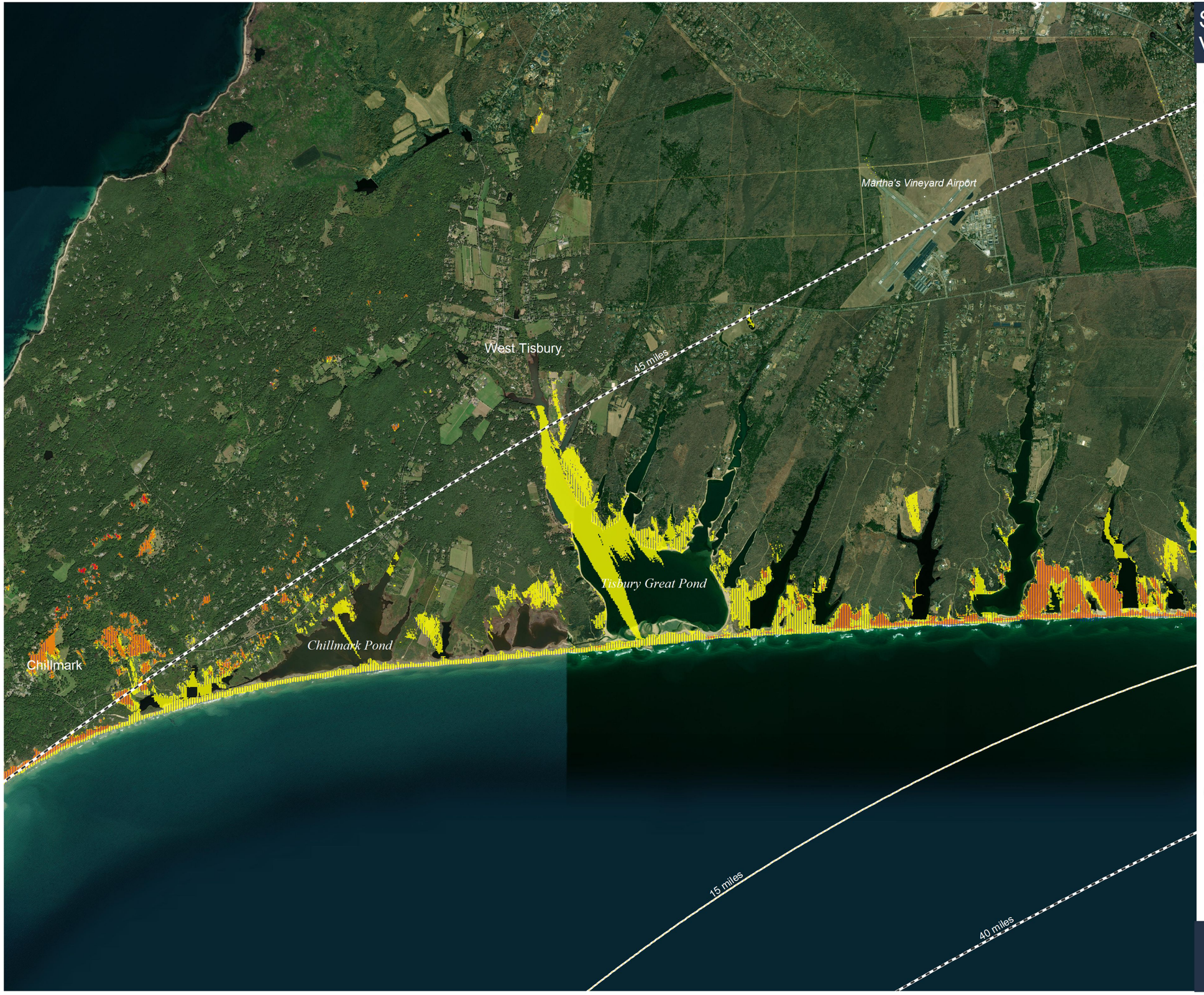
Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings



0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

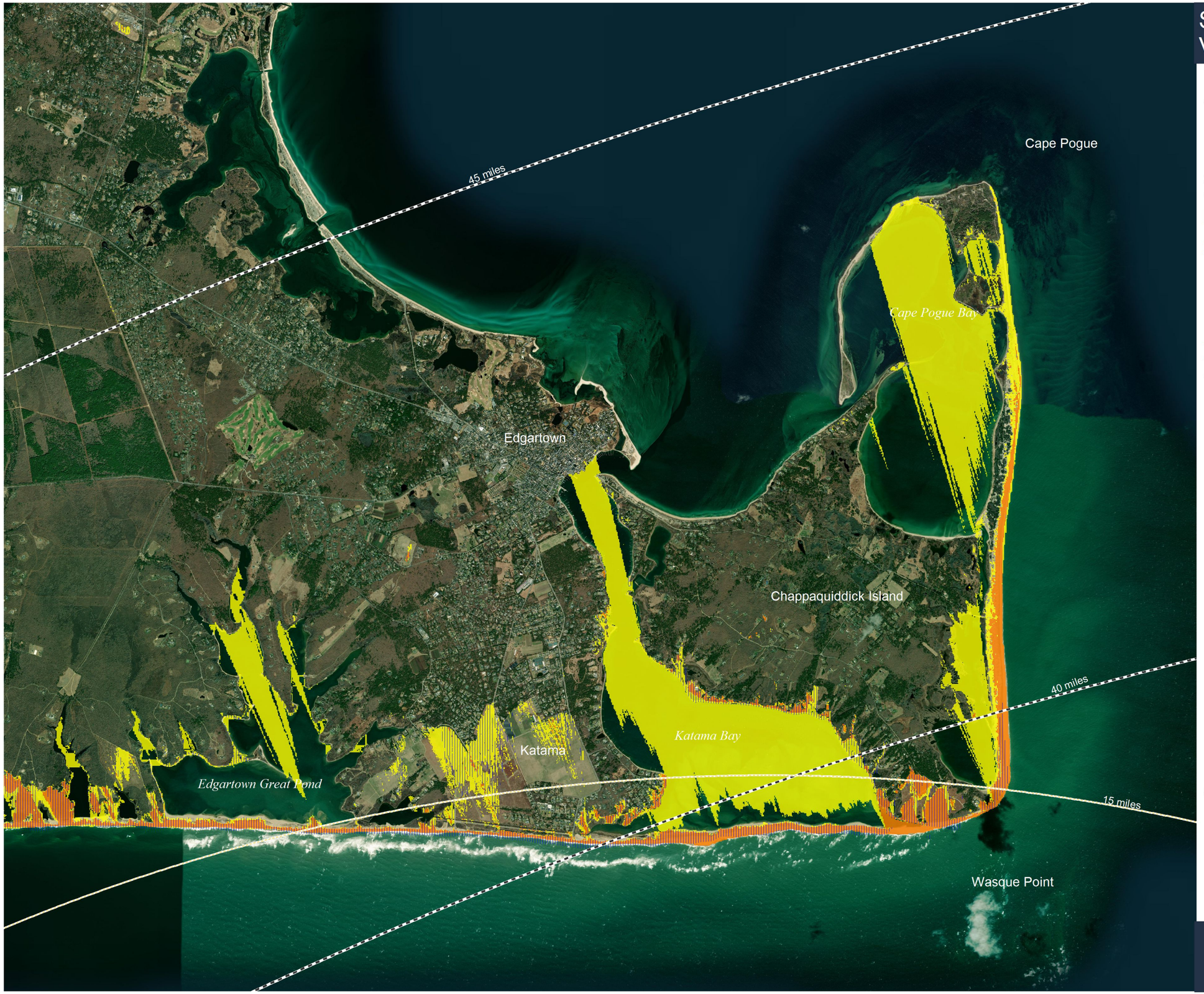
Figure A6
Viewshed Map
Martha's Vineyard (East)

Zone of Likely Visibility
(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings



0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

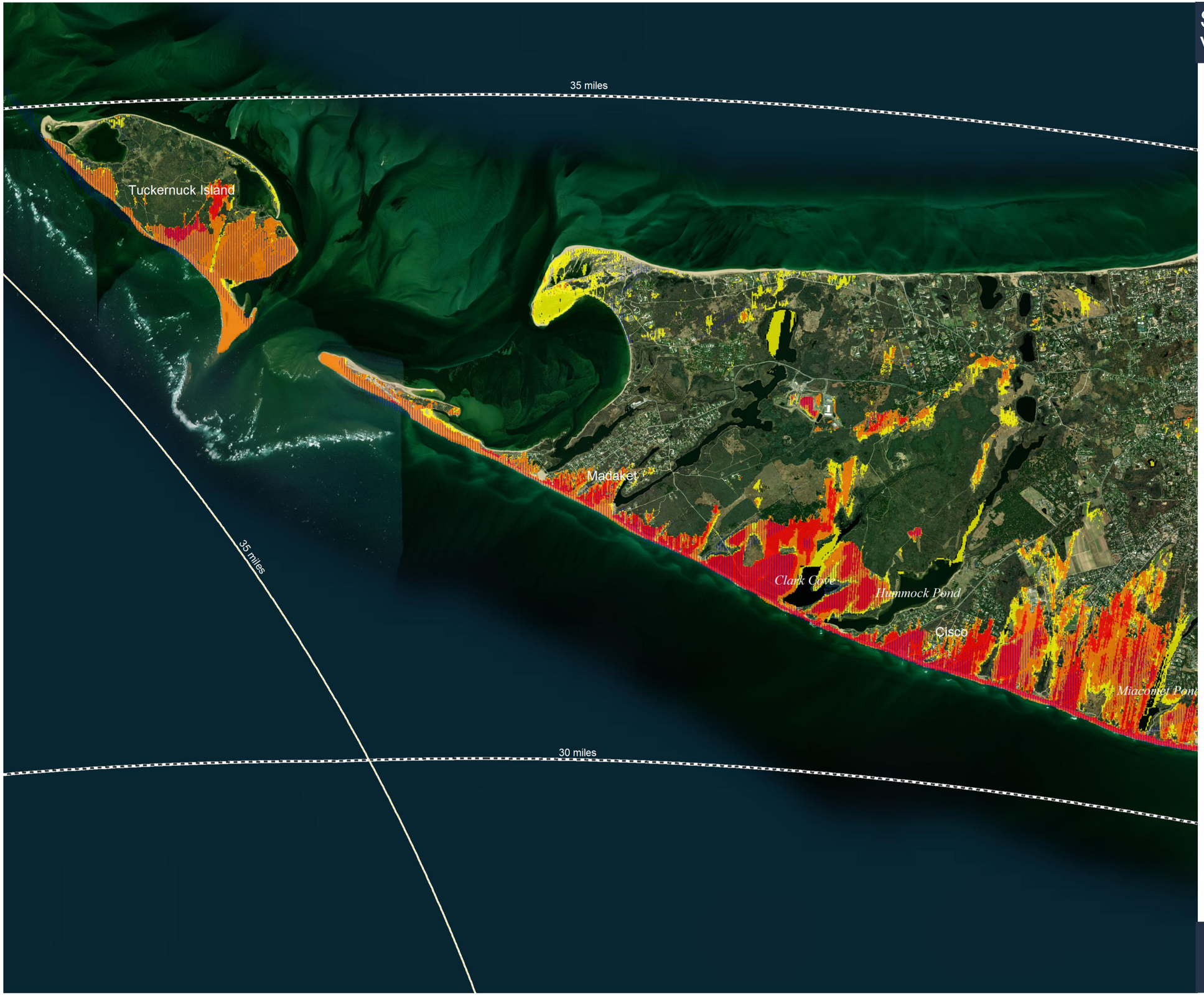


Figure A7

Viewshed Map

Nantucket (West)

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

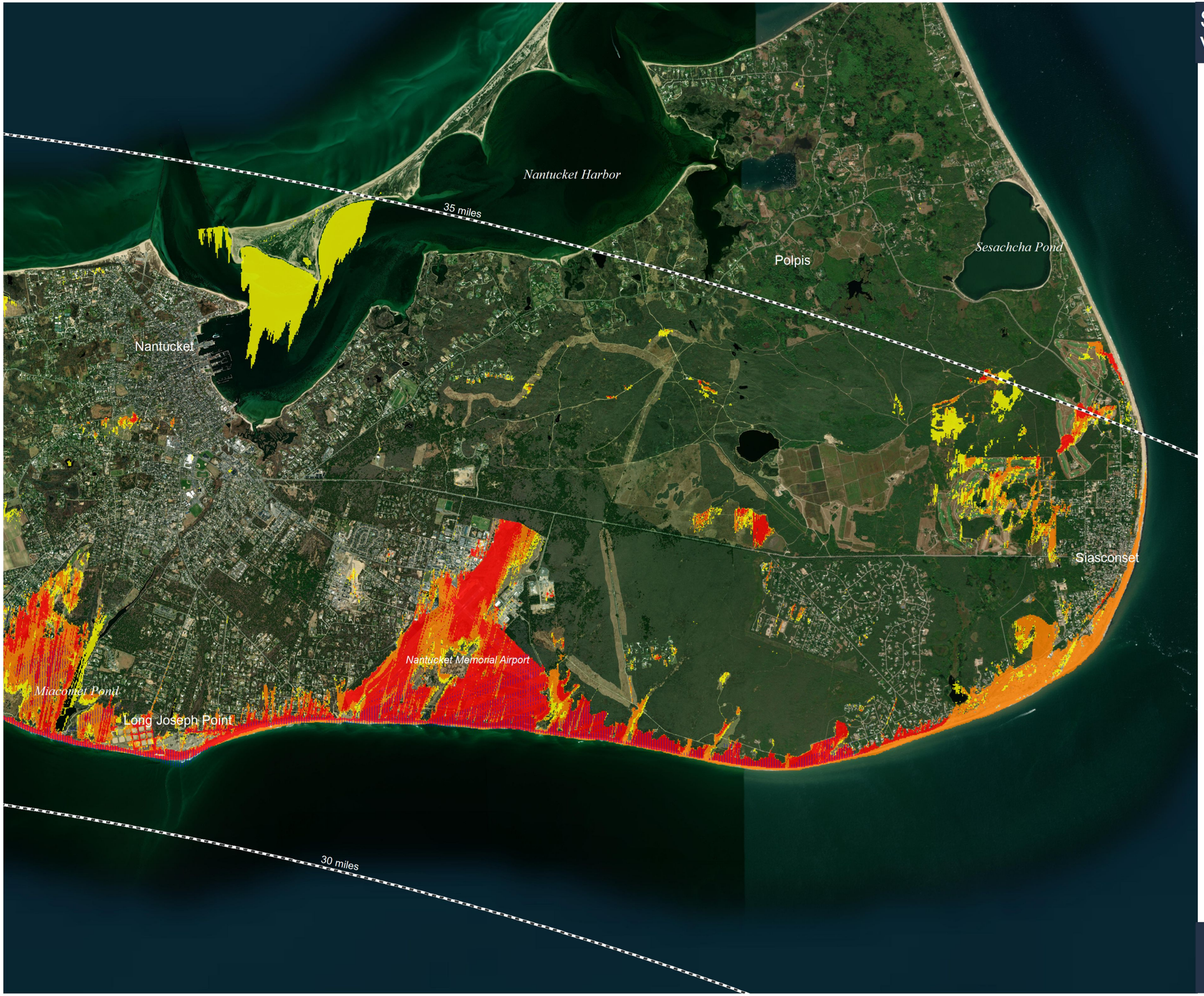
Figure A8
Viewshed Map
Nantucket (East)

Zone of Likely Visibility
(Includes screening by existing vegetation and structures)

- Blade Tip (400m [1,312ft]) Likely Visibile
- Booster Station (70m [230ft]) Likely Visibile
- Mid-tower (124m [407ft]) and higher Likely Visible
- Nacelle Top (249m [817ft]) and higher Likely Visible

