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Appendix I-1: Offshore Visual Impact Assessment

Coastal Virginia Offshore Wind Commercial Project

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ACRONYMS AND ABBREVIATIONS

ac	Acre
ADLS	Aircraft Detection Lighting System
aMSL	above mean sea level
BLM	U.S. Bureau of Land Management
BOEM	U.S. Bureau of Ocean Energy Management
DEM	Digital Elevation Model
dSLR	digital single lens reflex
Dominion Energy	Virginia Electric and Power Company, d/b/a Dominion Energy Virginia
FAA	Federal Aviation Administration
FAA lights	obstruction marking lights installed to meet FAA guidelines
ft	foot
GIS	Geographic Information System
GPS	global positioning system
ha	hectare
IALA	International Association of Marine Aids
IPS	Intermediate Peripheral Structure
km	kilometer
KOP	Key Observation Point
Lease Area	designated Renewable Energy Lease Area OCS-A 0483
LSZ	Landscape Similarity Zone
m	meter
MHHW	Mean Higher High Water
mi	statute mile
mph	miles per hour
m/s	meters per second
MSL	mean sea level
MW	megawatt
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
Offshore Visual Study Area	40-mi (64-km) study area around the Lease Area
PDE	Project Design Envelope
SGRE	Siemens Gamesa Renewable Energy
SPS	Significant Peripheral Structure
Tetra Tech	Tetra Tech, Inc.
USCG	U.S. Coast Guard
VIA	Visual Impact Assessment
VRM	Visual Resource Management
WEA	Wind Energy Area
WTG	Wind Turbine Generator

I-1.1 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) was contracted by the Virginia Electric and Power Company, doing business as Dominion Energy Virginia (Dominion Energy) to prepare a Visual Impact Assessment (VIA) in support of the development of the Dominion Energy Coastal Virginia Offshore Wind (CVOW) Commercial Project (hereafter referred to as the Project). The Project consists of an offshore wind farm to be located in the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) Offshore Virginia (Lease No. OCS-A-0483; Lease Area), which was awarded through the Bureau of Ocean Energy Management (BOEM) competitive renewable energy lease auction of the Wind Energy Area (WEA) offshore of Virginia in 2013. The Lease Area covers approximately 112,799 acres (ac; 45,658 hectares [ha]) and is approximately 27 statute miles (mi; 23.5 nautical miles [nm], 43.5 kilometers [km]) off the Virginia Beach coastline. (Figure I-1-1**,** Project Overview Map). The purpose of this VIA is to assess the seascape, landscape, and potential visual effects resulting from the construction and operation of the Offshore Project Components.

Dominion Energy has prepared a separate VIA to address the Onshore Project Components, which is included in this Appendix as Appendix I-2. The focus of this report is the Offshore Project Components including the Wind Turbine Generators (WTGs), Offshore Substations, Inter-Array Cables, and Offshore Export Cables. The WTGs, Offshore Substations, and Inter-Array Cables will be located in federal waters within the Lease Area, while the Offshore Export Cable Corridor will traverse both federal and state territorial waters of Virginia. During construction, the Project will additionally involve temporary construction laydown area(s) and construction port(s). The operation phase of the Project will include an onshore Operations and Maintenance (O&M) facility with an associated Base Port. Dominion Energy intends to lease existing and/or build to suit facilities in the Hampton Roads region of Virginia. In the event that upgrades or a new, build to suit facilities are needed, construction would be undertaken by the lessor and would be separately reviewed and authorized by the USACE and local authorities, as needed. As such, the construction and O&M ports are not a part of this undertaking and are not addressed in the VIA.

The VIA contained herein includes a detailed description of the Project components that were evaluated (Section I-1.2); a summary of the regulatory requirements and drivers behind the analysis conducted (Section I-1.3); a detailed discussion of the methods used to identify the Project Study Area and inventory visual resources potentially affected by the construction, operation, and decommissioning of the Project (Section I-1.4); a detailed discussion of the methods used to evaluate impacts and a summary of potential effects (Section I-1.5); and an evaluation of potential mitigation measures applicable to the Project (Section I-1.6).

For the purposes of this VIA, the Offshore Project Area refers to the Lease Area (offshore; where the WTGs, Inter-array Cables and Offshore Substations will be located) and the Offshore Export Cable Route Corridor as discussed in Section I-1.2 and shown on Figure I-1-1.

Although some historic resources are included as representative viewpoints and assessed as part of the VIA, an evaluation of the potential impacts on historic resources is included in Appendix H, Historic Properties Assessment.

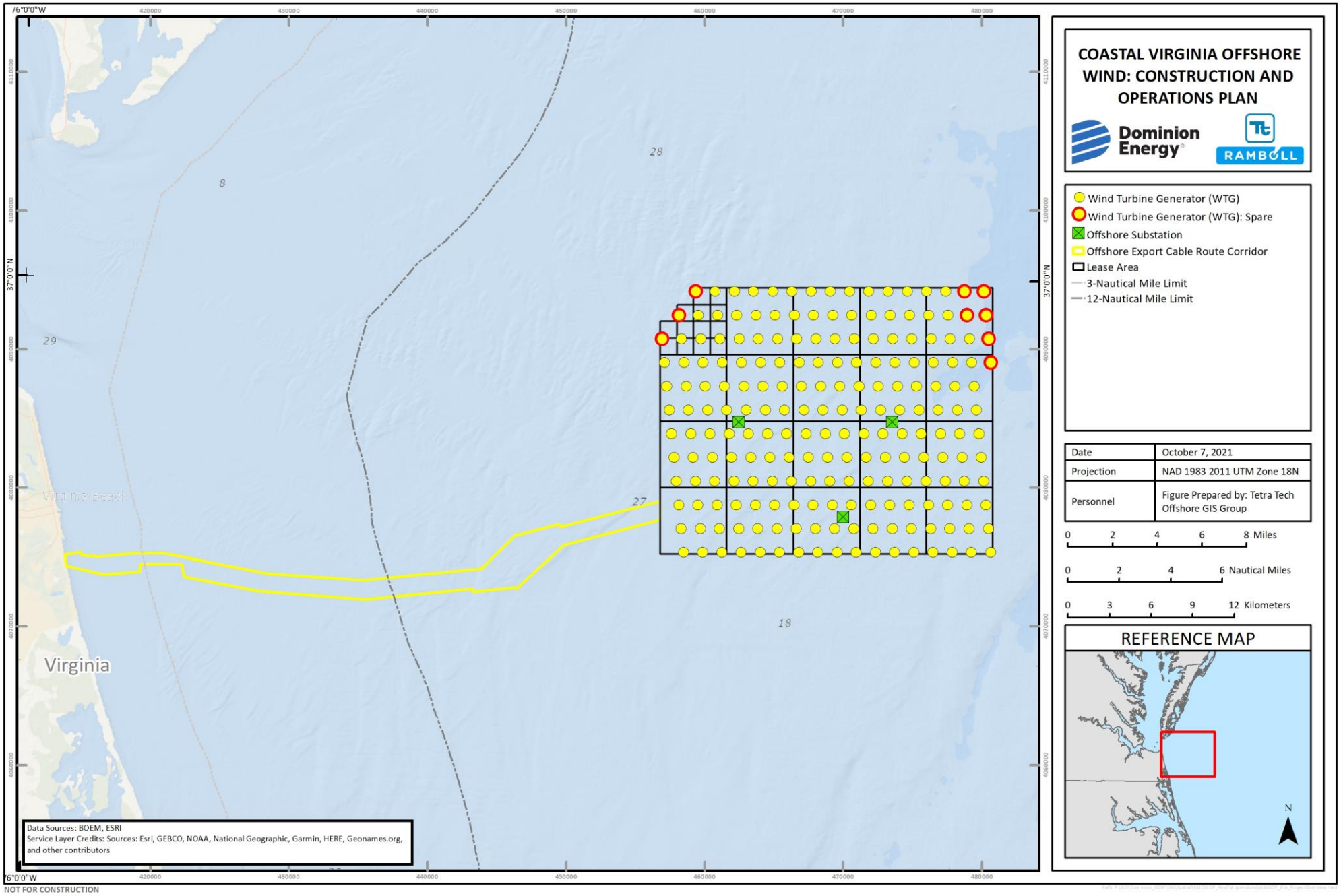

Figure I-1-1. Project Overview

I-1.2 PROJECT DESCRIPTION

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

The Project includes the construction of up to 205 WTGs, up to three Offshore Substations, and foundations for the WTGs and Offshore Substations within the Lease Area. The WTGs will be connected via Inter-Array Cables to the Offshore Substations. The Offshore Substations will collect the power generated by the WTGs and transport it onshore via Offshore Export Cables. The Inter-Array Cables and Offshore Export Cables will be located subsea, and therefore will not be visible components of the Project during operation. Construction impacts of these facilities are evaluated as part of this assessment. Table I-1-1 provides a summary of the parameters for the representative WTGs and Offshore Substations.