Legend

- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings



0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Appendix B

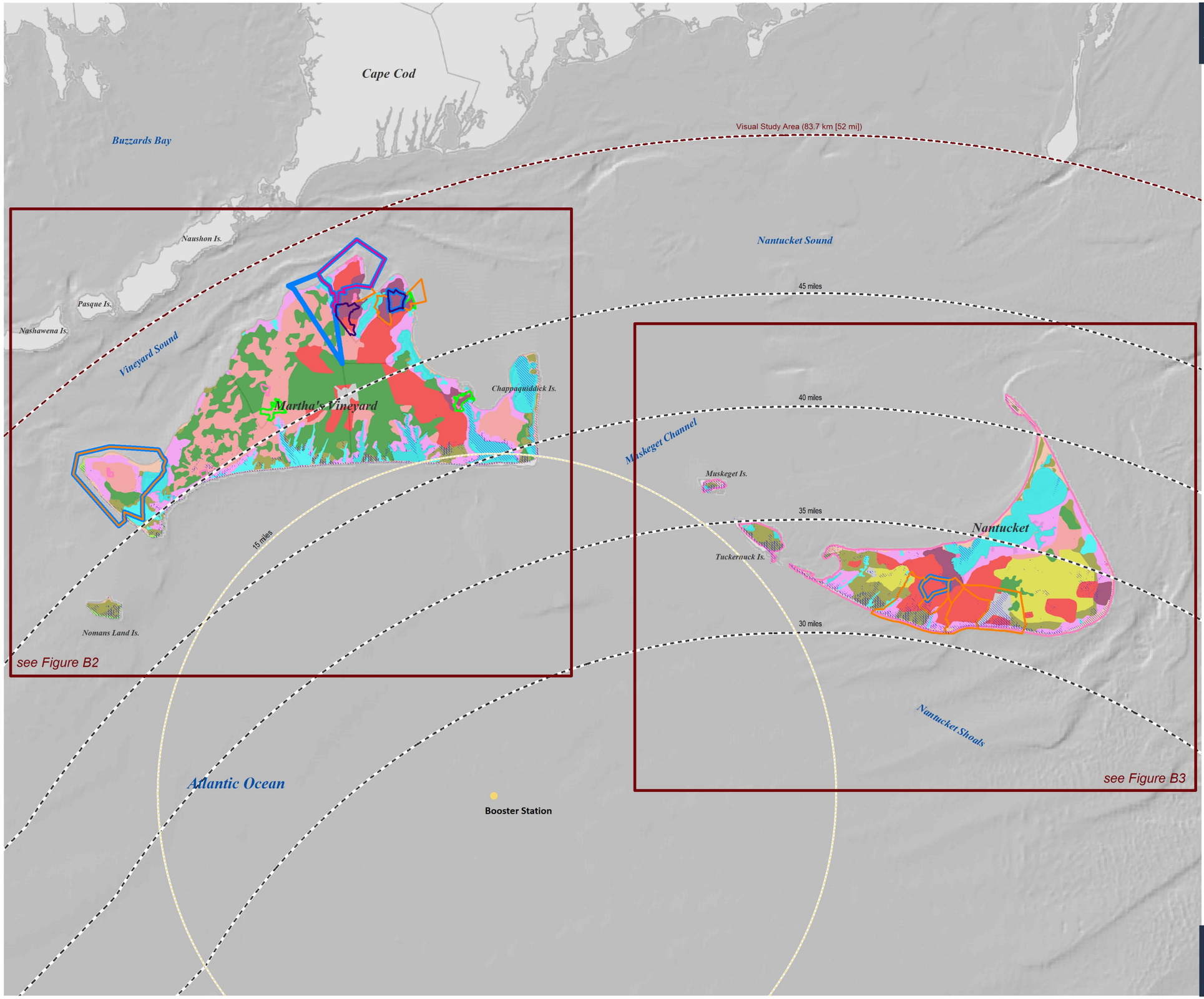
SEASCAPE/LANDSCAPE CHARACTER MAPS

Seascape, Landscape, and Visual Impact Assessment

Figure B1

Landscape Character Map

Visual Study Area



Landscape Character Areas

- EJ Area - Federal
- EJ Area - State (Income)
- EJ Area - State (Minority and Income)
- EJ Area - State (Minority)
- Historic District - Local
- Historic District - NRHP
- LCA - Forest
- LCA - Industrial Open Space
- LCA - Inland Sand Plain Grassland/Scrub
- LCA - Rural Residential
- LCA - Suburban Residential
- SCA - Coastal Bluffs
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings
- Booster Station Location

0 km 5 km 10 km 15 km 20 km

0 mi 2 mi 4 mi 6 mi 8 mi 10 mi 12 mi

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure B2
Landscape Character Map
Martha's Vineyard

Landscape Character Areas
- EJ Area - Federal
- EJ Area - State (Income)
- EJ Area - State (Minority and Income)
- EJ Area - State (Minority)
- Historic District - Local
- Historic District - NRHP
- LCA - Forest
- LCA - Industrial Open Space
- LCA - Rural Residential
- LCA - Suburban Residential
- SCA - Coastal Bluffs
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility
(Includes screening by existing vegetation and structures)
- Booster Station Visible
- WTGs Visible

Legend
- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 5 km 10 km

0 mi 2 mi 4 mi 6 mi

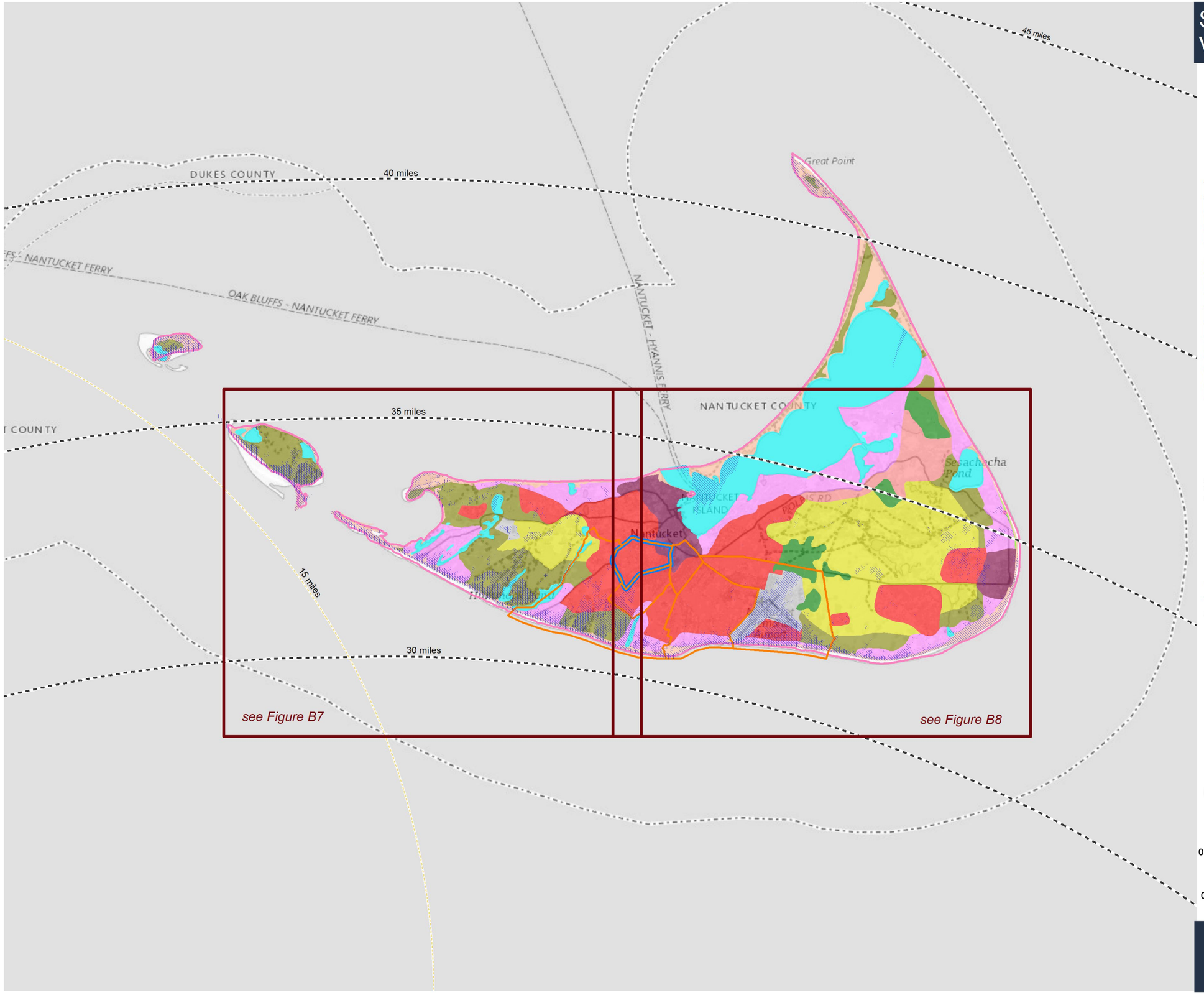
VINEYARD NORTHEAST
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure B3

Landscape Character Map

Nantucket



Landscape Character Areas

- EJ Area - Federal
- EJ Area - State (Minority)
- Historic District - NRHP
- LCA - Forest
- LCA - Industrial Open Space
- LCA - Inland Sand Plain Grassland/Scrub
- LCA - Rural Residential
- LCA - Suburban Residential
- SCA - Coastal Bluffs
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 5 km 10 km

0 mi 2 mi 4 mi 6 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment



Figure B4

Landscape Character Map

Martha's Vineyard (West)

Landscape Character Areas

- EJ Area - Federal
- EJ Area - State (Minority)
- Historic District - NRHP
- LCA - Forest
- LCA - Rural Residential
- SCA - Coastal Bluffs
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure B5

Landscape Character Map

Martha's Vineyard (Center)



Landscape Character Areas

- EJ Area - Federal
- Historic District - Local
- Historic District - NRHP
- LCA - Forest
- LCA - Industrial Open Space
- LCA - Rural Residential
- LCA - Suburban Residential
- SCA - Coastal Bluffs
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

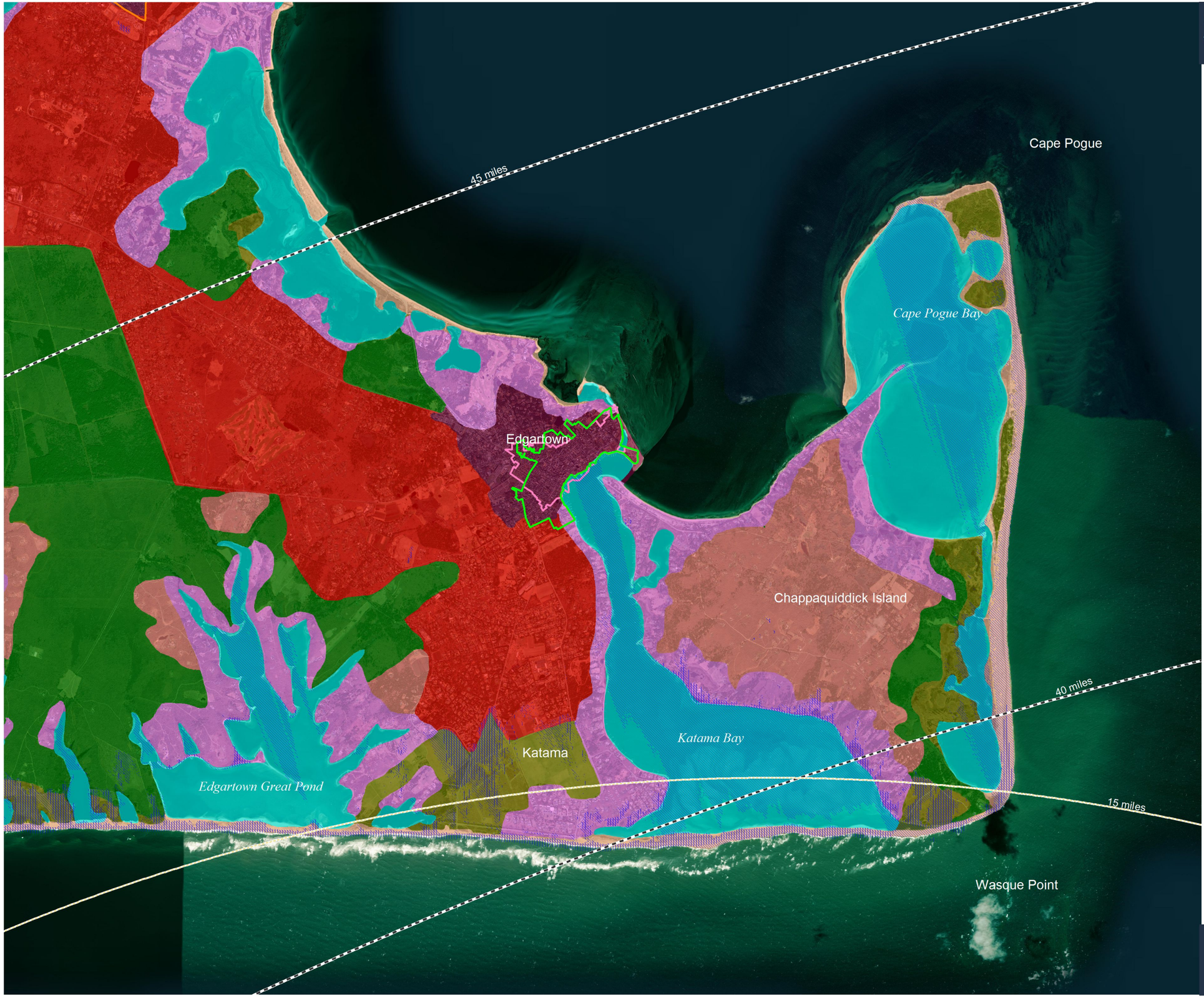
VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

Figure B6

Landscape Character Map

Martha's Vineyard (East)



Landscape Character Areas

- EJ Area - State (Minority)
- Historic District - Local
- Historic District - NRHP
- LCA - Forest
- LCA - Rural Residential
- LCA - Suburban Residential
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

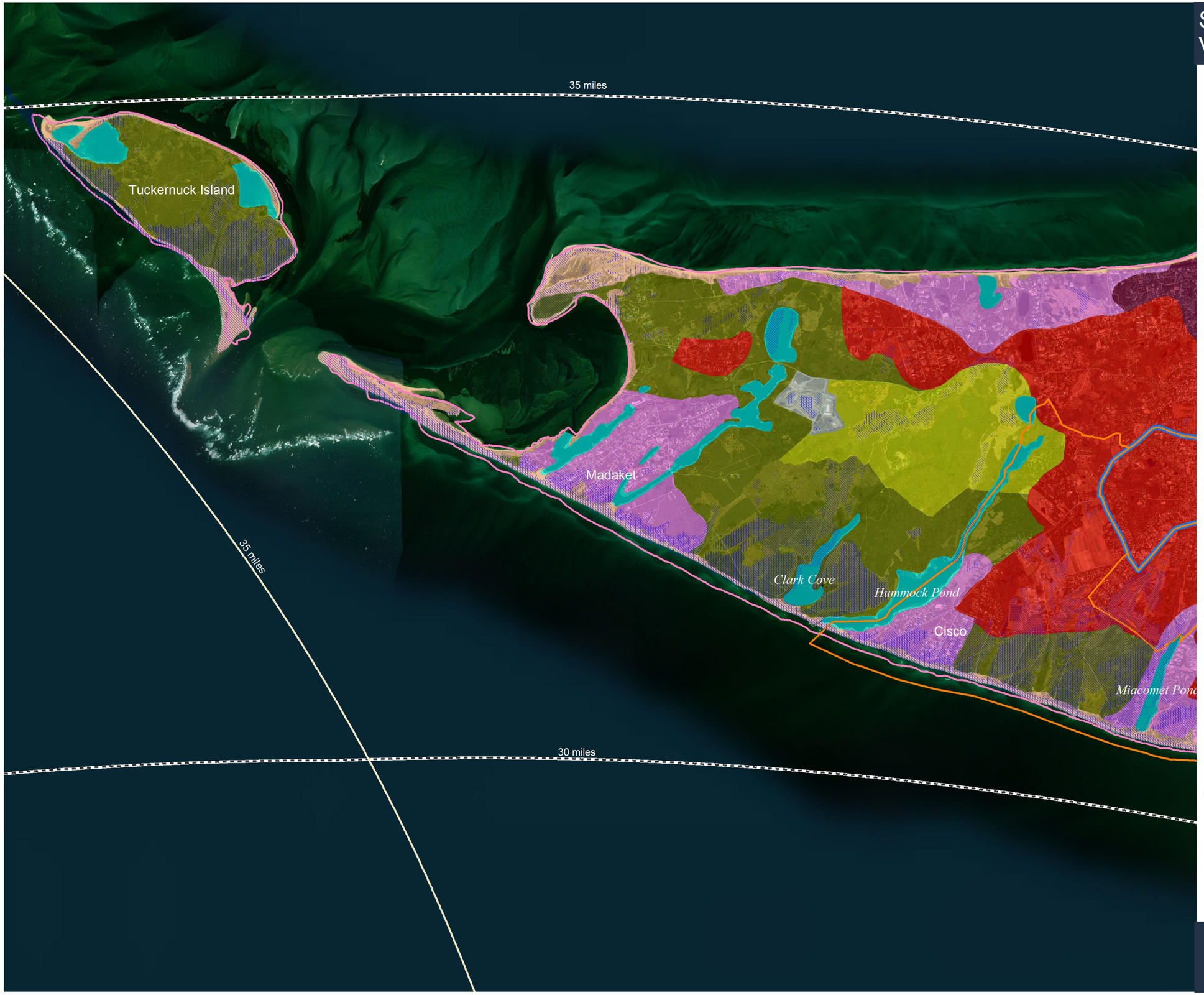


Figure B7

Landscape Character Map

Nantucket (West)

Landscape Character Areas

- EJ Area - Federal
- EJ Area - State (Minority)
- Historic District - NRHP
- LCA - Industrial Open Space
- LCA - Inland Sand Plain Grassland/Scrub
- LCA - Suburban Residential
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Booster Station Distance Ring
- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Seascape, Landscape, and Visual Impact Assessment