Table I-1-1. Summary of Project Design Envelope (PDE) Parameters

Project Parameter Details (Offshore Components)
General (Layout and Project Size)
• 176 to 205 WTGs • Anticipated to begin offshore construction in 2024 (foundations) and 2025 (WTGs) • Construction of the Project is expected to be complete within approximately 3 years
WTGs and Foundations
• Siemens Gamesa Renewable Energy SG 14-222 DD WTG • 14- to 16-megawatt (MW) WTGs characterized as "preferred" and "maximum" capacity • Rotor diameter ranging from 725 to 761 feet (ft) (222 to 232 meters [m]) • Hub height from mean sea level (MSL) ranging from 446 to 489 ft (144 to 149 m) • Turbine tip height from MSL ranging from 804 to 869 ft (245 to 265 m) • Installation of monopiles through pile-driving • Scour protection is proposed to be installed around WTG Foundations. • Installation vessels to include jack-up, platform support, crew transfer, tugs, barges, heavy-lift vessels, fall pipe vessels, walk-to-work, and other support vessel types as necessary
Inter-Array Cables
• Up to 66-kilovolt cables buried 3.3 to 9.8 ft (1 to 3 m) beneath the seabed • Up to 300 statute miles (mi; 484 kilometers [km]) total length of Inter-Array Cables (average Inter-Array Cable length of 5,868 ft [1,789 m] between turbines) • Installation by jet trenching, chain cutting, trench former, and/or other available technologies • Installation vessels to include deep draft cable lay, walk-to-work, crew transfer, trenching support, burial tool, survey, multipurpose support vessels, and other support vessel types as necessary
Offshore Export Cables
• Up to nine 230-kilovolt export cables buried 3.3 to 16.4 ft (1 to 5 m) beneath the seabed • Nine export cables (in a single corridor • Up to 416.9 mi (671 km) total length of Offshore Export Cable • Installation by jet trenching, plowing, chain cutting, trench former, and/or other available technologies • Installation vessels to include pull-in support barge, tug, multipurpose support, survey, shallow draft cable lay, hydroplow, crew transfer, deep-draft cable lay, walk-to-work, trenching support, burial tool vessels, and other support vessel types as necessary

Project Parameter Details (Offshore Components)
Offshore Substations and Foundations
• Two to three Offshore Substations • Offshore Substations installed atop piled jacket foundations • Scour protection installed at all foundation locations • Installation vessels to include deck carrier, heavy lift, semi-submersible, jack-up vessels, and other support vessel types as necessary

I-1.2.1 Wind Turbine Generators

Dominion Energy has selected Siemens Gamesa Renewable Energy (SGRE) as the preferred WTG supplier. To anticipate advancements in the available WTG technology, Dominion Energy requires flexibility in the final design of the WTG. Therefore, the PDE sets both preferred and maximum (14 megawatt [MW] to 16 MW) realistic design scenarios for both WTG design and layout parameters against which potential visual effects have been assessed in this VIA.

While a range of designs of WTG from SGRE may be considered, all WTGs for the Project are expected to follow the traditional offshore WTG design with three blades and a horizontal rotor axis. Specifically, the blades will be connected to a central hub, forming a rotor that turns a shaft connected to the generator. The generator will be located within a containing structure known as the nacelle situated adjacent to the rotor hub. The nacelle will be supported by a tower structure affixed to the WTG Foundation. The nacelle will be able to rotate or "yaw" on the vertical axis to face the oncoming wind direction.

In support of the development of the Project, Dominion Energy has selected the SGRE Renewable Energy SG 14-222 DD WTG. Table I-1-2 provides a summary of the physical characteristics of the SG 14-222 DD WTG. For the purpose of the assessments presented within this VIA, the WTG design envelope has been defined by preferred and maximum parameters that are representative of the SGRE WTGs currently on the market or expected to become available in time to be used for the Project. Regardless of WTG size, Dominion Energy is permitting up to 205 WTG positions, including 17 alternative, or spare, positions. For the purpose of this VIA, the maximum number and size of the WTGs proposed in the design envelope is considered the worst-case scenario and was analyzed, because it will result in maximum visibility from shore.

This assessment evaluated two impact scenarios based on the maximum number of representative 14-MW and 16-MW WTGs being considered that could be observed from onshore locations.

The WTGs are anticipated to have nighttime lighting in compliance with applicable Federal Aviation Administration (FAA) and U.S. Coast Guard (USCG) guidance/regulations.

Table I-1-2. Summary of WTG Parameters

Parameter	Minimum	Maximum	Preferred Alternative
Project nameplate capacity	2,500 megawatt (MW)	3,000 MW	2,587 MW
WTG generating capacity	14 MW	16 MW	14.7 with power boost technology MW
Cut in wind Speed	6.7 miles per hour (mph) (3 meters per second [m/s])	11.2 mph (5 m/s)	6.7 mph (3 m/s)

Parameter	Minimum	Maximum	Preferred Alternative
Cut out wind speed	55.9 mph (25 m/s)	67.1 mph (30 m/s)	62.6 mph (28 m/s)
Total number of WTGs	176	205	176
Turbine tip height from mean sea level (MSL)	804 feet (ft) (245 meter [m])	869 ft (265 m)	836 ft (255 m)
Hub height from MSL	446 ft (136 m)	489 ft (149 m)	472 ft (144 m)
Rotor diameter	725 ft (221 m)	761 ft (232 m)	728 ft (222 m)
Distance from bottom of turbine tip to Highest Astronomical Tide (air gap)	82 ft (25 m)	109 ft (33 m)	109 ft (33 m)

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

- **Tower:** Steel tubular section which supports the rotor and nacelle, in addition to providing the height required to efficiently capture wind energy. The tower is the piece connected to the foundation and typically holds some control and electrical components within or at the base while also providing access to the nacelle for servicing.

- **Nacelle:** Box-like structure at the top of the tower which houses the electro-mechanical components of the WTG. The nacelle may also contain other equipment, such as transformers, yaw systems, and gearboxes.
- **Rotor:** Consists of the three blades and the hub (where the blades connect). The rotor is responsible for the extraction of wind energy which is then converted into electricity by the generator. Rotors can range in length depending on WTG size and the blades can be pitched to control thrust force and rotor speed.

Figure I-1-2 shows a comparison of the preferred and maximum representative WTG and associated layouts.