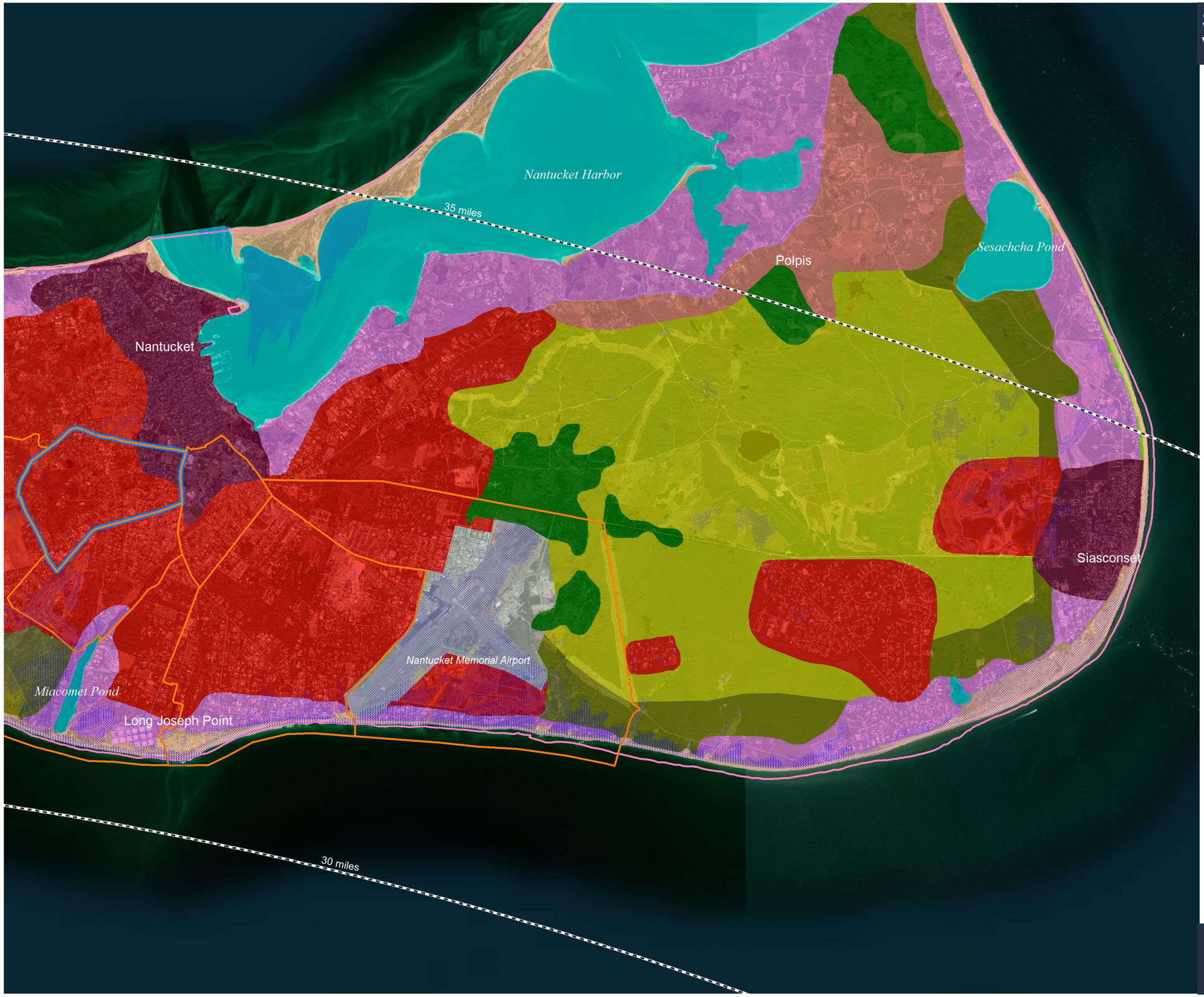


Figure B8

Landscape Character Map

Nantucket (East)

Landscape Character Areas

- EJ Area - Federal
- EJ Area - State (Minority)
- Historic District - NRHP
- LCA - Forest
- LCA - Industrial Open Space
- LCA - Inland Sand Plain Grassland/Scrub
- LCA - Rural Residential
- LCA - Suburban Residential
- SCA - Coastal Bluffs
- SCA - Coastal Village/Town Center
- SCA - Ocean Beach/Coastal Dunes
- SCA - Salt Ponds/Tidal Marsh
- SCA - Sand Plain Grassland/Coastal Scrub
- SCA - Shoreline Residential

Zone of Likely Visibility

(Includes screening by existing vegetation and structures)

- Booster Station Visible
- WTGs Visible

Legend

- Visual Study Area (VSA) Distance Ring
- WTG/ESP Position Distance Rings

0 km 1 km 2 km 3 km

0 mi 0.5 mi 1 mi 1.5 mi 2 mi

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Appendix C

KEY OBSERVATION POINT (KOP) PHOTO LOG

Existing Condition (124° x 27°± panorama view)

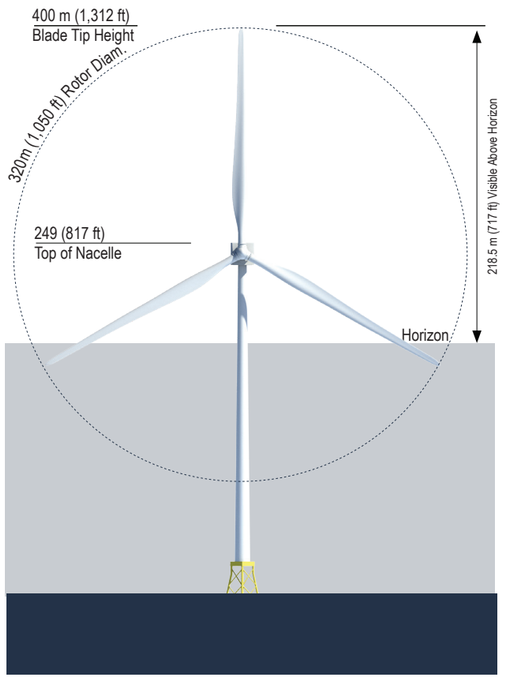


Photo Data

Date/Time:	06-May-2022 / 10:40	Temperature:	58°F
Light Conditions:	Side Light	Humidity:	67%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Mostly Cloudy

Photo Location Map

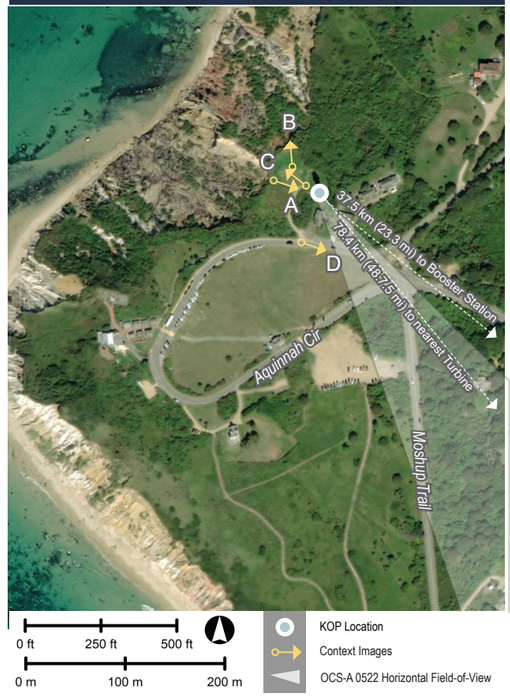
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Coastal Bluffs
Resource Type:	Historic Site
Use Type:	Scenic/Cultural Tourism
Viewer Types:	Scenery-oriented Visitors

KOP Location

Latitude:	41° 20' 54.0593" N
Longitude:	41° 20' 54.0593" N
Elevation (+/-):	49.1 m (161 ft)
Nearest WTG:	78.4 km (48.7 mi)
Farthest WTG:	104.6 km (65.0 mi)
A 0522 Horiz. Field-of-View	26.3°
Booster Station Distance:	37.5 km (23.3 mi)

View Compass

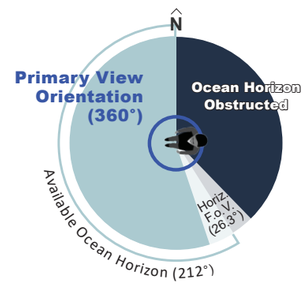


Figure C1

M09: Gay Head Lighthouse
Town of Aquinnah, Martha's Vineyard, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

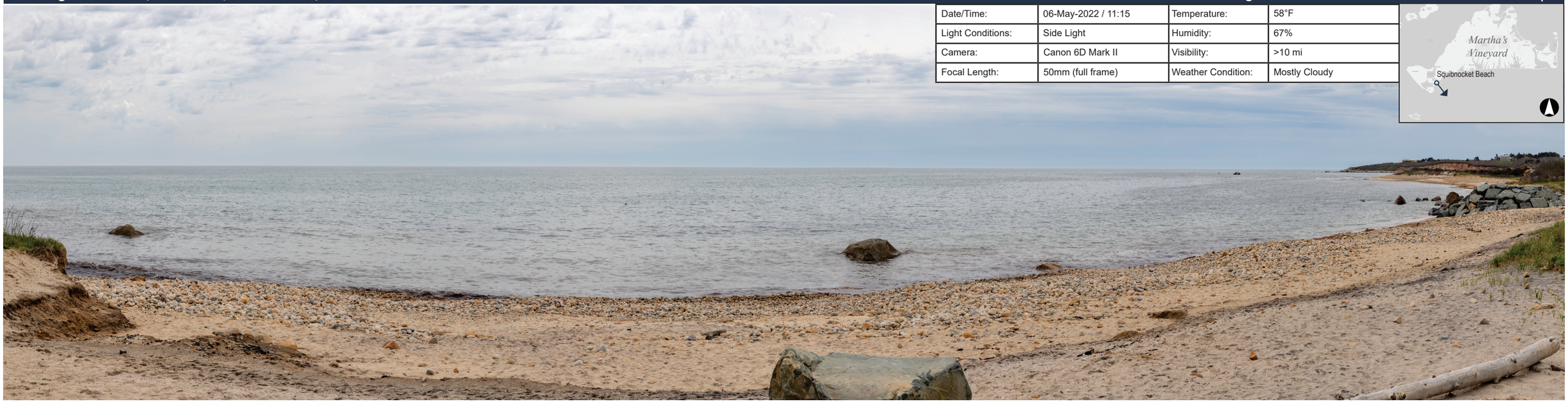


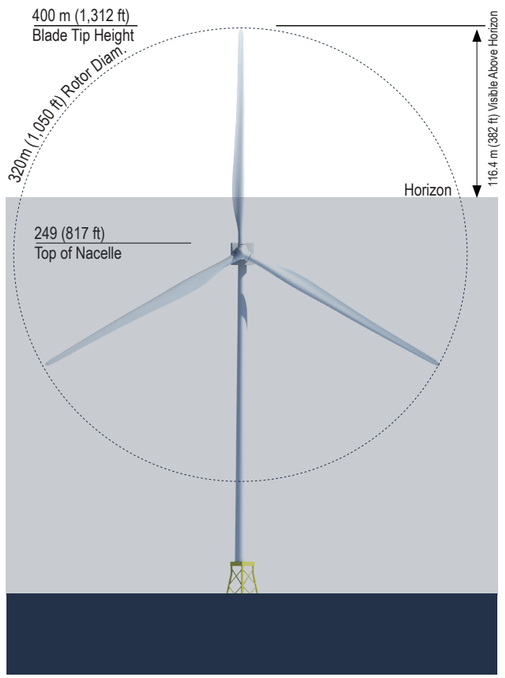
Photo Data

Date/Time:	06-May-2022 / 11:15	Temperature:	58°F
Light Conditions:	Side Light	Humidity:	67%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Mostly Cloudy

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes, Shoreline Res
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 19' 09.2234" N
Longitude:	70° 45' 52.5970" W
Elevation (+/-):	4.3 m (14 ft)
Nearest WTG:	72.3 km (44.9 mi)
Farthest WTG:	98.5 km (61.2 mi)
A 0522 Horiz. Field-of-View	28.2°
Booster Station Distance:	30.9 km (19.2 mi)

View Compass

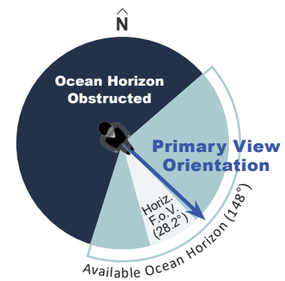


Figure C2

M08: Squibnocket Beach
Town of Chillmark, Martha's Vineyard, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



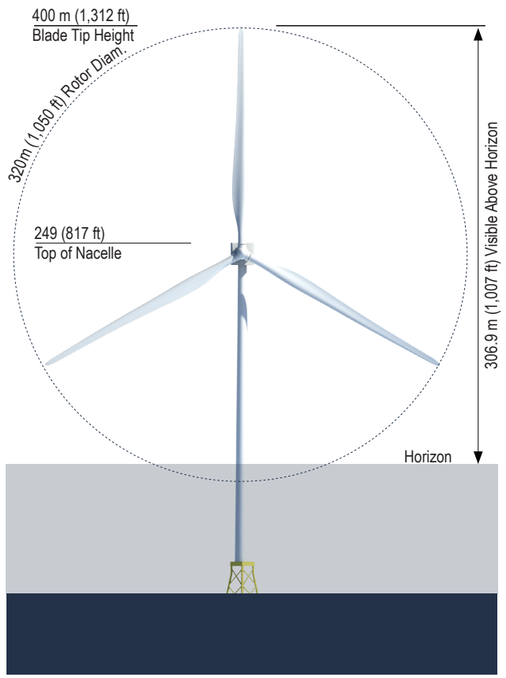
Photo Data

Date/Time:	06-May-2022 / 11:50	Temperature:	60°F
Light Conditions:	Side Light	Humidity:	51%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Partly Cloudy

Meteorological Data

Photo Location Map

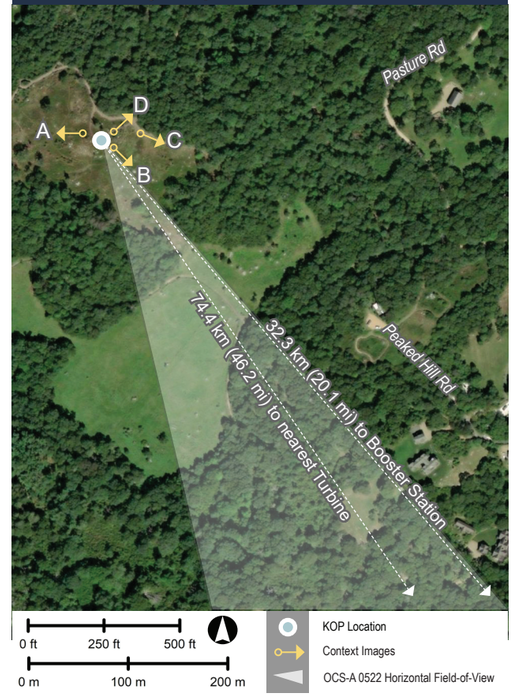
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Forest
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 21' 24.9239" N
Longitude:	70° 44' 18.8880" W
Elevation (+/-):	95.7 m (314 ft)
Nearest WTG:	74.4 km (46.2 mi)
Farthest WTG:	100.4 km (62.4 mi)
A 0522 Horiz. Field-of-View	27.4°
Booster Station Distance:	32.3 km (20.1 mi)

View Compass

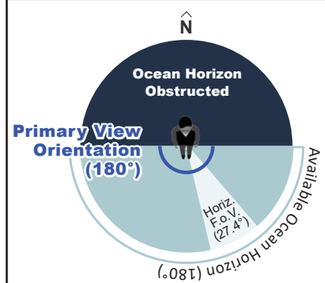


Figure C3

M07: Peaked Hill

Town of Chillmark, Martha's Vineyard, MA

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



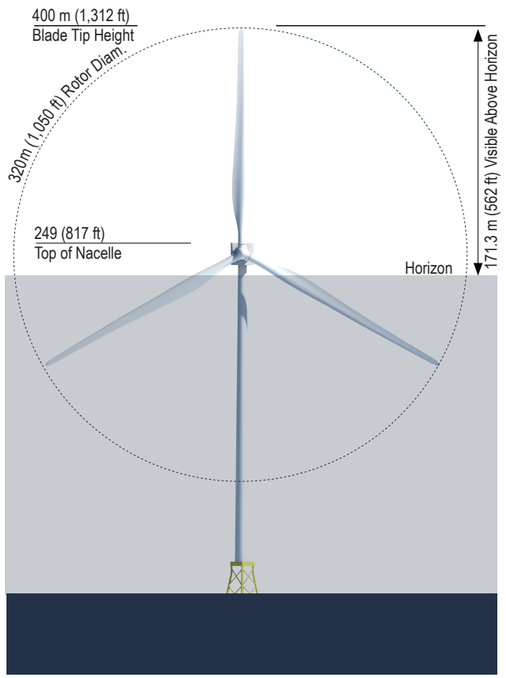
Photo Data

Date/Time:	06-May-2022 / 09:40	Temperature:	62°F
Light Conditions:	Side Light	Humidity:	44%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Mostly Cloudy

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Shoreline Residential
Resource Type:	Scenic Overlook
Use Type:	Scenic/Cultural Tourism
Viewer Types:	Scenery-oriented Visitors

KOP Location

Latitude:	41° 20' 30.2027" N
Longitude:	70° 43' 47.7156" W
Elevation (+/-):	14.3 m (47 ft)
Nearest WTG:	72.4 km (45.0 mi)
Farthest WTG:	98.7 km (61.3 mi)
A 0522 Horiz. Field-of-View	28.0°
Booster Station Distance:	30.7 km (19.1 mi)

View Compass

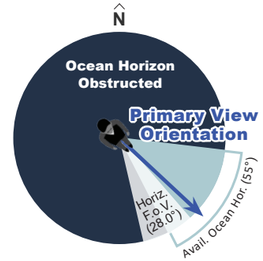


Figure C4

M06: Allen Farm Scenic Overlook
Town of Chillmark, Martha's Vineyard, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