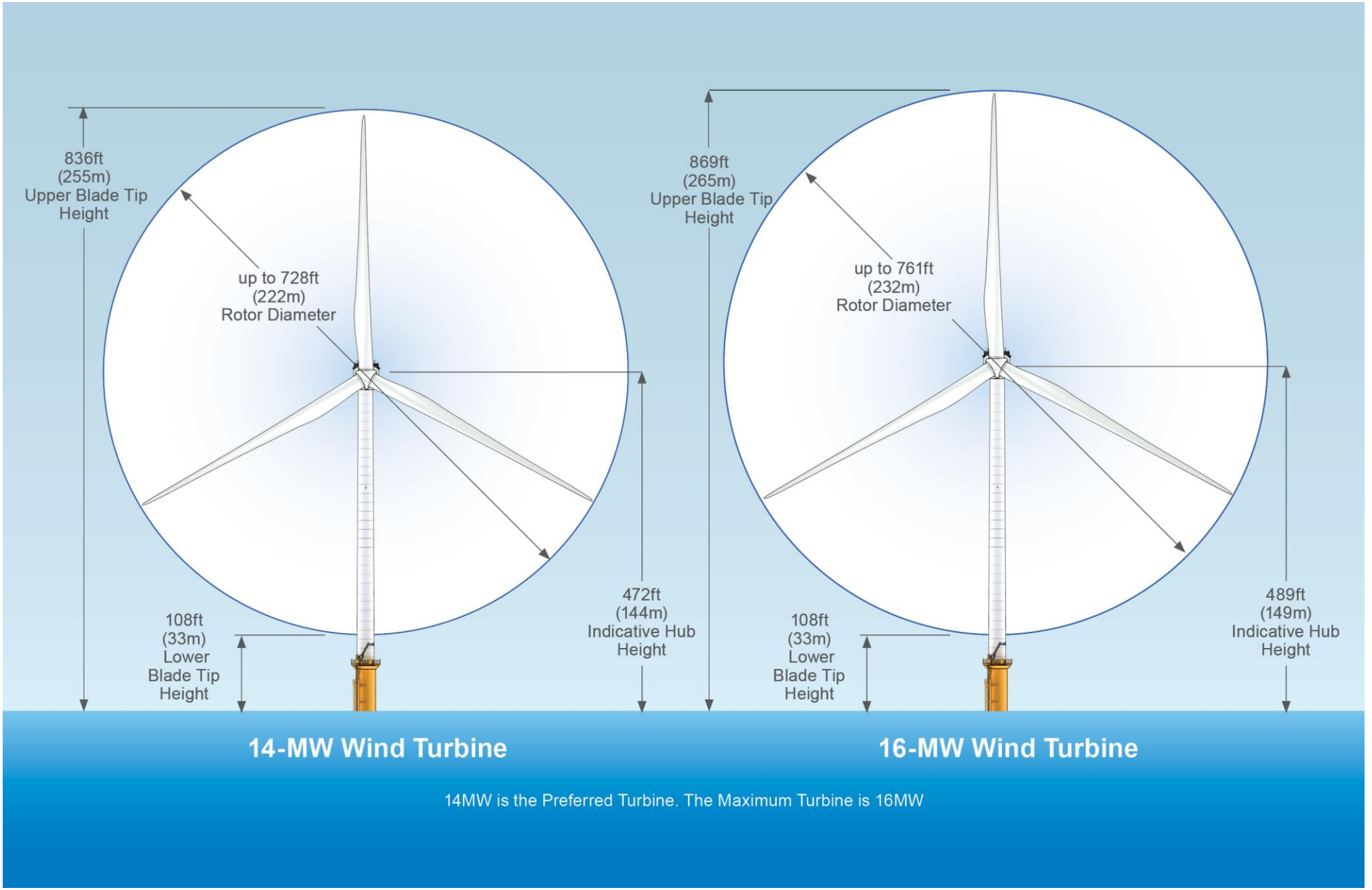

Figure I-1-2. Representative Wind Turbine Size

I-1.2.2 Foundations

Foundations are required to secure the WTGs and Offshore Substations vertically while withstanding loads from wind and the marine environment. Foundations also provide a means of safe personnel access for maintenance activities. The WTG foundations will be monopile style with transition pieces while the substations will be installed atop piled jacket foundations. Table I-1-1 provides a summary of the parameters for the representative WTGs foundation. Figure I-1-3 illustrates a monopile and transition piece WTG foundation.

I-1.2.3 Lighting

The WTGs will be lit and marked in accordance with FAA Advisory Circular 70/7460-1L, BOEM's Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development (April 28, 2021), International Association of Marine Aids (IALA) to Navigation and Lighthouse Authorities Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2013), and United States Coast Guard Fifth District Local Notice to Mariners entry 36-20 as detailed below:

- All foundation structures will be painted yellow, RAL 1023, all around from the level of Mean Higher High Water (MHHW) to 50 feet (ft) (15 meters [m]) above MHHW and will utilize retro reflective material visible through a 360-degree arc, in at least 2-foot bands around the structure, no less than 30 ft above MHHW, as shown on Figure I-1-4.
- WTGs will have approximately 10 ft (3 m) high alphanumeric marking in black, that will be visible in all directions in both daytime and nighttime. A unique alphanumeric marking scheme will be subsequently determined, in coordination with the USCG. Letters will be easily visible by using either illumination or retro-reflecting material, as shown on Figure I-1-4.
- WTGs above the yellow painted section, will be painted no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey, as shown on Figure I-1-4.
- All WTGs in excess of 699 ft (213 m) above ground level will require two synchronized flashing red lights (with medium intensity L-864 and LED infrared color between 800 and 900 nanometers) placed on the back of the nacelle on opposite sides with a flash rate of 30 fpm. While every WTG may be outfitted with a light, not all may be turned on and there will be no unlit separations or gaps more than 0.5 mi (804 m) around the perimeter and no unlit separation or gaps of more than 1 mi(1.6 km) within the grid or cluster of turbines.
- Additionally, mid-level lighting (model L-810) will be required at a halfway point on the tower between the top of the nacelle and ground level. Mid-level lighting should be flashing red lights configured to flash in unison with the nacelle lighting and should contain a minimum of three of the L-810 lights.
- Additional Consideration: While not required by FAA guidance, the Project can also look into an Aircraft Detection Lighting System (ADLS) to minimize the number of hours/day aviation lighting is in full effect. This system would activate only when signaled by the presence of a near-by aircraft (vs. a continuous activation). This system has the potential to decrease visual impacts to other stakeholders due to the decreased hours/day that the lights are activated. The impact of

implementing an ADLS system is something that can be examined as a part of the aviation assessments which can utilize local flight data to determine an area-specific result.