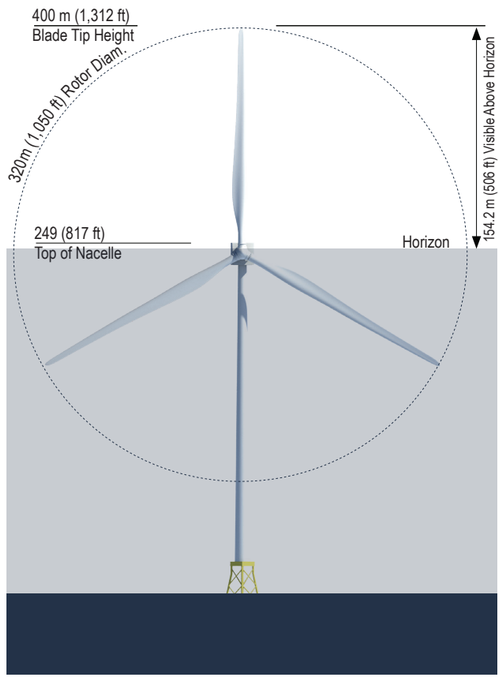
Photo Data

Date/Time:	11-Apr-2022 / 10:27	Temperature:	52°F
Light Conditions:	Side Light	Humidity:	45%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

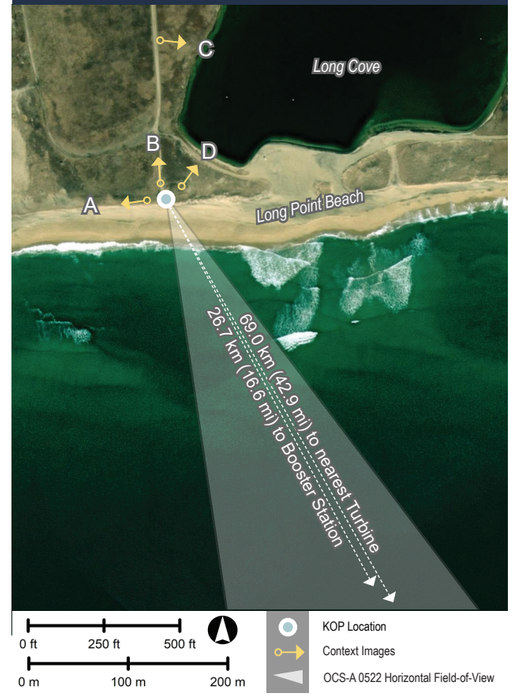
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 20' 54.5751" N
Longitude:	70° 38' 19.5936" W
Elevation (+/-):	5.5 m (18 ft)
Nearest WTG:	69.0 km (42.9 mi)
Farthest WTG:	95.0 km (59.0 mi)
A 0522 Horiz. Field-of-View	28.8°
Booster Station Distance:	26.7 km (16.6 mi)

View Compass

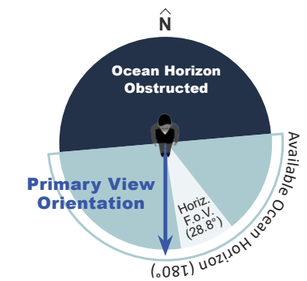


Figure C5

M05: Long Point Beach
Town of West Tisbury, Martha's Vineyard, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

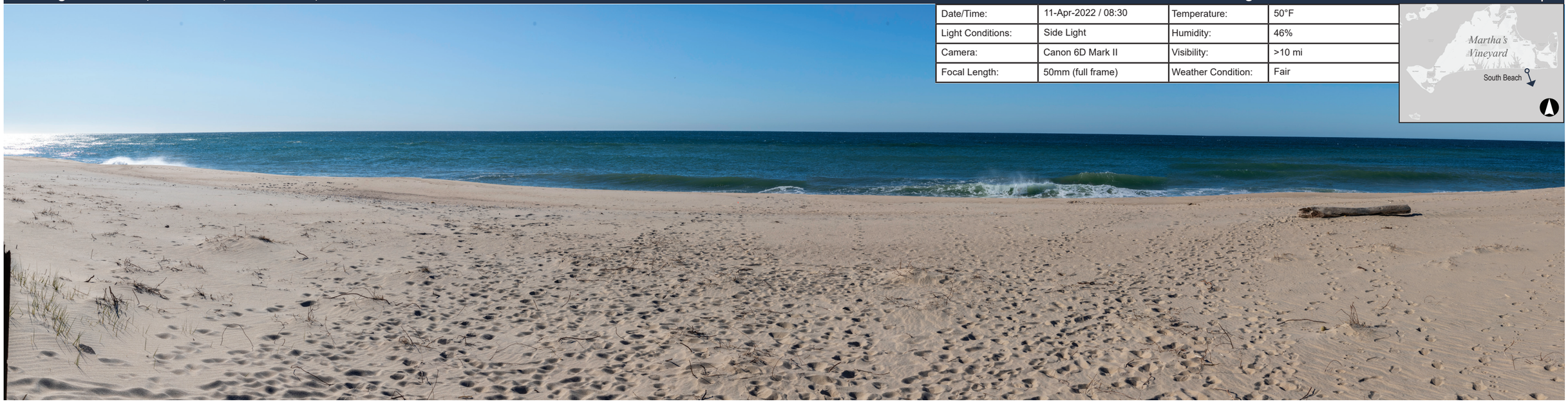
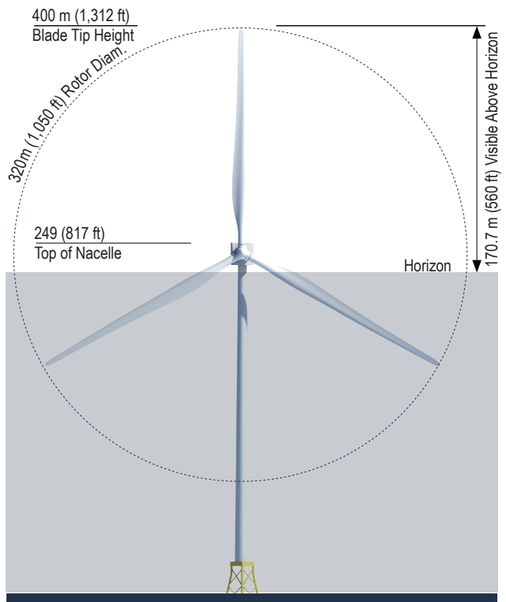


Photo Data

Date/Time:	11-Apr-2022 / 08:30	Temperature:	50°F
Light Conditions:	Side Light	Humidity:	46%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

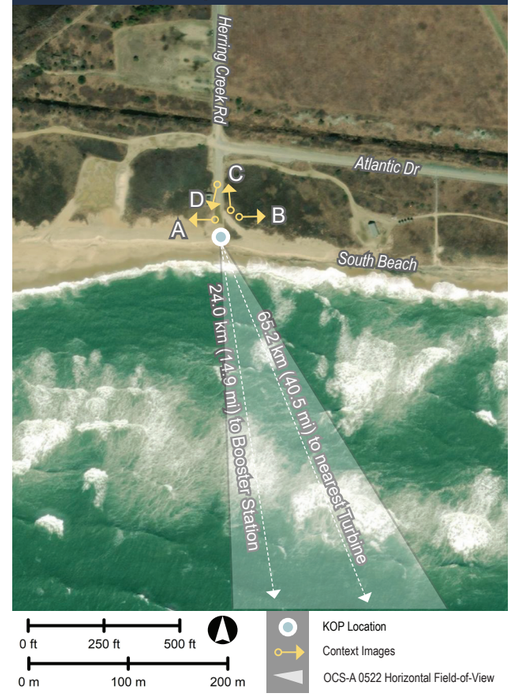
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 21' 00.1945" N
Longitude:	70° 31' 43.6800" W
Elevation (+/-):	3.7 m (12 ft)
Nearest WTG:	65.2 km (40.5 mi)
Farthest WTG:	90.4 km (56.2 mi)
A 0522 Horiz. Field-of-View	29.6°
Booster Station Distance:	24.0 km (14.9 mi)

View Compass

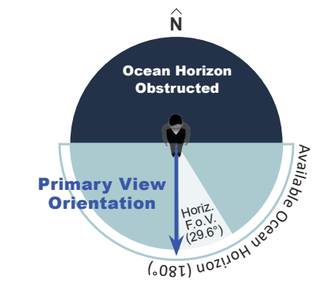


Figure C6

M04: South Beach
Town of Edgartown, Martha's Vineyard, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



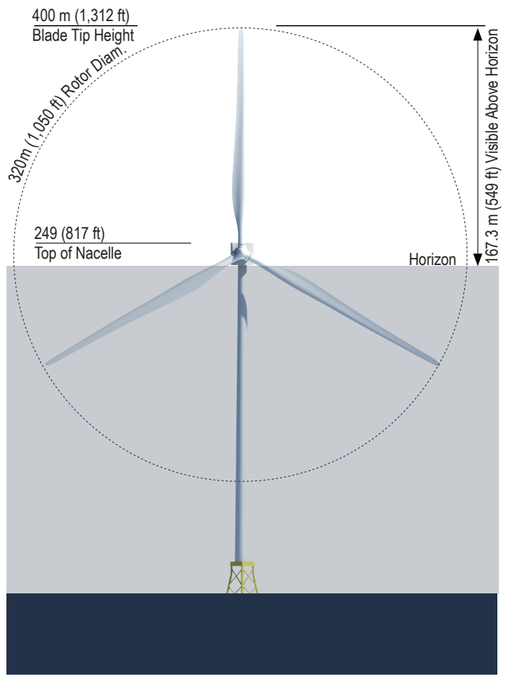
Photo Data

Date/Time:	10-Apr-2022 / 17:10	Temperature:	49°F
Light Conditions:	Side Light	Humidity:	44%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Salt Pond/Tidal Marsh
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 21' 47.2586" N
Longitude:	70° 28' 40.1943" W
Elevation (+/-):	3.0 m (10 ft)
Nearest WTG:	65.2 km (40.5 mi)
Farthest WTG:	90.0 km (55.9 mi)
A 0522 Horiz. Field-of-View	29.3°
Booster Station Distance:	25.1 km (15.6 mi)

View Compass

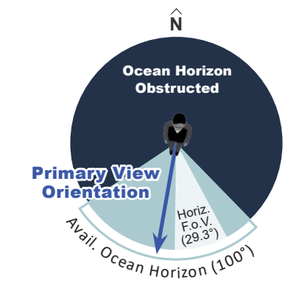


Figure C7

M03: Quammux Trail/Katama Bay
Town of Edgartown, Chappaquiddick Island, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



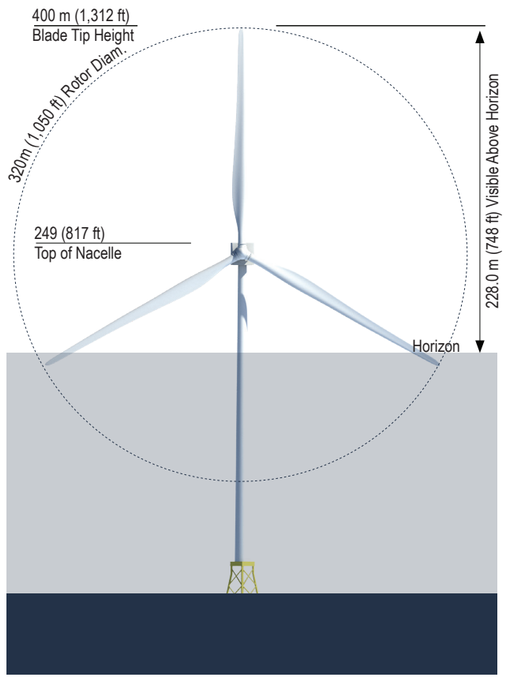
Photo Data

Date/Time:	10-Apr-2022 / 16:20	Temperature:	49°F
Light Conditions:	Side Light	Humidity:	44%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Sand Plain Grassland/Coastal Scrub
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 21' 20.4443" N
Longitude:	70° 27' 39.9108" W
Elevation (+/-):	12.8 m (42 ft)
Nearest WTG:	63.9 km (39.7 mi)
Farthest WTG:	88.7 km (55.1 mi)
A 0522 Horiz. Field-of-View	29.6°
Booster Station Distance:	24.5 km (15.2 mi)

View Compass

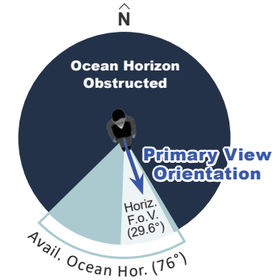


Figure C8

M02: Wasque Reservation
Town of Edgartown, Chappaquiddick Island, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



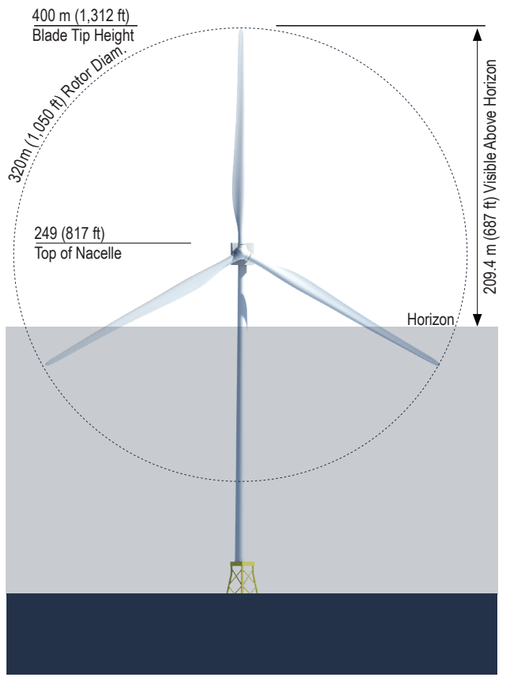
Photo Data

Date/Time:	10-Apr-2022 / 15:50	Temperature:	51°F
Light Conditions:	Side Light	Humidity:	43%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 21' 05.1124" N
Longitude:	70° 27' 17.7010" W
Elevation (+/-):	7.3 m (24 ft)
Nearest WTG:	63.2 km (39.3 mi)
Farthest WTG:	88.0 km (54.7 mi)
A 0522 Horiz. Field-of-View	29.3°
Booster Station Distance:	24.0 km (14.9 mi)

View Compass

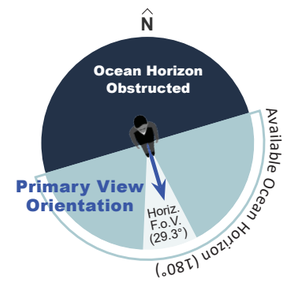


Figure C9

M01: Wasque Beach
Town of Edgartown, Chappaquiddick Island, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

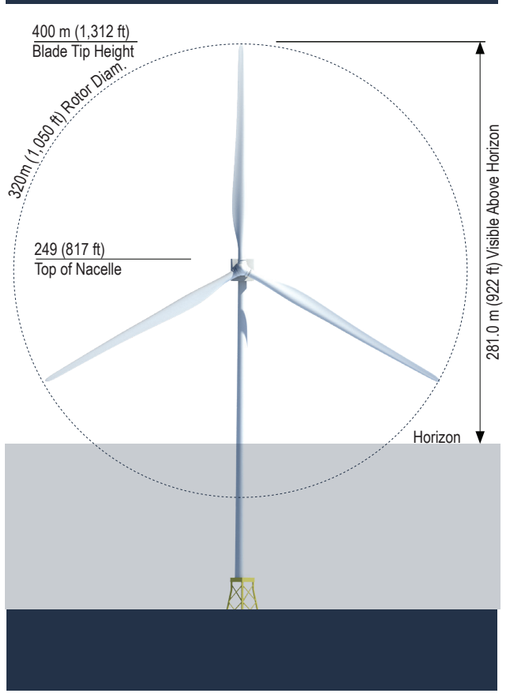


Photo Data

Date/Time:	05-May-2022 / 11:36	Temperature:	60°F
Light Conditions:	Side Light	Humidity:	62%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes, Shoreline Res
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 16' 13.2132" N
Longitude:	70° 12' 05.5008" W
Elevation (+/-):	6.4 m (21 ft)
Nearest WTG:	51.5 km (32.0 mi)
Farthest WTG:	79.8 km (49.6 mi)
A 0522 Horiz. Field-of-View	31.4°
Booster Station Distance:	28.2 km (17.5 mi)

View Compass

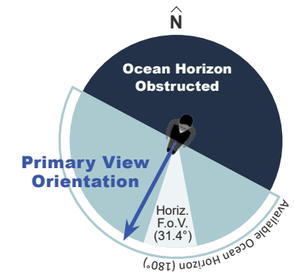


Figure C10

N25: Madaket Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



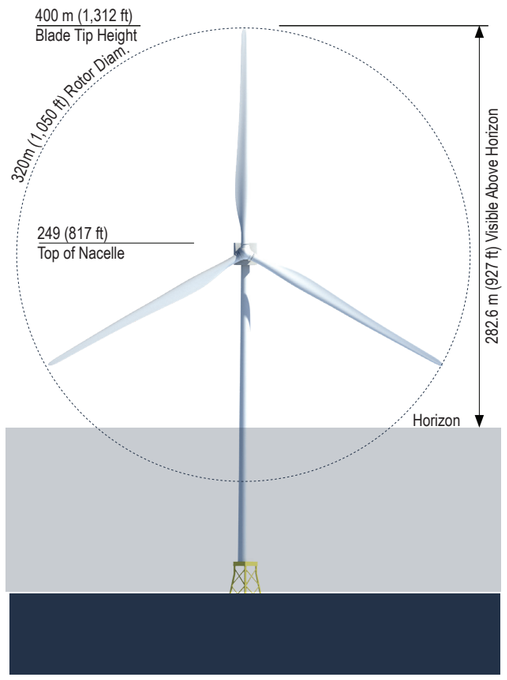
Photo Data

Date/Time:	12-Apr-2022 / 14:30	Temperature:	No Data
Light Conditions:	Side Light	Humidity:	No Data
Camera:	Canon 6D Mark II	Visibility:	No Data
Focal Length:	50mm (full frame)	Weather Condition:	No Data

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Shoreline Residential
Resource Type:	Residential
Use Type:	Vacation Residential
Viewer Types:	Seasonal Residents/Vacationers

KOP Location

Latitude:	41° 16' 16.1942" N
Longitude:	70° 12' 04.3092" W
Elevation (+/-):	7.0 m (23 ft)
Nearest WTG:	51.7 km (32.1 mi)
Farthest WTG:	79.8 km (49.6 mi)
A 0522 Horiz. Field-of-View	31.3°
Booster Station Distance:	28.2 km (17.5 mi)

View Compass

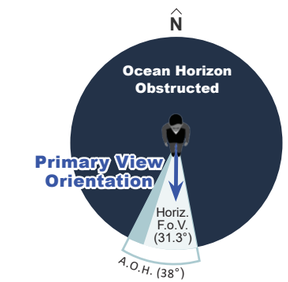


Figure C11

N24: Madaket Residential Area
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

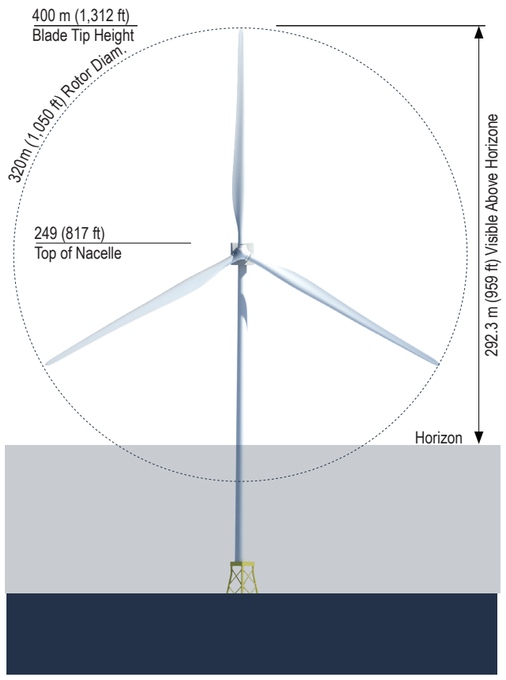


Photo Data

Date/Time:	05-May-2022 / 12:00	Temperature:	60°F
Light Conditions:	Side Light	Humidity:	62%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

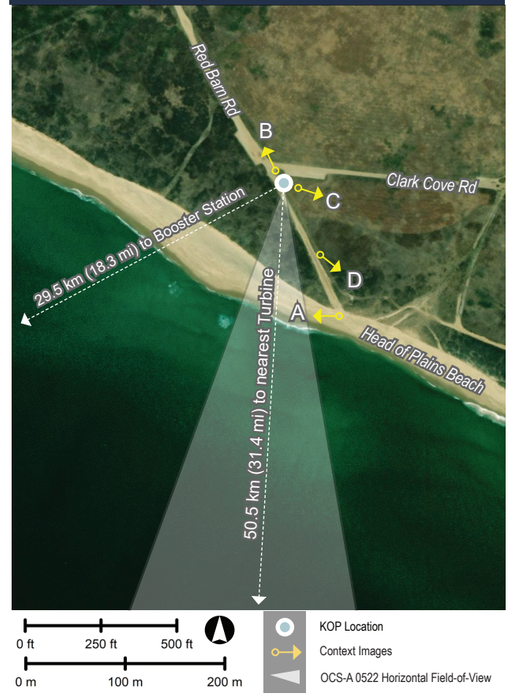
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Sand Plain Grassland/Coastal Scrub
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 38.4546" N
Longitude:	70° 10' 29.0476" W
Elevation (+/-):	7.9 m (26 ft)
Nearest WTG:	50.5 km (31.4 mi)
Farthest WTG:	79.5 km (49.4 mi)
A 0522 Horiz. Field-of-View	31.3°
Booster Station Distance:	29.5 km (18.3 mi)

View Compass

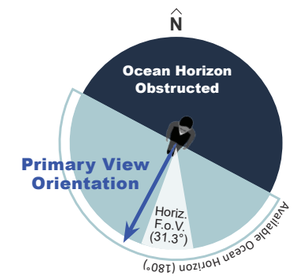


Figure C12

N23: Head of Plains Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



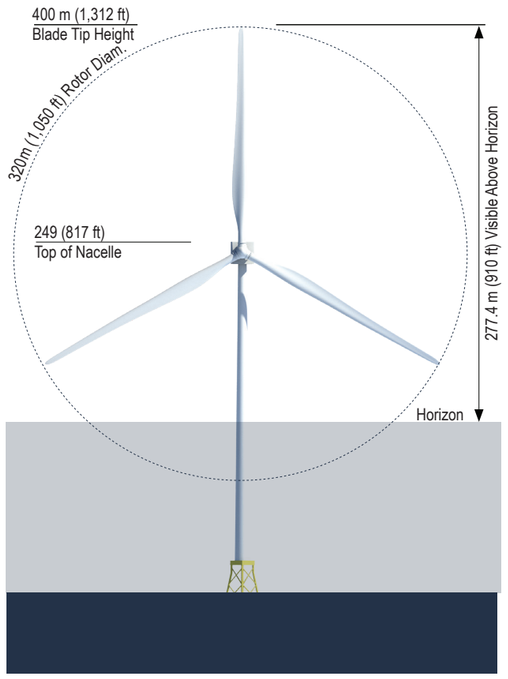
Photo Data

Date/Time:	05-May-2022 / 12:20	Temperature:	62°F
Light Conditions:	Side Light	Humidity:	56%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

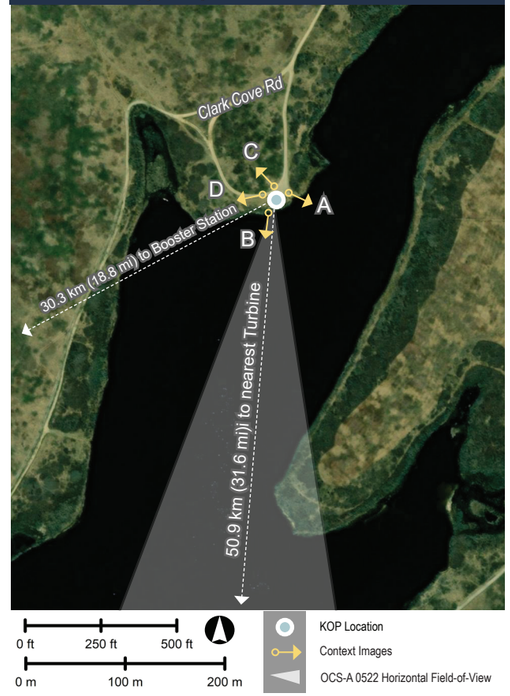
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



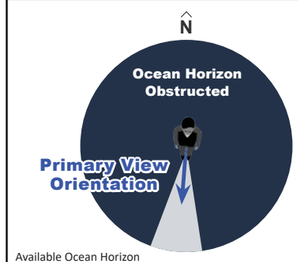
Visual Setting

SCA/LCA:	Salt Pond/Tidal Marsh
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 43.5612" N
Longitude:	70° 09' 56.3760" W
Elevation (+/-):	4.9 m (16 ft)
Nearest WTG:	50.9 km (31.6 mi)
Farthest WTG:	79.8 km (49.6 mi)
A 0522 Horiz. Field-of-View	31.0°
Booster Station Distance:	30.3 km (18.8 mi)

View Compass



Available Ocean Horizon is none or limited

Figure C13

N22: Clark Cove Pond
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

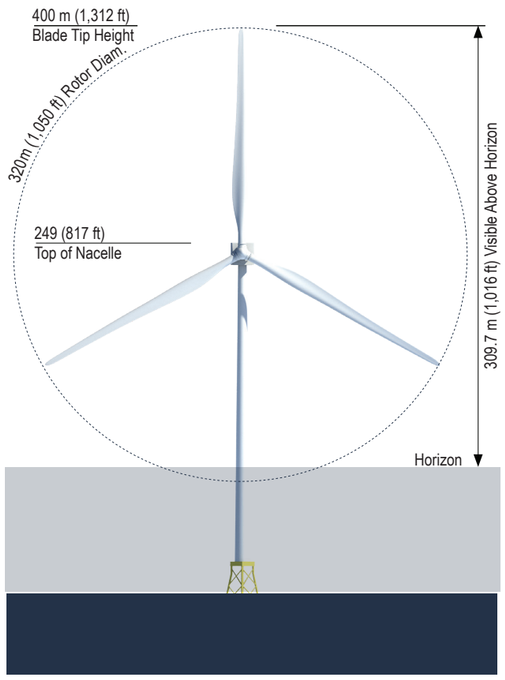


Photo Data

Date/Time:	05-May-2022 / 13:00	Temperature:	62°F
Light Conditions:	Side Light	Humidity:	56%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



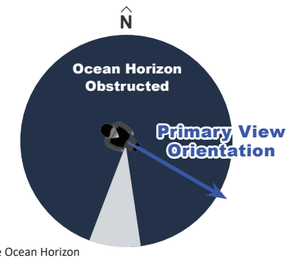
Visual Setting

SCA/LCA:	Sand Plain Grassland/Coastal Scrub
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 56.4416" N
Longitude:	70° 09' 00.1908" W
Elevation (+/-):	15.2 m (50 ft)
Nearest WTG:	51.3 km (31.9 mi)
Farthest WTG:	80.8 km (50.2 mi)
A 0522 Horiz. Field-of-View	30.4°
Booster Station Distance:	31.5 km (19.6 mi)

View Compass



Available Ocean Horizon is none or limited

Figure C14

N21: Sanford Farm/Ram Pasture - Barn Walk Overlook
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

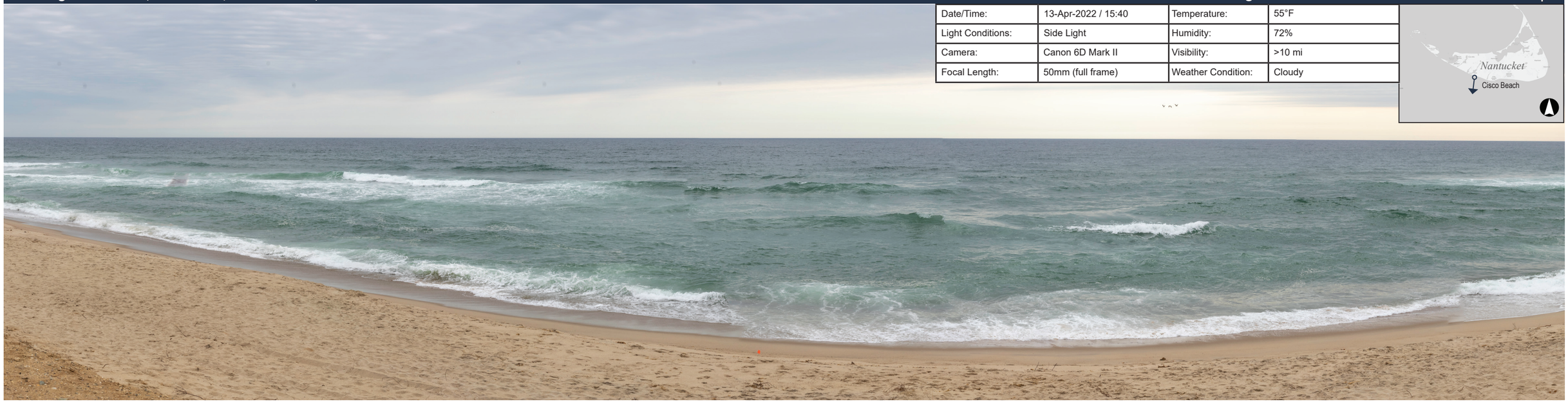


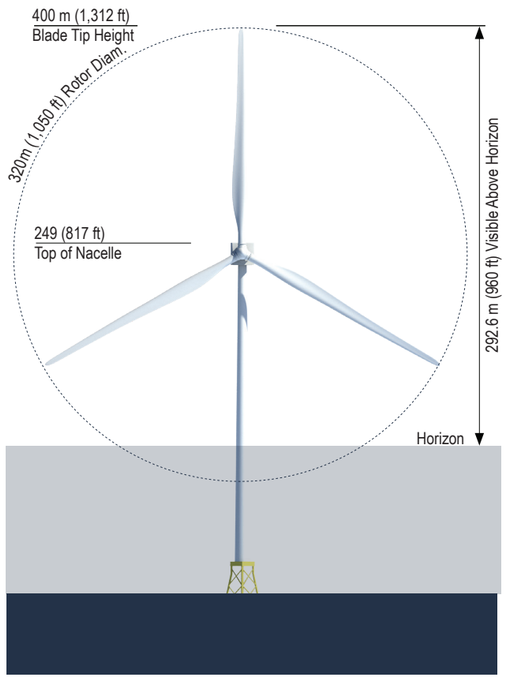
Photo Data

Date/Time:	13-Apr-2022 / 15:40	Temperature:	55°F
Light Conditions:	Side Light	Humidity:	72%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 07.8804" N
Longitude:	70° 09' 08.6796" W
Elevation (+/-):	7.0 m (23 ft)
Nearest WTG:	49.7 km (30.9 mi)
Farthest WTG:	79.3 km (49.3 mi)
A 0522 Horiz. Field-of-View	31.1°
Booster Station Distance:	30.7 km (19.1 mi)

View Compass

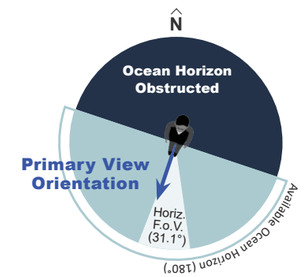


Figure C15

N20: Cisco Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



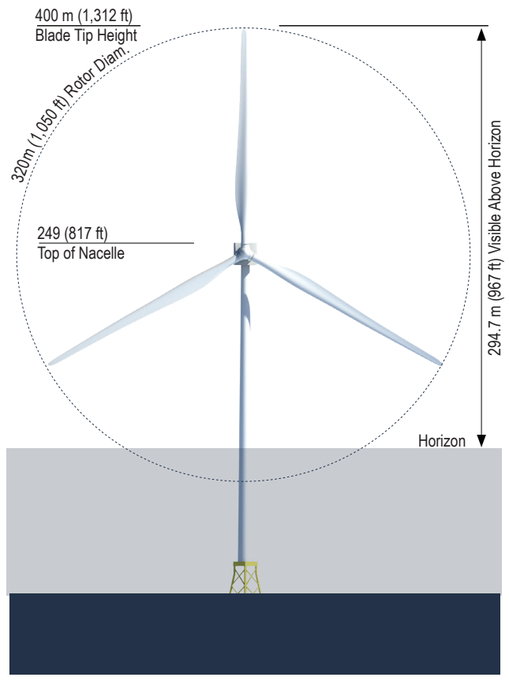
Photo Data

Date/Time:	13-Apr-2022 / 16:00	Temperature:	55°F
Light Conditions:	Side Light	Humidity:	72%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Shoreline Residential
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 16.7839" N
Longitude:	70° 09' 02.8152" W
Elevation (+/-):	7.9 m (26 ft)
Nearest WTG:	50.1 km (31.1 mi)
Farthest WTG:	79.5 km (49.4 mi)
A 0522 Horiz. Field-of-View	31.0°
Booster Station Distance:	31.1 km (19.3 mi)

View Compass

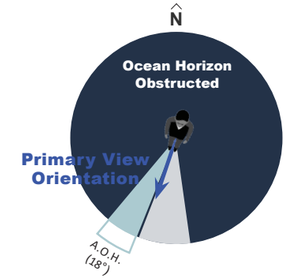


Figure C16

N19: Cisco Bike Path

Town of Nantucket, MA

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

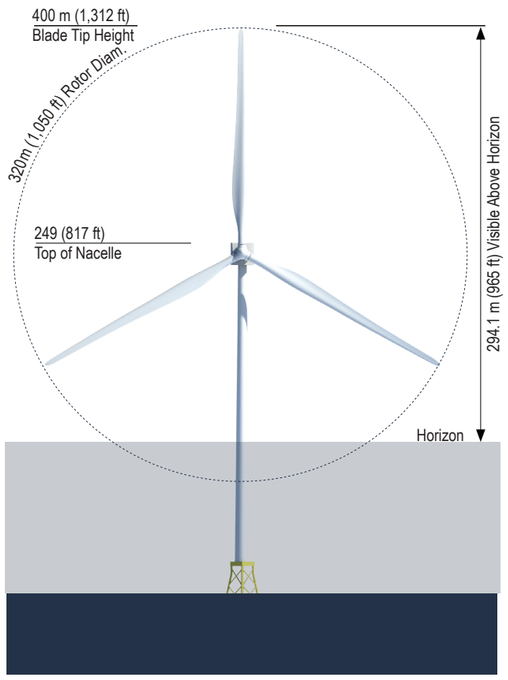


Photo Data

Date/Time:	13-Apr-2022 / 15:20	Temperature:	55°F
Light Conditions:	Side Light	Humidity:	72%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Photo Location Map