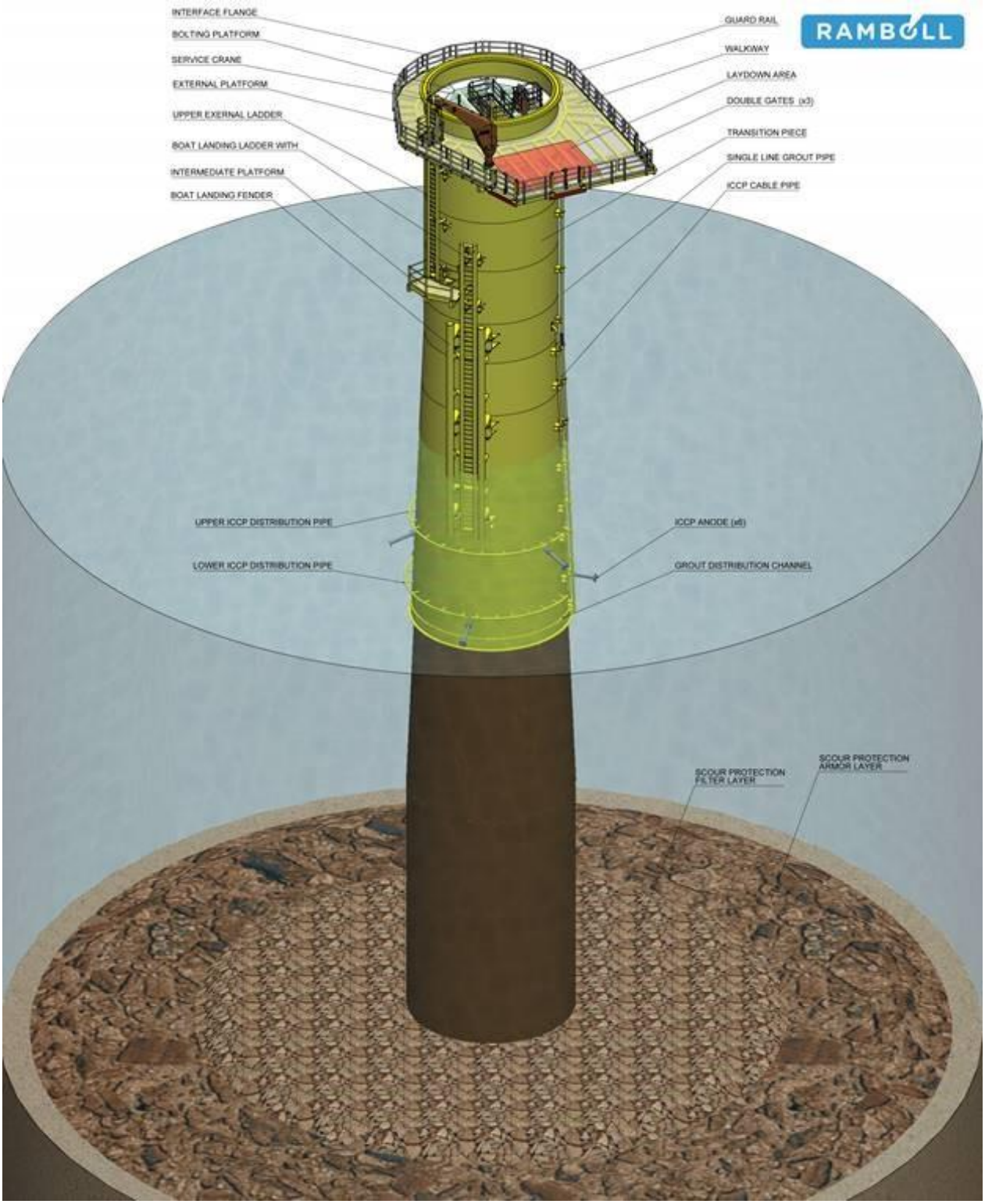

Figure I-1-3. Wind Turbine Generator Foundation

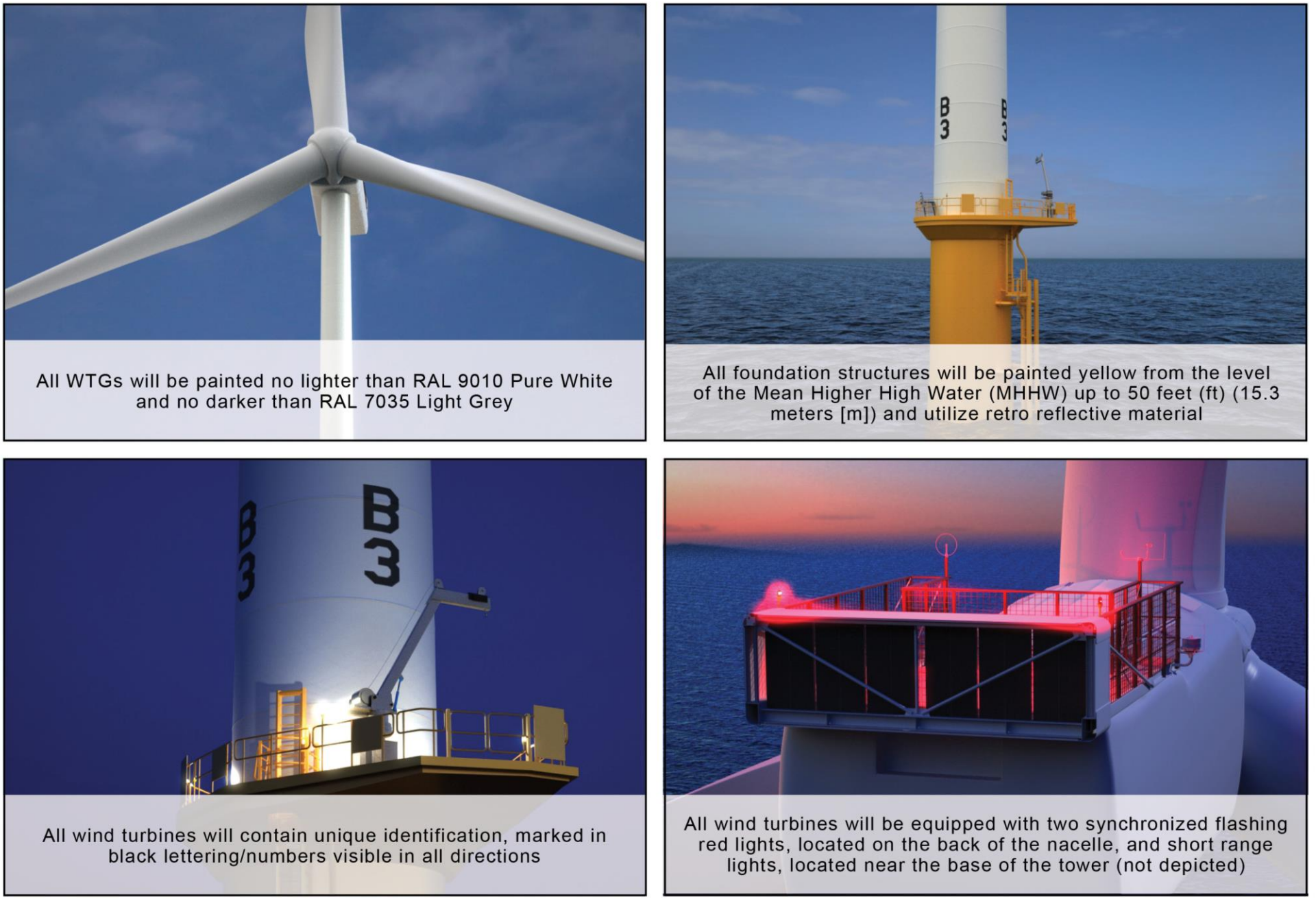

Figure I-1-4. Wind Turbine Generator and Foundation Paint, Identification Markings, and Aircraft Obstruction Lighting

In accordance with IALA 0-139 and USCG Local Notice to Mariners Entry 33-20, the following also apply:

- A Significant Peripheral Structure (SPS) is the "corner" or other significant point on the periphery of the Project. Every individual SPS should be marked by sufficient lights so as to be visible to the mariner from all relevant directions in the horizontal plane.
- In accordance with IALA 0-139, SPS lights will be flashing yellow with a nominal 5 nm (9 km) range. In addition to SPS lights, Intermediate Peripheral Structure (IPS) lights are located on the periphery of a wind farm and will be located between SPS lights, as needed. IPS lights will be 2.5 second flashing yellow with a nominal range of 3 nm, and all other WTGs will be marked with 6 or 10 second flashing yellow lights with a nominal range of 2 nm, but synchronized to a different flash sequence than SPS and IPS lights. All lighting will be visible to mariners from all directions in the horizontal plane. There will be no unlit separations or gaps of more than 0.5 mi (804 m) around the perimeter and no unlit separations or gaps of more than 1 mi (1.6 km) within the grid of turbines. Additionally, the distance between SPSs should not normally exceed 3 nautical miles.
- Selected intermediate structures on the periphery of a wind farm other than the SPSs should be marked with flashing yellow lights which are visible to the mariner from all relevant directions in the horizontal plane. The flash character of such lights should be distinctly different from those displayed on the SPSs with an operational range of not less than 2 nm. The lateral distance between such lighted structures or the nearest SPS should not exceed 2 nm.
- All maritime Aids to Navigation on the structure of a WTG should be mounted below the lowest point of the arc of the rotor blades. They should be exhibited at a height above the level of the Highest Astronomical Tide of no less than 20 ft (6 m) and no more than 50 ft (15 m).
- All temporary foundation base, tower, and construction components will be marked with only quick flashing yellow obstruction lights visible in a 360-degree arc with a 5-nm operational range. All necessary notifications will be made to the USCG.

WTG navigational lighting is shown on Figure I-1-5.

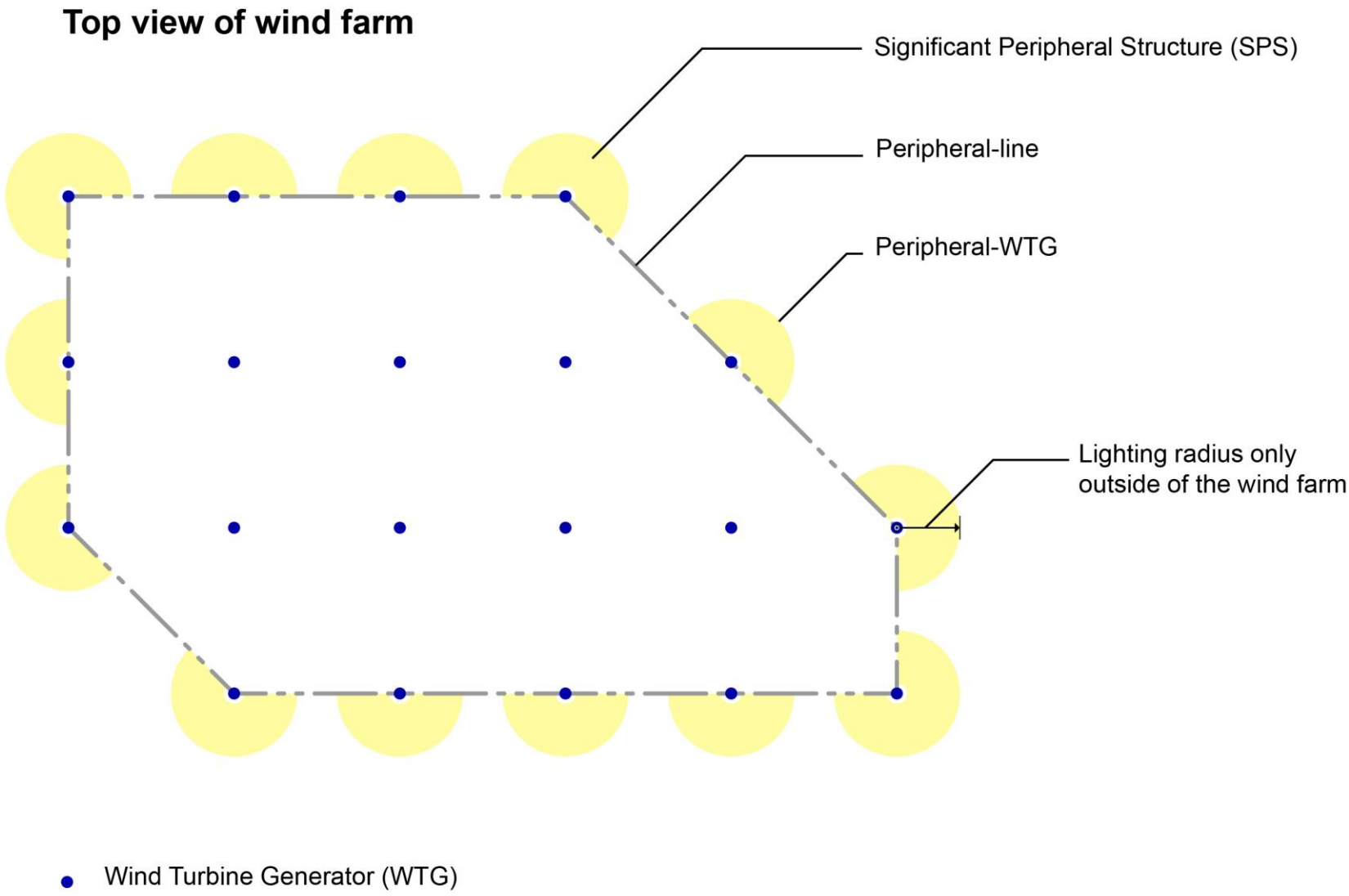

Figure I-1-5. Navigation Lighting Requirements for Wind Turbines

I-1.2.4 Inter-Array Cables

The Inter-Array Cables will carry the electrical current produced by the WTGs to the Offshore Substations. The Inter-Array Cable system will comprise a series of cable "strings" that interconnect a small grouping of WTGs to the Offshore Substations below the seafloor. The Inter-Array Cables will consist of strings of three-core copper and/or aluminum conductor, with a rated voltage of 72.5 kV and an operating voltage of 66 kV, connecting up to eight WTGs per string. The Preferred Alternative currently included in the PDE for the Inter-Array Cable strings includes variable cable dimensions. The Preferred Alternative would utilize all-copper conductor cables with the largest cable diameter of 7.9 inches (200 millimeters). The smallest diameter cable would be used to connect the WTGs located furthest from the Offshore Substation, which would then transition to the medium and then largest cable diameter as the Inter-Array Cables approach the Offshore Substation.

I-1.2.5 Offshore Substation

In addition to the WTGs, the Project will require the installation of up to three Offshore Substations. The Offshore Substations will have a maximum width of 203 ft (62 m) and length of 230 ft (70 m). The maximum height of the Offshore Substations will be 220 ft (67 m) measured from Highest Astronomical Tide to the top of the lightning protection and ancillary structures on the Offshore Substations. The Offshore Substations are anticipated to have nighttime lighting in compliance with applicable FAA and USCG guidance/regulations. Figure I-1-6 illustrates a piled jacket foundation.

For the purpose of the VIA, the maximum number and size of the WTGs proposed in the PDE is considered the worst-case scenario, because it will result in maximum visibility from shore at most viewing locations and encompasses the potential visibility of the Offshore Substations as they are located within the WTG layout and are shorter than the WTGs . Located at distances ranging from 29 mi (46 km) to 34.4 mi (55 km) from shore, it is anticipated that the Offshore Substations will likely not be visible from most inland locations, and would also be obscured from lower elevation shoreline viewing locations at a distance of 29 mi (46 km) or more due to curvature of the earth. The closest Offshore Substation may be partially visible from elevated viewing locations such as taller buildings (e.g., residential multiplexes, hotels) along the shore if viewing from an elevation greater than 125 ft (38.1 m).

I-1.2.6 Offshore Export Cables

Electricity would be transferred from each of the three Offshore Substations to the Cable Landing Location via three 3-core copper and/or aluminum-conductor 230-kV subsea cables, for a total of nine Offshore Export Cables. The Offshore Export Cable Route Corridor width associated with the three cables originating from each Offshore Substation would be 1,280 ft (390 m). Upon exiting the Lease Area, the three Offshore Export Cable Route Corridors originating at the Offshore Substations would merge to become one overall Offshore Export Cable Route Corridor containing all nine Offshore Export Cables. The Offshore Export Cable Route Corridor between the western edge of the Lease Area and the Cable Landing Location would range from 2,500 ft to 9,400 ft (762 to 2,865 m) wide.

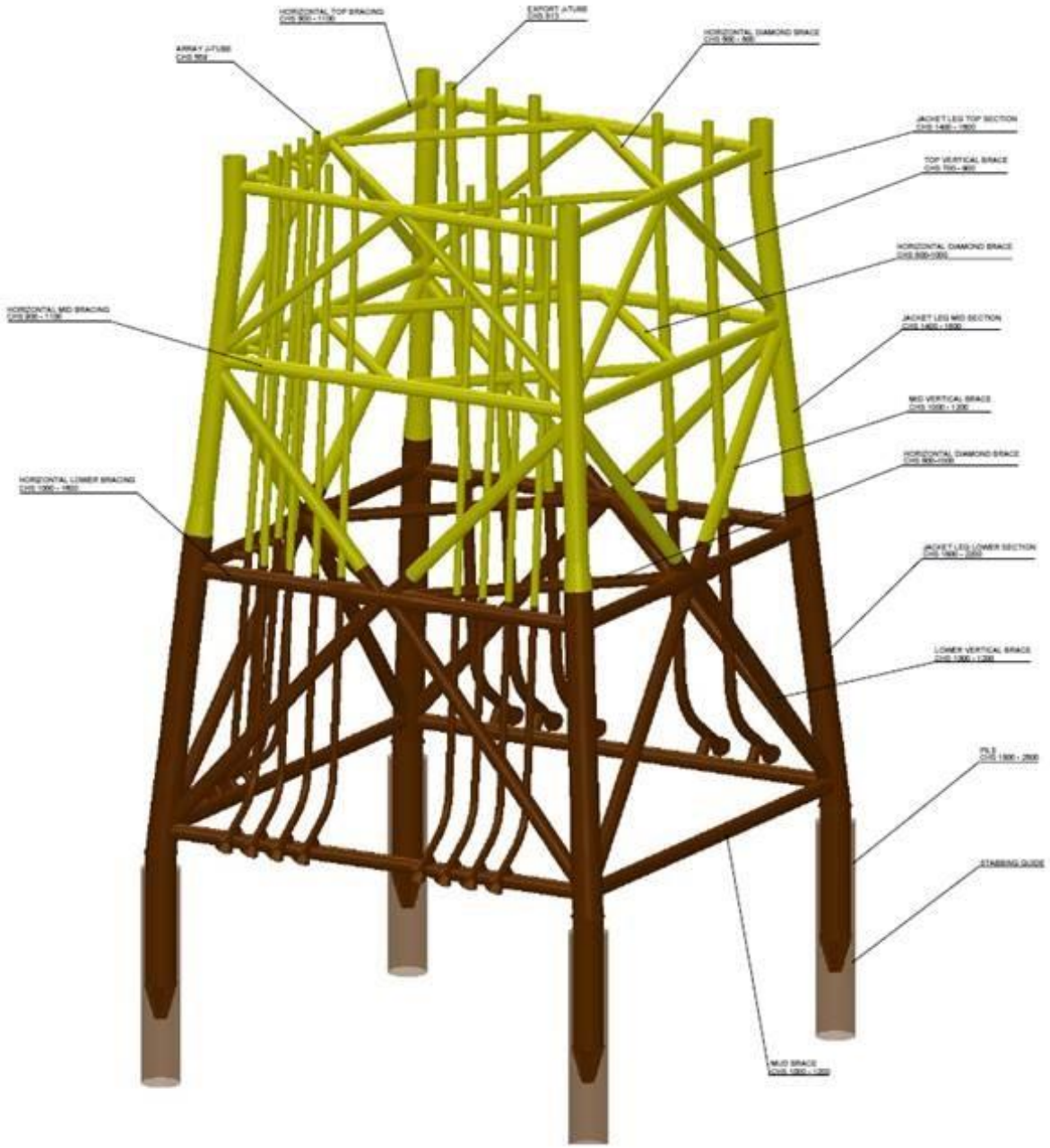

Figure I-1-6. Offshore Substation Foundation

I-1.3 REGULATORY SETTING

Several federal, state, and local agencies have regulatory authority over the Project, based on the location of the different Project components. The WTGs, Inter-Array Cables, and Offshore Substations will be located entirely within federal waters of the United States and within the OCS, and are under the jurisdiction of BOEM. The Offshore Export Cables will be located in both federal waters and the state waters of Virginia.