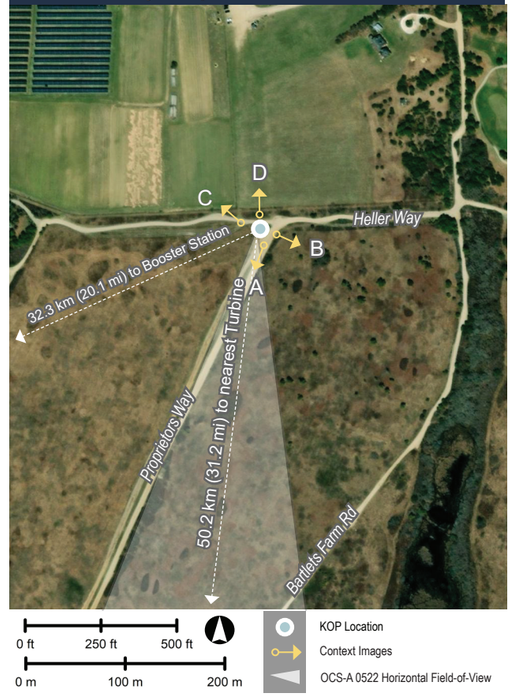
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



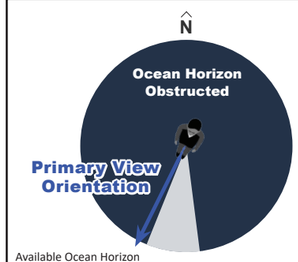
Visual Setting

SCA/LCA:	Sand Plain Grassland/Coastal Scrub
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 16.1088" N
Longitude:	70° 08' 00.7188" W
Elevation (+/-):	7.9 m (26 ft)
Nearest WTG:	50.2 km (31.2 mi)
Farthest WTG:	80.1 km (49.8 mi)
A 0522 Horiz. Field-of-View	30.5°
Booster Station Distance:	32.3 km (20.1 mi)

View Compass



Available Ocean Horizon is very limited, <5°

Figure C17

N18: Proprietors Way
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



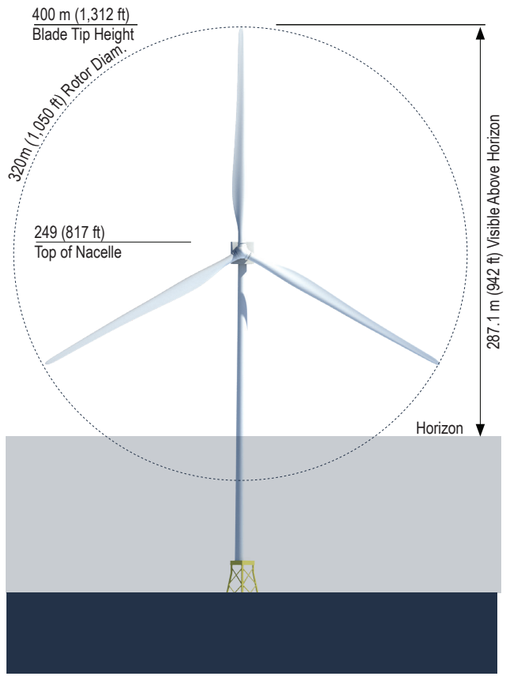
Photo Data

Date/Time:	13-Apr-2022 / 15:00	Temperature:	53°F
Light Conditions:	Side Light	Humidity:	74%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 07.8804" N
Longitude:	70° 09' 08.6796" W
Elevation (+/-):	5.5 m (18 ft)
Nearest WTG:	49.5 km (30.8 mi)
Farthest WTG:	79.3 km (49.3 mi)
A 0522 Horiz. Field-of-View	30.9°
Booster Station Distance:	31.9 km (19.8 mi)

View Compass

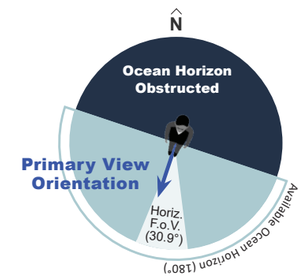


Figure C18

N17: Ladies Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

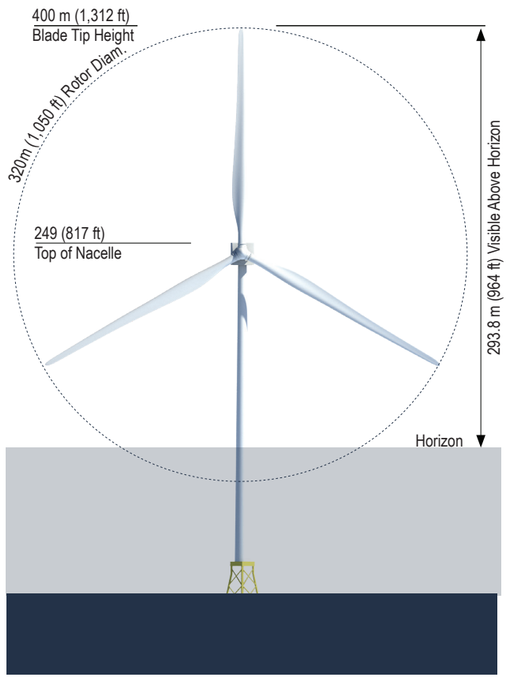


Photo Data

Date/Time:	13-Apr-2022 / 16:40	Temperature:	53°F
Light Conditions:	Side Light	Humidity:	80%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Mostly Cloudy

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



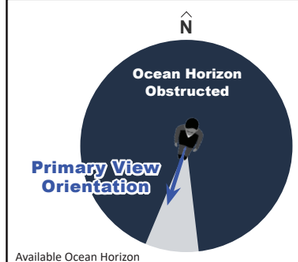
Visual Setting

SCA/LCA:	Sand Plain Grassland/Coastal Scrub
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 59.5262" N
Longitude:	70° 07' 44.6268" W
Elevation (+/-):	7.3 m (24 ft)
Nearest WTG:	49.7 km (30.9 mi)
Farthest WTG:	79.8 km (49.6 mi)
A 0522 Horiz. Field-of-View	30.6°
Booster Station Distance:	32.5 km (20.2 mi)

View Compass



Available Ocean Horizon is very limited, <5°

Figure C19

N16: Moxies Pond Road
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



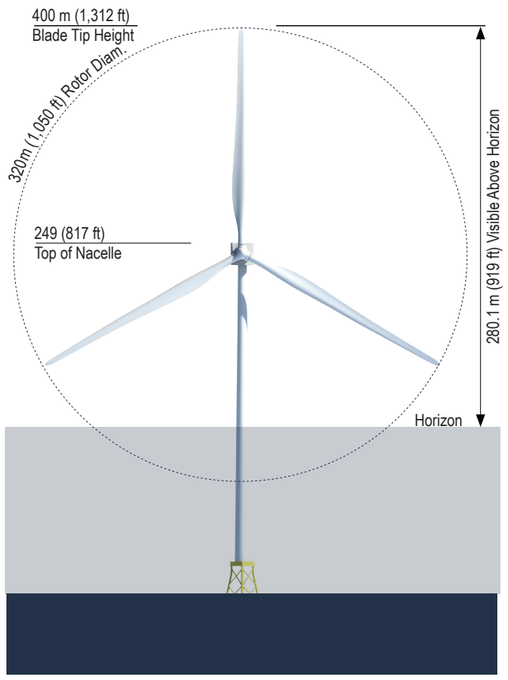
Photo Data

Date/Time:	13-Apr-2022 / 14:40	Temperature:	53°F
Light Conditions:	Side Light	Humidity:	74%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Meteorological Data

Photo Location Map

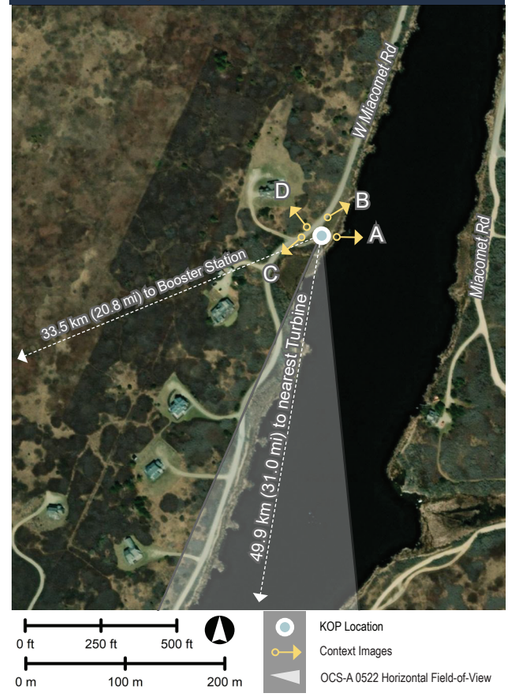
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



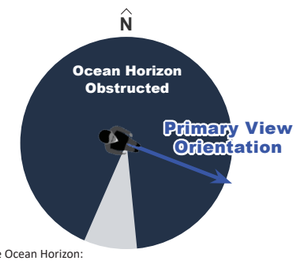
Visual Setting

SCA/LCA:	Salt Pond/Tidal Marsh
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 54.9697" N
Longitude:	70° 06' 59.2272" W
Elevation (+/-):	4.3 m (14 ft)
Nearest WTG:	49.9 km (31.0 mi)
Farthest WTG:	80.0 km (49.7 mi)
A 0522 Horiz. Field-of-View	30.3°
Booster Station Distance:	33.5 km (20.8 mi)

View Compass



Available Ocean Horizon:
None or limited

Figure C20

N14: Miacomet Pond
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

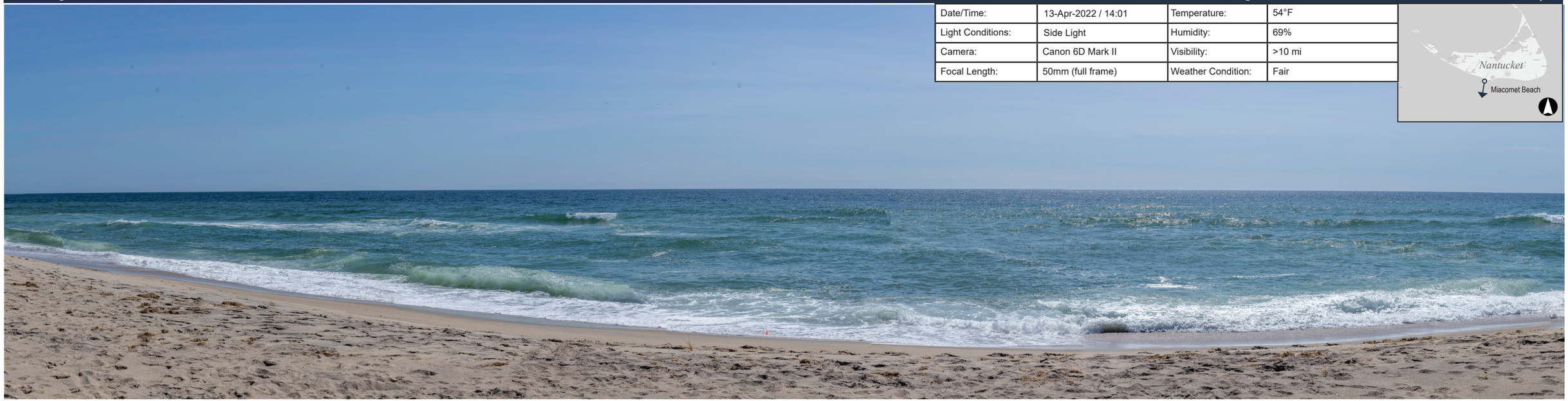
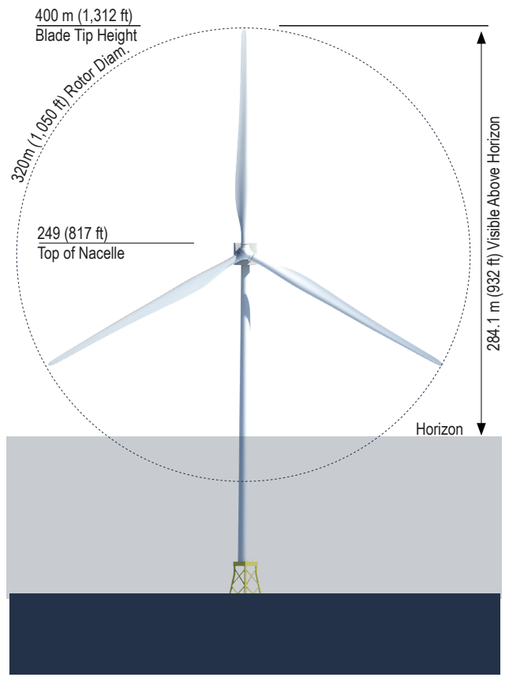


Photo Data

Date/Time:	13-Apr-2022 / 14:01	Temperature:	54°F
Light Conditions:	Side Light	Humidity:	69%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

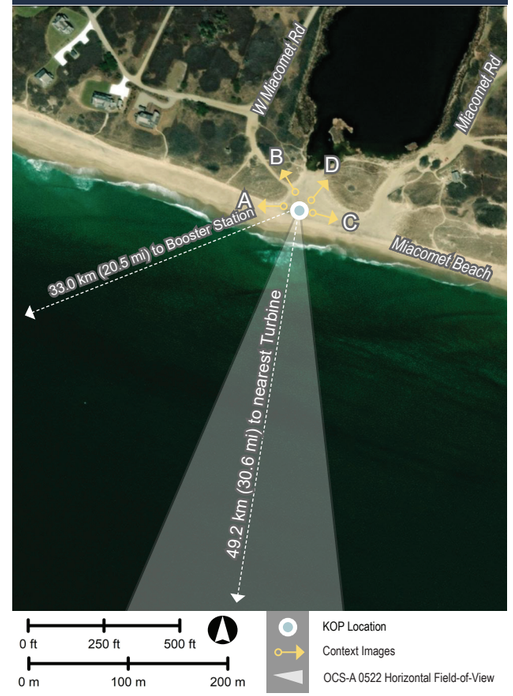
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest WTG:	49.2 km (30.6 mi)
Farthest WTG:	79.5 km (49.4 mi)
A 0522 Horiz. Field-of-View	30.6°
Booster Station Distance:	33.0 km (20.5 mi)

View Compass

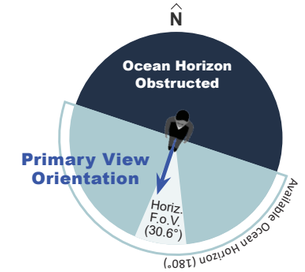


Figure C21

N13: Miacomet Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



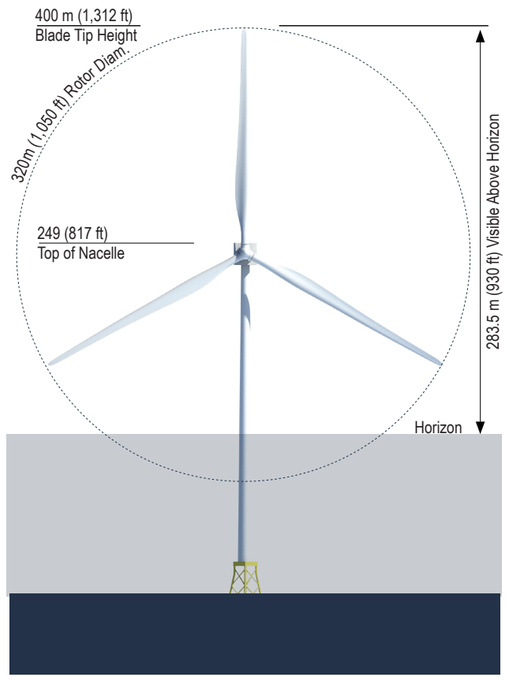
Photo Data

Date/Time:	13-Apr-2022 / 13:10	Temperature:	56°F
Light Conditions:	Side Light	Humidity:	64%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

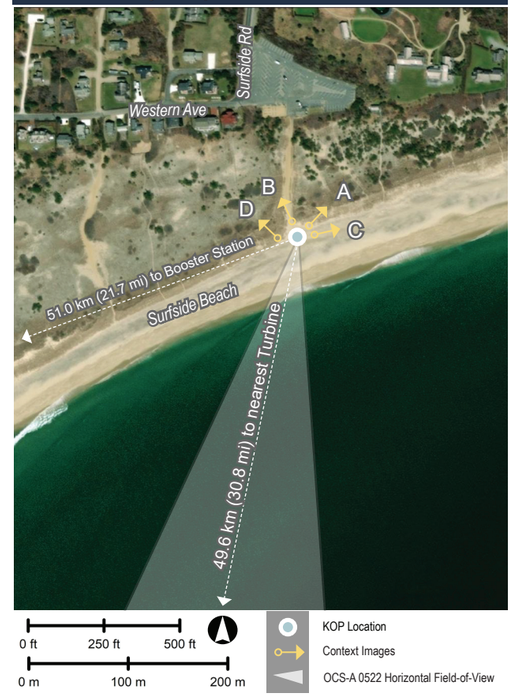
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 34.2254" N
Longitude:	70° 05' 40.1064" W
Elevation (+/-):	4.6 m (15 ft)
Nearest WTG:	49.6 km (30.8 mi)
Farthest WTG:	80.3 km (49.9 mi)
A 0522 Horiz. Field-of-View	29.9°
Booster Station Distance:	51.0 km (21.7 mi)