I-1.3.1 Federal and State

I-1.3.1.1 BOEM's National Environmental Policy Act Review

Assessments of visual resources are required to support BOEM's National Environmental Policy Act review process for a proposed Construction and Operations Plan on an offshore wind energy lease. BOEM's *Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan* (BOEM 2016) indicates that the visual resource assessment should apply appropriate viewshed mapping, photographic simulations, and field inventory techniques to determine, with reasonable accuracy, the visibility of the proposed project to sensitive and scenic viewpoints.

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

- The VIA must include an assessment of all currently proposed and future phases of development. This includes accurate and realistic photographic and virtual simulations, in addition to field inventory techniques and delineation of the onshore viewshed to determine the visibility of the Project. Simulations should illustrate sensitive and scenic viewpoints evaluating vantages from:
  - Variable heights at and above the beach and shoreline;
  - Variable heights at and above known protected areas (see 30 Code of Federal Regulations §§ 585.627[a][5] and [6]);
  - Variable heights at and above potential places or areas that are eligible for entry onto historic listings; and
  - Land cover types or frequented locations along the coastal area that are not directly on the beach.

The VIA should assess how seasonal sun angles, times of day, and meteorological conditions affect the above. The submission also should describe the potential visual impacts to any coastal prehistoric or historic resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places.

- The VIA should address key design elements, including:
  - Visual uniformity;
  - Use of tubular towers; and
  - Proportion and color of WTGs.

- The applicant must address FAA and USCG-required lighting while minimizing visibility from shore, such as through the use of directional aviation lights.
- The applicant must seek public input in evaluating the visual site design elements of the proposed facility.

The potentially affected areas fall within federal waters of the United States and state waters of Virginia. Therefore, to support the VIA, Dominion Energy has coordinated with stakeholders that have an interest in visual resources, including a meeting with BOEM on December 22, 2020 and May 27, 2021 (see Appendix L, Agency and Stakeholder Engagement, for additional information). As part of this outreach, Dominion Energy provided background information on the Project, including the scope, as well as the methodology proposed to identify, inventory, and evaluate visual resources within the Project Area. Stakeholder feedback was used to inform the Offshore Visual Study Area, as well as confirm the methodology and baseline characterization, and to inform Dominion Energy's planning and proposed mitigation measures.

I-1.3.1.2 BOEM's Seascape, Landscape, and Visual Impacts Guidance

BOEM recently released guidance, *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States* (BOEM 2021a), describing the methodology for seascape, landscape, and visual impact assessments that BOEM uses to identify the potential impacts of offshore wind energy developments in federal waters on the OCS of the United States. In comments on the Study Plan for this VIA provided by BOEM in May 2021, BOEM requested that certain elements of this analysis described in the guidance be incorporated into this VIA. Because the VIA was already underway, BOEM indicated that not all requirements outlined in the guidance would need to be addressed, but requested the following be included:

- Incorporate the scale of visual prominence listed in *Offshore Wind Turbine Visibility and Impact Threshold Distances* (Sullivan 2013a).
- Evaluate the ability to breakdown Landscape Similarity Zones (LSZ) further and characterize the seascape and landscape character areas and consider the adjacent ocean character area.
- Include simulations for each LSZ identified at variable distances and elevations.
- Include scale of change in the visual impact analysis in addition to visual contrasts.
- Include viewer types and characteristics and activities user types are engaged in throughout the analysis.
- Host a technical session to discuss the VIA approach relative to the recently released guidance.

I-1.3.1.3 Coastal Zone Management Program

The National Coastal Zone Management Program was established as part of the Coastal Zone Management Act, which was enacted in 1972 to address issues associated with continued growth in coastal zones (NOAA 2019). The National Coastal Zone Management Program and federally approved individual state programs comprehensively addresses the nation's coastal issues through a voluntary partnership between the federal government and coastal and Great Lake states and territories and provides the basis for "protecting, restoring, and responsibly developing our nation's diverse coastal communities and resources" (NOAA

2019). Permitting systems are established to control activities that affect coastal resources. Jurisdictions that oversee these permitting systems vary state-by-state but generally fall within one of two categories: state-only jurisdiction or shared state and local jurisdiction (Rath 2018).

I-1.3.1.4 Virginia Coastal Zone Management Program

The Virginia Coastal Management Program was approved by The National Oceanic and Atmospheric Administration (NOAA) in 1986, and the Department of Environmental Quality serves as the lead agency. Authorized by a commonwealth executive order, the coastal management program is structured as a network of agencies that have authority for implementing nine core policies and a set of advisory policies covering wetlands, fisheries, water quality, dunes and beaches, subaqueous lands, and other coastal resources in the Virginia coastal zone. The coastal zone includes the state's 29 coastal counties, 17 cities, and 42 incorporated towns.

I-1.3.1.5 North Carolina Coastal Zone Management Program

The North Carolina Coastal Management Program, approved by NOAA in 1978, is administered by the Division of Coastal Management within the Department of Environment and Natural Resources. The primary authority for the coastal management program is the Coastal Area Management Act. North Carolina's coastal zone includes 20 coastal counties that in whole or in part are adjacent to, adjoining, intersected, or bounded by the Atlantic Ocean or any coastal sound.

I-1.3.1.6 Virginia Scenic Highways and Byways

Scenic highways and Virginia Byways are designated under Title 33.2-405 of the Code of Virginia. The 2018 Virginia Outdoors Plan[1] includes Chapter 10 on Scenic Resources, which describes several visual resource programs in Virginia including the Virginia Byways Program. In order to be designated as a Byway, a road (or portion of) must meet several criteria:

- The route provides important scenic values and experiences.
- There is a diversity of experiences, as in transition from one landscape scene to another.
- The route links together or provides access to scenic, historic, recreational, cultural, natural, and archeological elements.
- The route bypasses major roads or provides opportunities to leave high-speed routes for variety and leisure in motoring.
- Landscape control or management along the route is feasible.
- The route allows for additional features that will enhance the motorist's experience and improve safety.
- Local government(s) has/have initiated zoning or other land-use controls, so as to reasonably protect the aesthetic and cultural value of the highway.

[1] https://www.dcr.virginia.gov/recreational-planning/document/vopchapt10.pdf

There were no North Carolina state byways or federal scenic highways identified in the Offshore Visual Study Area.

I-1.3.2 Local Land Use Plans and Guidance

I-1.3.2.1 Moving Forward: City of Chesapeake Comprehensive Plan 2035

Moving Forward: City of Chesapeake Comprehensive Plan 2035 (Chesapeake Bay Planning Department 2018) outlines the vision for the City of Chesapeake's physical environment, built environment, and land use for 2023. The plan is a proactive measure to ensure that new development and structures support and improves upon the existing and current development. Actions strategies that outline guidelines for the visual character of the city, include:

- Achieve a harmonious and balanced land use pattern with attention to development-related lighting to address light pollution.
- Construct local utilities and community facilities in consideration to local infrastructure and design.
- Design commercial infrastructure with consideration to building placement, size, and height when adjacent to residential areas.
- Ensure that all new development will be designed to have a minimum impact on open space, natural areas, and waterfronts (Chesapeake Bay Planning Department 2018).

I-1.3.2.2 City of Norfolk's Comprehensive Plan

PlaNorfolk2030 (City of Norfolk 2021) is the City of Norfolk's comprehensive plan, which serves as a guide for the future physical, social, and economic development as a basis for land use decisions within the city. Actions and goals associated with enhancing visual and scenic resources and utilities include:

- Action LU1.2.16. "Ensure that the design and scale of public utility structures are in keeping with the surrounding uses and that the placement minimizes physical or visual obstructions and avoids environmentally sensitive areas."
- Action LU1.2.17. "Develop design guidelines for public utility structures."
- Action N3.1.1. "Develop and prioritize a list of improvements to public spaces, including streets, which can serve to enhance visual character and improve the environment."

I-1.3.2.3 City of Virginia Beach Comprehensive Plan

It's Our Future: A Choice City – City of Virginia Beach Comprehensive Plan (City of Virginia Beach 2020) uses the moto "A Community for A Lifetime" and "Living the Life" to reflect on enhancing the community, its outdoor space, small businesses, and residents in sustainable manner, using long-term strategic city planning. Goals and discussion associated with enhancing the visual design of new structures on the shore and along the shoreline include:

- "Rediscovering the waterways…creating more visual and public water access points along an extensive public trail system is an underlying design principle."
- Provisions of Section 1804 in Zoning Ordinance:

  - "Significant landscape buffers should be established between existing residential areas and proposed developments and roadways to mitigate the adverse visual and noise concerns."
  - "Integrate adjacent land uses such that each complements the other visually, functionally, and spatially with attractive landscaped vistas, open space areas and multipurpose trails, and other amenities to enhance the quality of the physical environment and provide connectivity."
- Light policies:
  - "All outdoor lighting should be of a design that accentuates the site and provides sufficient illumination for the development without projecting light and glare onto adjacent properties or into the sky."
  - "Lighting poles should be of minimum height, possessing a pedestrian scale, but provide adequate illumination."
  - "Lighting of non-residential buildings should be designed as an integral part of the building's architecture to be as unobstructive as possible. Lighting especially on the rear of buildings that face residential areas should be designed and placed so that it does not direct or reflect any illumination into residential properties."

I-1.3.2.4 Currituck County, North Carolina

The Imagine Currituck 2040 Vision Plan (Currituck County 2019) satisfies the Coastal Area Management Act requirement to produce and adopt a local land use plan for Currituck County that replaces the 2006 Currituck County Land Use Plan. Bound by the Atlantic Ocean to the east and Currituck Sound to the west, the Currituck Outer Banks are a major tourist destination attracting hundreds of thousands of visitors per year. Caratoke Highway provides the primary point of access to the Outer Banks, transporting visitors through the Mainland and across the Currituck Sound (Currituck County 2019). Geographical areas addressed within the plan relevant to this Project include the Off-Road Area and the Corolla Area. Some guiding principles of the plan include:

- Ensure that new development preserves physical and visual public access to the waterfront.
- Plan for additional public access areas with diverse recreation activities including boat, canoe and kayak launches, marinas, docks, scenic outlooks, boardwalks, swimming, and crabbing areas.
- Consider property acquisition or easements along shorelines and waterfronts or within marsh areas for increased public access opportunities.

The Off-Road Area is an exceptionally distinct geography. Located north of milepost 13 on NC 12 on the Outer Banks, it comprises large areas of protected wildlife preserves and is the last remaining habitat of the Corolla Wild Horses. The wild horse population attracts thousands of visitors a year and has inspired the establishment of commercial wild horse tours. The Off-Road Area is accessible by driving on the beach (Currituck County 2019). In this geographical area, some land use policies include:

- Explore the feasibility of public-private partnerships with landowners and conservation agencies to acquire lots in the Off-Road Area for conservation, open space preservation.
- Limit development intensity by exploring increased building setbacks and decreased lot coverage allowance.

The Corolla Area includes the Outer Banks from the Dare County line north to the Off-Road Area beach access. This area includes Corolla Village, residential subdivisions, several planned unit developments, and four concentrated commercial areas along North Carolina Highway 12. In comparison to the other geographic areas of the County, Corolla is densely populated during summer tourist season and highly developed. The area experiences a surge in residents and tourists during the spring and summer months who come to visit Corolla's outstanding natural resource areas, including the beaches. While Corolla's economy is driven by tourism, the seasonal increase in visitors often strains the County's infrastructure. As the annual number of visitors to the County is projected to continue growing over the next several years, strategic planning for transportation, infrastructure, land use, and conservation is critical for ensuring appropriate development, adequate infrastructure, and conservation of sensitive natural areas. In this geographical area, some land use policies include:

- Protect tourism interests and support and enhance a family-oriented beach environment.
- Protect and preserve natural resources for the crucial role they play in the County's tourism and economic development potential.
- Continue to improve access to estuarine shorelines and beaches.
- Encourage waterfront eco-tourism in Corolla along the estuarine shoreline, including compatible uses in Historic Corolla Park.

I-1.4 RESOURCE INVENTORY

BOEM has recently developed methodology for seascape, landscape, and visual impact assessments to be used on future offshore wind energy projects (BOEM 2021a). The guidance and comments from BOEM on the Study Plan were reviewed and are incorporated in this VIA. Additionally, a standard inventory and assessment approach that applied certain elements of the U.S. Bureau of Land Management (BLM) Visual Resource Management (VRM) system and Sullivan et al. (2013a) visibility rating and observed distances was used for this VIA.

Key steps in the methodology include establishing a study area, inventorying visual resources in the study area, identifying sensitive viewing locations and key observation points (KOP), conducting fieldwork to assess the existing visual character of the seascape and landscape and to inventory KOPs, creation of visual simulations, and assessing impacts and potential mitigation. BOEM was provided with a proposed list of KOPs that were discussed in a workshop on May 27, 2021. Comments and suggestions have been incorporated in the KOP list in this VIA.

I-1.4.1 Offshore Visual Study Area

The theoretical limit of visibility of the representative WTGs was used to establish the Offshore Visual Study Area and was determined by the distance between the viewer and the structure, the height of the structure, the elevation of the viewer, and the curvature of the earth.[2] Figure I-1-7 shows a scaled graphic demonstrating how the representative WTGs will disappear below the horizon, accounting for curvature of

[2] Curvature of the Earth is discussed in Section I-1.5.1.2.

the earth, based on viewer distance, from the perspective of a viewer at sea level (on the beach).[3] The nacelle (hub), full rotor blades, and the tower are shown as visible above the horizon line at 5.3 mi (8.5 km). The nacelle (hub) is shown as visible just above the horizon line at 16.6 mi (26.7 km). Therefore, the lights on the nacelle are also located just above the horizon line and are potentially visible. At 31 mi (49.9 km), the tip of the rotor blade (in the upright position) will be above the horizon line.

Two CVOW Pilot Project WTGs are located within the Offshore Visual Study Area, in Research Lease OCS-A 0497 just to the west of the Project Area. The presence of these WTGs provide a high level of confidence in both visual assumptions and simulations by providing a real-world benchmark to evaluate and understand potential visual impacts. The Pilot Project WTGs were installed in the summer of 2020, were provisionally accepted in October 2020 and entered commercial operations in January 2021.

Visual assessments conducted for proposed offshore wind farms in the United States have applied study areas that range from approximately 25 to 40 mi (40 to 64 km), depending on the size of the proposed WTG, the WTG layout, and the surrounding landscape (Sullivan et al. 2013a; Deepwater Wind 2012; BOEM 2015). A study prepared for BOEM found that small to moderately sized wind facilities (wind farms with WTG hub [nacelle] heights ranging from approximately 219 to 295 ft (67 to 90 m) above mean sea level (aMSL) "were noticeable to casual observers at distances of almost 18 mi (29 km); and were visible with extended or concentrated viewing at distances beyond 25 mi (40 km)" (Sullivan et al. 2013a). The findings of this study were based on observations of operational wind farms in Europe with WTGs that were smaller than those proposed for the Project; therefore, consideration of a larger study area is appropriate for this VIA. In an earlier study of onshore wind energy impacts, Sullivan et al. (2013a) showed maximum visibility distances of moderately sized WTGs at greater distances than the offshore study distances mentioned above. Both studies established that even moderately sized wind farms with modestly sized turbines can be visible both day and night at long distances. Both studies also discussed the trend towards larger WTGs (BOEM 2021b).