View Compass

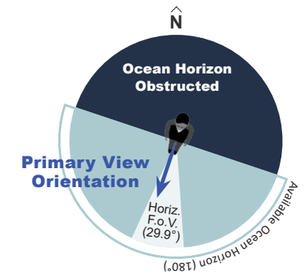


Figure C22

N12: Surfside Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

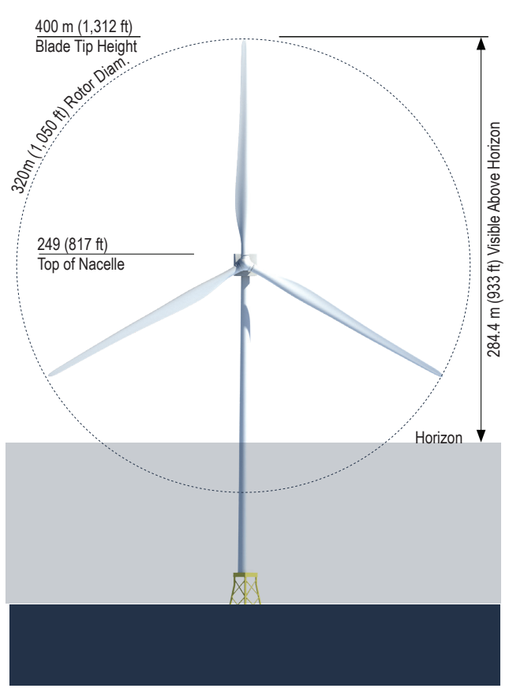


Photo Data

Date/Time:	12-Apr-2022 / 12:40	Temperature:	53°F
Light Conditions:	Side Light	Humidity:	83%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes, Shoreline Res
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 41.8274" N
Longitude:	70° 04' 41.5380" W
Elevation (+/-):	5.5 m (18 ft)
Nearest WTG:	50.1 km (31.1 mi)
Farthest WTG:	81.1 km (50.4 mi)
A 0522 Horiz. Field-of-View	29.3°
Booster Station Distance:	36.2 km (22.5 mi)

View Compass

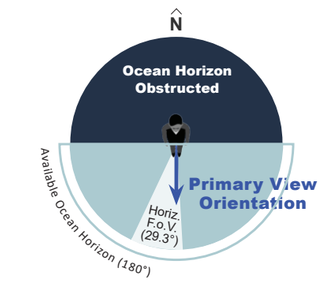


Figure C23

N11: Nobadeer Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

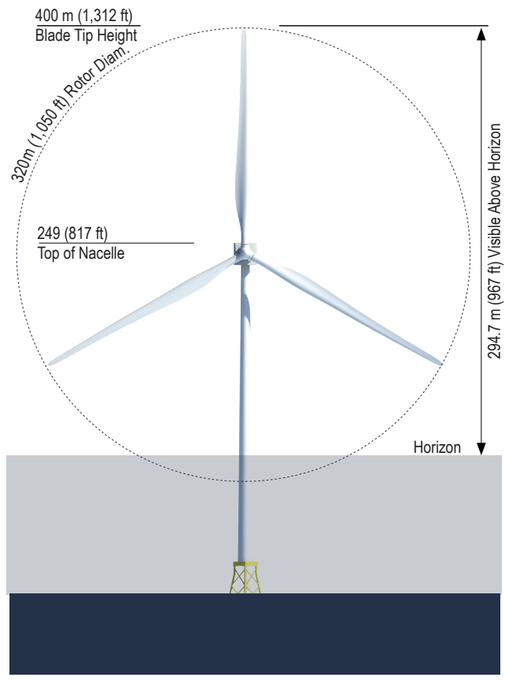


Photo Data

Date/Time:	12-Apr-2022 / 11:20	Temperature:	57°F
Light Conditions:	Side Light	Humidity:	67%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Sand Plain Grassland/Coastal Scrub
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 43.0950" N
Longitude:	70° 02' 52.5552" W
Elevation (+/-):	8.8 m (29 ft)
Nearest WTG:	50.7 km (31.5 mi)
Farthest WTG:	82.2 km (51.1 mi)
A 0522 Horiz. Field-of-View	29.3°
Booster Station Distance:	38.6 km (24.0 mi)

View Compass

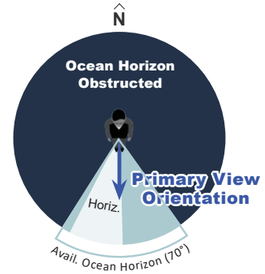


Figure C24

N10: Madequecham Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



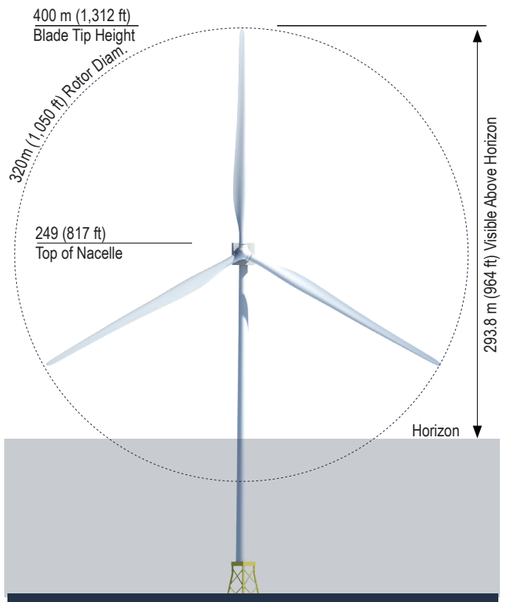
Photo Data

Date/Time:	13-Apr-2022 / 11:40	Temperature:	58°F
Light Conditions:	Side Light	Humidity:	56%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes, Shoreline Res
Resource Type:	Public Park/Beach
Use Type:	Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 14' 23.5220" N
Longitude:	70° 00' 33.6750" W
Elevation (+/-):	9.5 m (31 ft)
Nearest WTG:	51.2 km (31.8 mi)
Farthest WTG:	83.2 km (51.7 mi)
A 0522 Horiz. Field-of-View	27.1°
Booster Station Distance:	41.5 km (25.8 mi)

View Compass

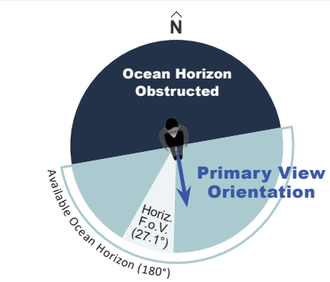


Figure C25

N08: Tom Nevers Field
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

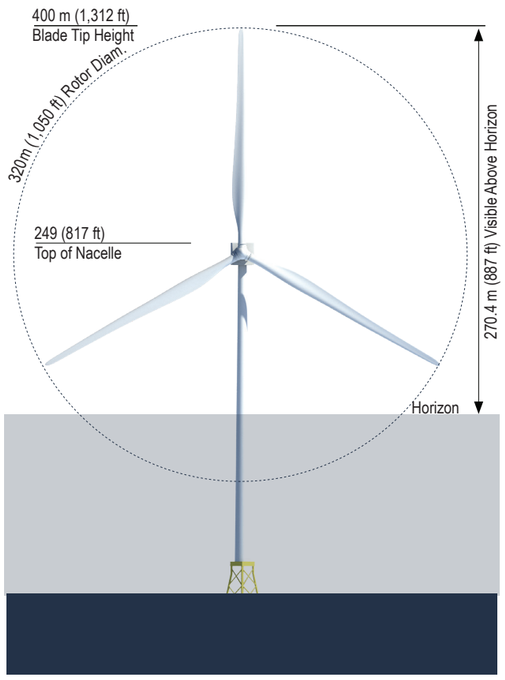


Photo Data

Date/Time:	12-Apr-2022 / 11:50	Temperature:	57°F
Light Conditions:	Side Light	Humidity:	67%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Shoreline Residential
Resource Type:	Residential
Use Type:	Vacation Residential
Viewer Types:	Seasonal Residents/Vacationers

KOP Location

Latitude:	41° 14' 43.1489" N
Longitude:	70° 01' 29.8239" W
Elevation (+/-):	5.2 m (17 ft)
Nearest WTG:	52.3 km (32.5 mi)
Farthest WTG:	84.7 km (52.6 mi)
A 0522 Horiz. Field-of-View	26.2°
Booster Station Distance:	43.5 km (27.0 mi)

View Compass

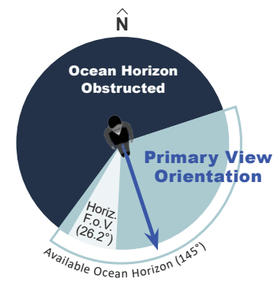


Figure C26

N07: Wanoma Way Residential Area
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

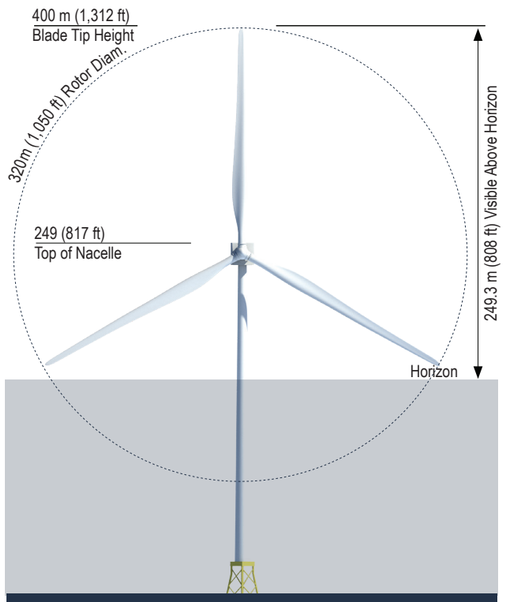


Photo Data

Date/Time:	13-Apr-2022 / 10:40	Temperature:	62°F
Light Conditions:	Side Light	Humidity:	43%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

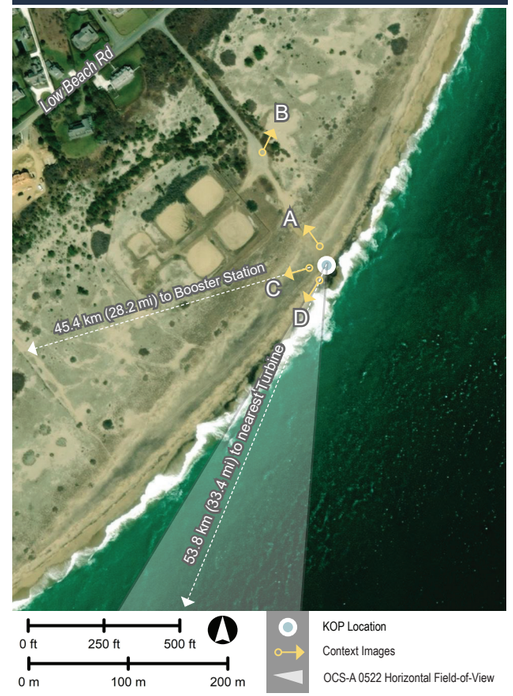
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes, Shoreline Res
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 09.5957" N
Longitude:	69° 58' 03.3204" W
Elevation (+/-):	2.7 m (9 ft)
Nearest WTG:	53.8 km (33.4 mi)
Farthest WTG:	86.3 km (53.6 mi)
A 0522 Horiz. Field-of-View	25.2°
Booster Station Distance:	45.4 km (28.2 mi)

View Compass

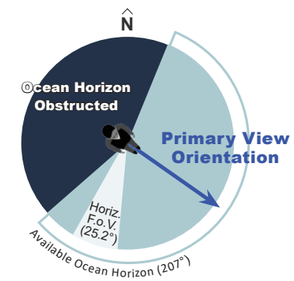


Figure C27

N06: Low Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)



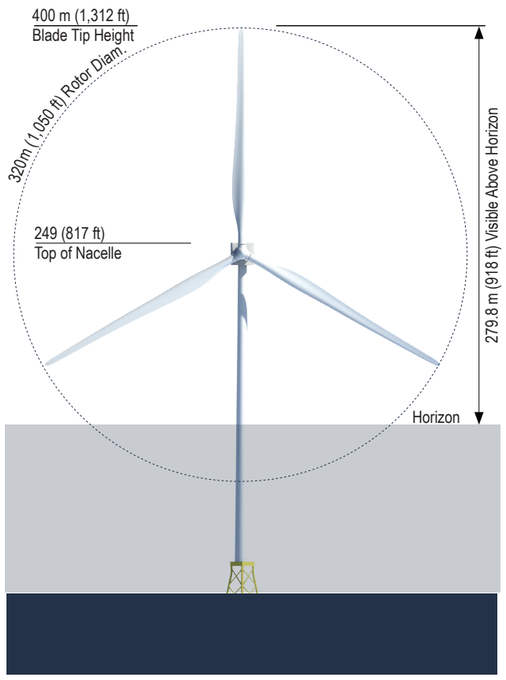
Photo Data

Date/Time:	12-Apr-2022 / 10:20	Temperature:	52°F
Light Conditions:	Side Light	Humidity:	83%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Cloudy

Meteorological Data

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Shoreline Residential
Resource Type:	Residential
Use Type:	Vacation Recreation
Viewer Types:	Seasonal Residents/Vacationers

KOP Location

Latitude:	41° 15' 23.4288" N
Longitude:	69° 58' 03.1548" W
Elevation (+/-):	10.4 m (34 ft)
Nearest WTG:	54.2 km (33.7 mi)
Farthest WTG:	86.6 km (53.8 mi)
A 0522 Horiz. Field-of-View	25.1°
Booster Station Distance:	45.5 km (28.3 mi)

View Compass

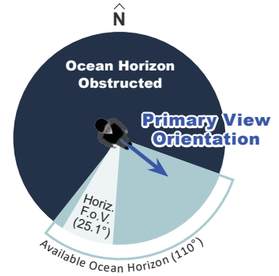


Figure C28

N05: Low Beach Residential Area
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

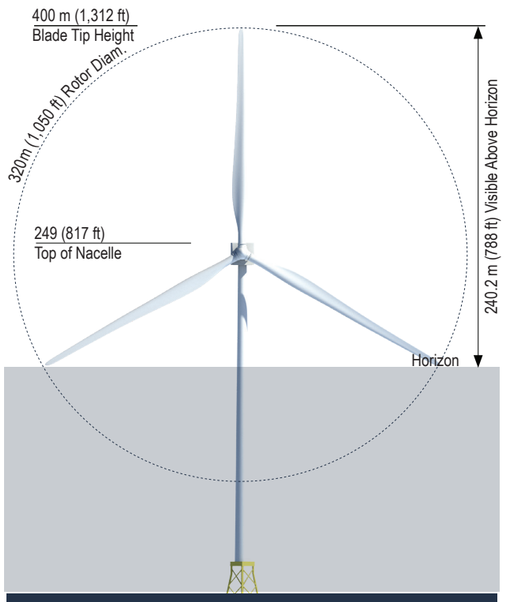


Photo Data

Date/Time:	13-Apr-2022 / 10:10	Temperature:	60°F
Light Conditions:	Side Light	Humidity:	41%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

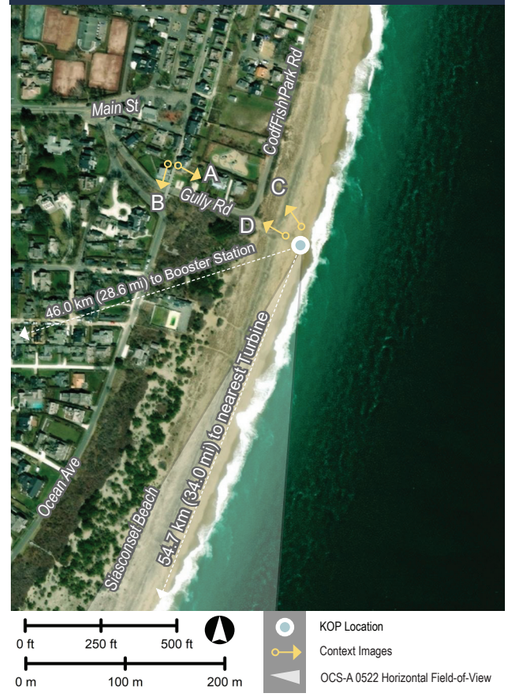
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 15' 38.8620" N
Longitude:	69° 57' 45.2232" W
Elevation (+/-):	2.7 m (9 ft)
Nearest WTG:	54.7 km (34.0 mi)
Farthest WTG:	87.2 km (54.2 mi)
A 0522 Horiz. Field-of-View	24.8°
Booster Station Distance:	46.0 km (28.6 mi)

View Compass

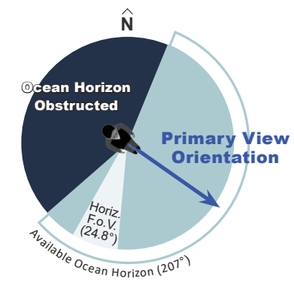


Figure C29

N04: Siasconset Beach
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

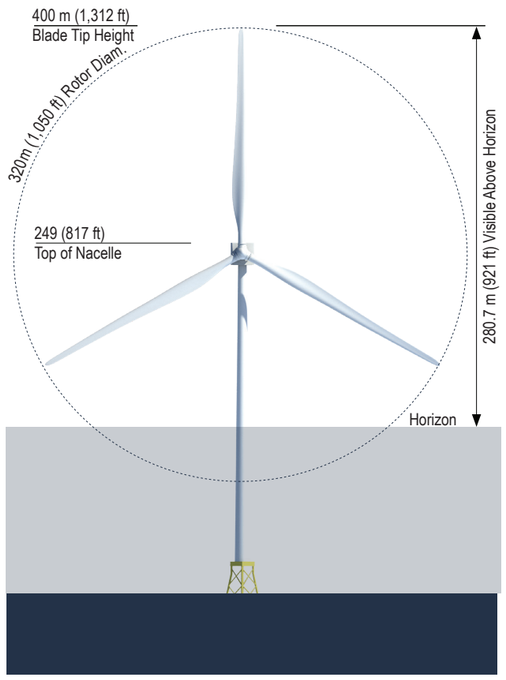


Photo Data

Date/Time:	13-Apr-2022 / 09:20	Temperature:	60°F
Light Conditions:	Side Light	Humidity:	41%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Coastal Village/Town Center
Resource Type:	Village Historic District
Use Type:	Scenic/Cultural Tourism
Viewer Types:	Seasonal Residents/Vacationers

KOP Location

Latitude:	41° 15' 44.4604" N
Longitude:	69° 57' 48.6684" W
Elevation (+/-):	11.9 m (39 ft)
Nearest WTG:	54.9 km (34.1 mi)
Farthest WTG:	87.4 km (54.3 mi)
A 0522 Horiz. Field-of-View	24.8°
Booster Station Distance:	46.0 km (28.6 mi)

View Compass

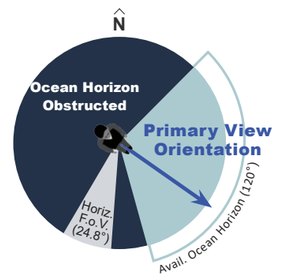


Figure C30

N03: Front Street - Siasconset
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

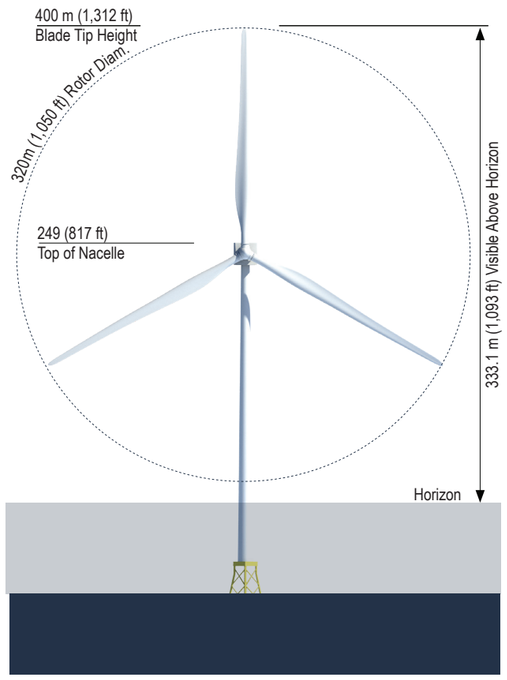


Photo Data

Date/Time:	05-May-2022 / 10:15	Temperature:	60°F
Light Conditions:	Side Light	Humidity:	67%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



Visual Setting

SCA/LCA:	Coastal Bluffs
Resource Type:	Historic Site
Use Type:	Scenic/Cultural Tourism
Viewer Types:	Scenery-oriented Visitors

KOP Location

Latitude:	41° 17' 03.8823" N
Longitude:	65° 57' 58.6735" W
Elevation (+/-):	45.7 m (150 ft)
Nearest WTG:	57.1 km (35.5 mi)
Farthest WTG:	89.3 km (55.5 mi)
A 0522 Horiz. Field-of-View	24.4°
Booster Station Distance:	46.5 km (28.9 mi)

View Compass

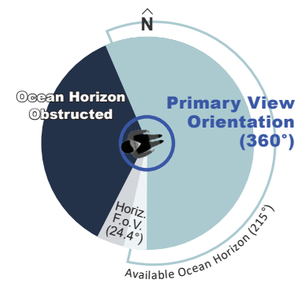


Figure C31

N02: Sankaty Head Lighthouse
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Existing Condition (124° x 27°± panorama view)

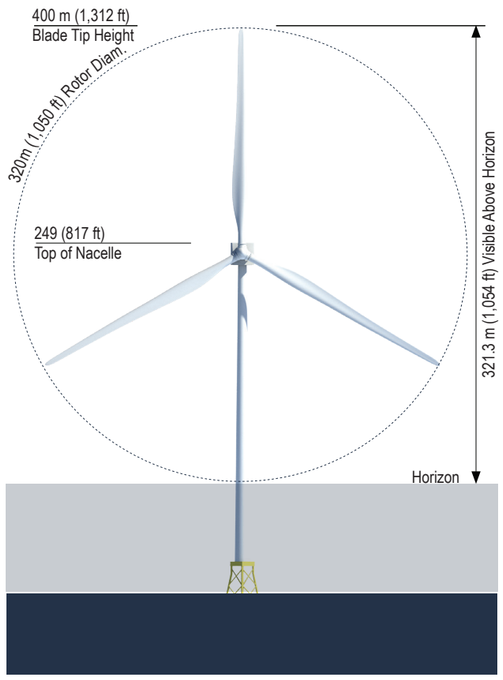


Photo Data

Date/Time:	13-Apr-2022 / 08:30	Temperature:	58°F
Light Conditions:	Side Light	Humidity:	51%
Camera:	Canon 6D Mark II	Visibility:	>10 mi
Focal Length:	50mm (full frame)	Weather Condition:	Fair

Photo Location Map

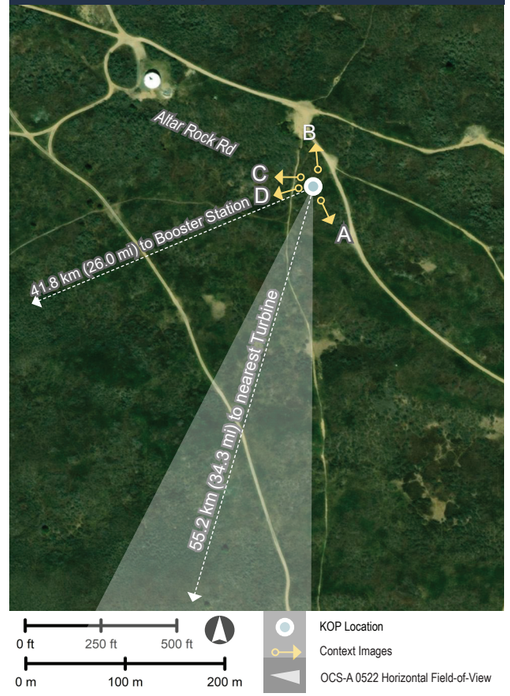
Visible Portion of Closest WTG



Context Images



KOP Vicinity Map



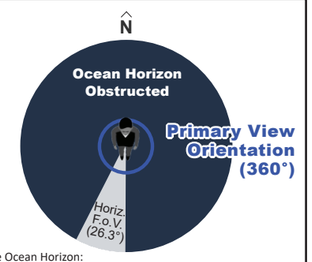
Visual Setting

SCA/LCA:	Inland Sand Plain Grassland/Scrub
Resource Type:	Trail
Use Type:	Scenic Recreation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

KOP Location

Latitude:	41° 16' 53.7145" N
Longitude:	70° 01' 29.8239" W
Elevation (+/-):	30.8 m (101 ft)
Nearest WTG:	55.2 km (34.3 mi)
Farthest WTG:	86.7 km (53.9 mi)
A 0522 Horiz. Field-of-View	26.3°
Booster Station Distance:	41.8 km (26.0 mi)

View Compass



Available Ocean Horizon:
None or limited

Figure C32

N01: Altar Rock
Town of Nantucket, MA

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Appendix D

PHOTO SIMULATIONS

Provided under separate cover.

Appendix E

PHOTO SIMULATIONS

DAYLIGHT CONDITION ANALYSIS



Photographic Simulations

Photo Location Map

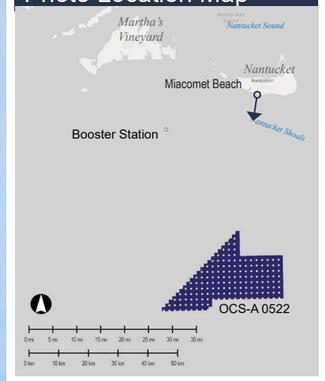


Photo Data

Date/Time:	13-Apr-2022 / 14:01
Light Conditions:	Side Light
Camera:	Canon 6D Mark II
Focal Length:	50mm (full frame)

Photo Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest Turbine:	49.2 km (30.6 mi)
Farthest Turbine:	79.5 km (49.4 mi)
Horiz. Field-of-View:	30.6°
Booster Station Dist.:	33.0 km (20.5 mi)

Meteorological Data

Temperature:	54°F
Humidity:	69%
Visibility:	10 mi
Weather Condition:	Fair

Visual Setting

SCA/LCA:	Ocean Beach/Coastal Dunes
Resource Type:	Public Beach
Use Type:	Relaxation
Viewer Types:	Scenery-oriented Visitors Recreation-oriented Visitors

Figure E1

N13: Miacomet Beach
Town of Nantucket, MA

EXISTING VIEW

The above photograph is intended to be viewed 20 inches from the reader's eye when printed on 11"x17" paper and 13 inches from the reader's eye when printed on 8 1/2" x 11" paper. Viewing on an uncalibrated video monitor can alter intended lightness, color and/or contrast of the image.

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Photographic Simulations

Photo Location Map

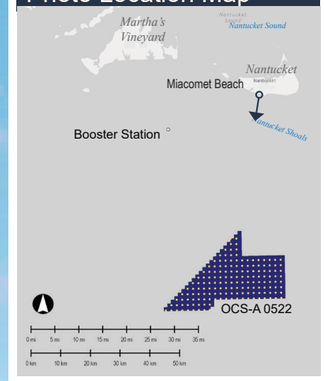


Photo Data

Date/Time:	13-Apr-2022 / 14:01
Light Conditions:	Side Light
Camera:	Canon 6D Mark II
Focal Length:	50mm (full frame)

Photo Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest Turbine:	49.2 km (30.6 mi)
Farthest Turbine:	79.5 km (49.4 mi)
Horiz. Field-of-View:	30.6°
Booster Station Dist.:	33.0 km (20.5 mi)

Visible Portion of Closest WTG

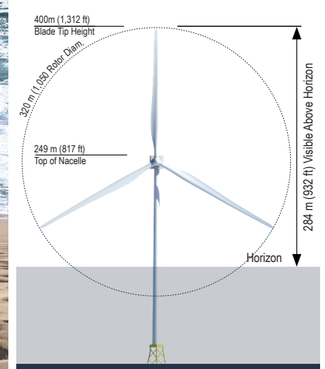


Figure E2

N13: Miacomet Beach
Town of Nantucket, MA

SIMULATED VIEW - Daylight Study: 7:00am

The above photograph is intended to be viewed 20 inches from the reader's eye when printed on 11"x17" paper and 13 inches from the reader's eye when printed on 8 1/2" x 11" paper. Viewing on an uncalibrated video monitor can alter intended lightness, color and/or contrast of the image.

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Photographic Simulations

Photo Location Map

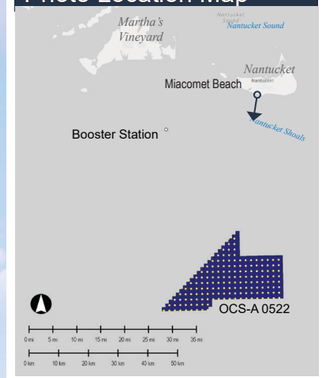


Photo Data

Date/Time:	13-Apr-2022 / 14:01
Light Conditions:	Side Light
Camera:	Canon 6D Mark II
Focal Length:	50mm (full frame)

Photo Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest Turbine:	49.2 km (30.6 mi)
Farthest Turbine:	79.5 km (49.4 mi)
Horiz. Field-of-View:	30.6°
Booster Station Dist.:	33.0 km (20.5 mi)

Visible Portion of Closest WTG

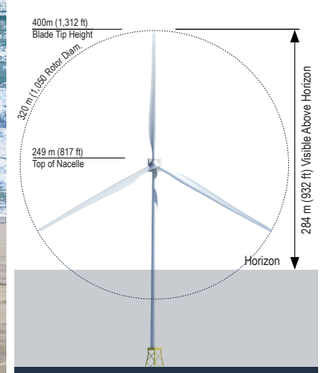


Figure E3

N13: Miacomet Beach
Town of Nantucket, MA

SIMULATED VIEW - Daylight Study: 10:00am

The above photograph is intended to be viewed 20 inches from the reader's eye when printed on 11"x17" paper and 13 inches from the reader's eye when printed on 8 1/2" x 11" paper. Viewing on an uncalibrated video monitor can alter intended lightness, color and/or contrast of the image.

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Photographic Simulations

Photo Location Map

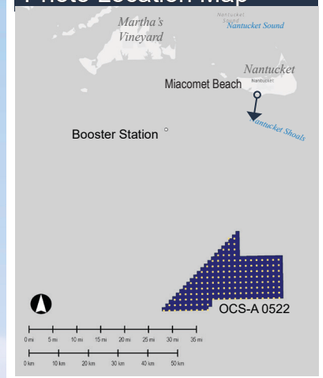


Photo Data

Date/Time:	13-Apr-2022 / 14:01
Light Conditions:	Side Light
Camera:	Canon 6D Mark II
Focal Length:	50mm (full frame)

Photo Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest Turbine:	49.2 km (30.6 mi)
Farthest Turbine:	79.5 km (49.4 mi)
Horiz. Field-of-View:	30.6°
Booster Station Dist.:	33.0 km (20.5 mi)

Visible Portion of Closest WTG

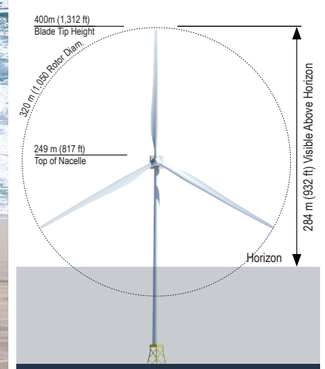


Figure E4

N13: Miacomet Beach
Town of Nantucket, MA

SIMULATED VIEW - Daylight Study: 1:00pm

The above photograph is intended to be viewed 20 inches from the reader's eye when printed on 11"x17" paper and 13 inches from the reader's eye when printed on 8 1/2" x 11" paper. Viewing on an uncalibrated video monitor can alter intended lightness, color and/or contrast of the image.

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Photographic Simulations

Photo Location Map

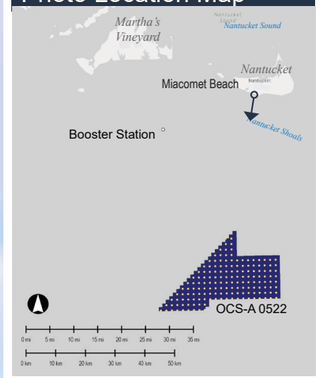


Photo Data

Date/Time:	13-Apr-2022 / 14:01
Light Conditions:	Side Light
Camera:	Canon 6D Mark II
Focal Length:	50mm (full frame)

Photo Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest Turbine:	49.2 km (30.6 mi)
Farthest Turbine:	79.5 km (49.4 mi)
Horiz. Field-of-View:	30.6°
Booster Station Dist.:	33.0 km (20.5 mi)

Visible Portion of Closest WTG

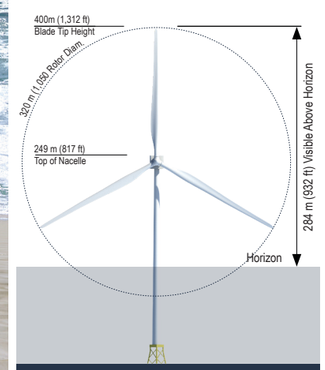


Figure E5

N13: Miacomet Beach
Town of Nantucket, MA

SIMULATED VIEW - Daylight Study: 4:00pm

The above photograph is intended to be viewed 20 inches from the reader's eye when printed on 11"x17" paper and 13 inches from the reader's eye when printed on 8 1/2" x 11" paper. Viewing on an uncalibrated video monitor can alter intended lightness, color and/or contrast of the image.

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Photographic Simulations

Photo Location Map

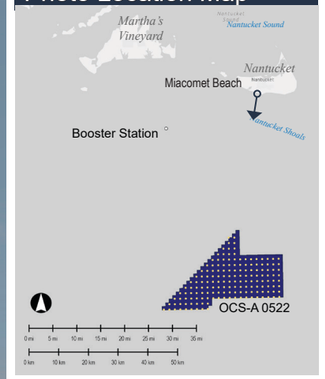


Photo Data

Date/Time:	13-Apr-2022 / 14:01
Light Conditions:	Side Light
Camera:	Canon 6D Mark II
Focal Length:	50mm (full frame)

Photo Location

Latitude:	41° 14' 35.4178" N
Longitude:	70° 07' 06.9132" W
Elevation (+/-):	4.3 m (14 ft)
Nearest Turbine:	49.2 km (30.6 mi)
Farthest Turbine:	79.5 km (49.4 mi)
Horiz. Field-of-View:	30.6°
Booster Station Dist.:	33.0 km (20.5 mi)

Visible Portion of Closest WTG

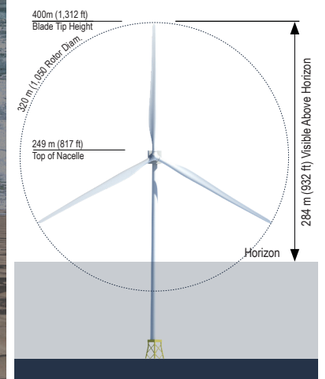


Figure E6

N13: Miacomet Beach
Town of Nantucket, MA

SIMULATED VIEW - Daylight Study: 7:00pm

The above photograph is intended to be viewed 20 inches from the reader's eye when printed on 11"x17" paper and 13 inches from the reader's eye when printed on 8 1/2" x 11" paper. Viewing on an uncalibrated video monitor can alter intended lightness, color and/or contrast of the image.

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Appendix F

PRELIMINARY VISUAL ASSESSMENT - ONSHORE SUBSTATIONS

This Appendix is redacted in its entirety.