Figure I-1-8 is a similar scaled graphic, showing the WTGs at varying distances based on a photograph from a coastal beach location. Although it is anticipated that the thin form of the rotor blades of the representative WTGs will not be noticeable or perceived by the casual observer, the use of the 40 mi (64 km) Offshore Visual Study Area around the Lease Area was used as a conservative estimate. This Offshore Visual Study Area consists of portions of the Delmarva Peninsula, Virginia Beach area, and the northern tip of North Carolina. The location and extent of the Offshore Visual Study Area is illustrated in Figure I-1-9.

[3] Figure I-1-7 and Figure I-1-8 do not account for atmospheric refraction.

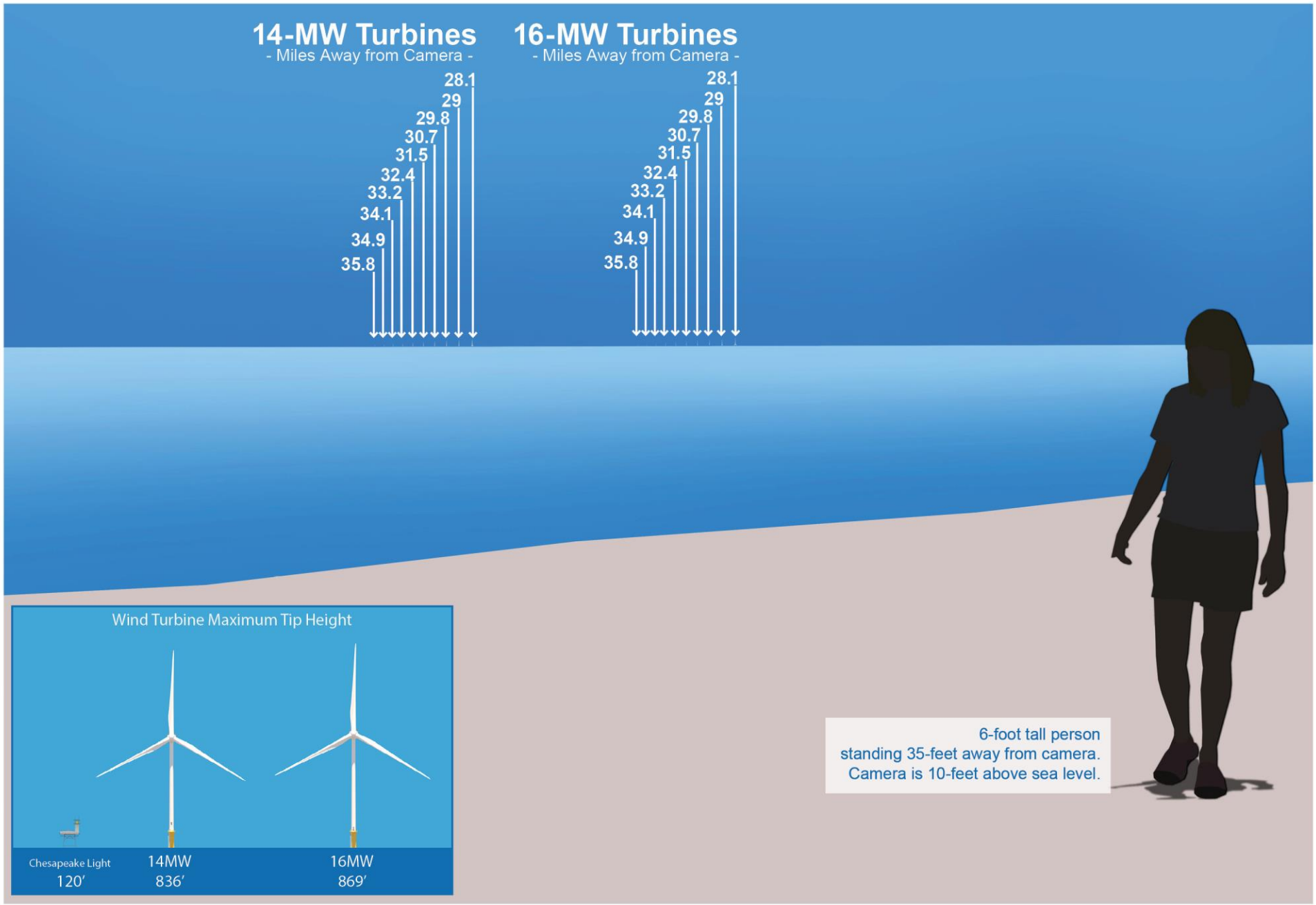

Figure I-1-7. Wind Turbine Visibility at Varying Distances

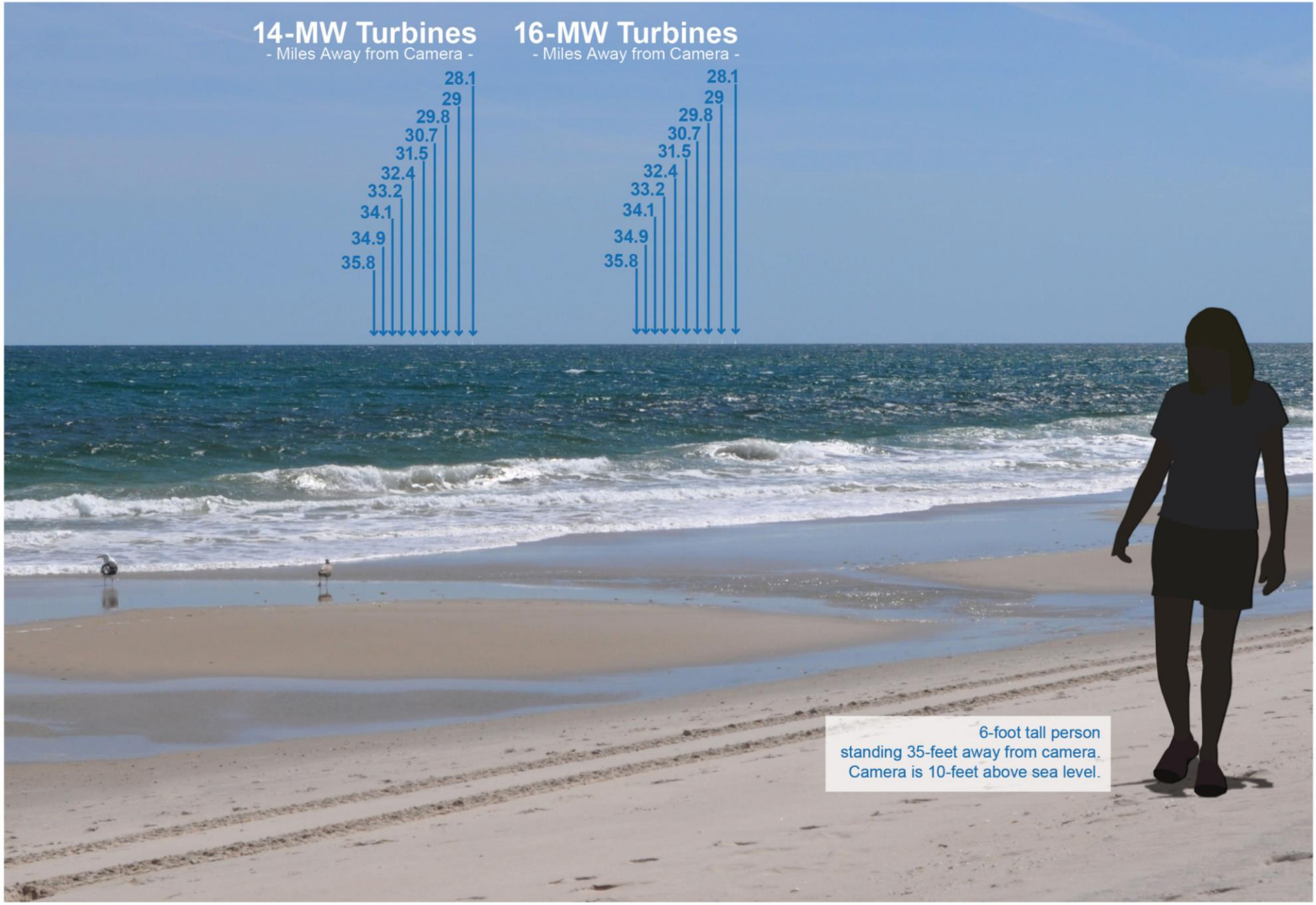

Figure I-1-8. Perspective Simulation

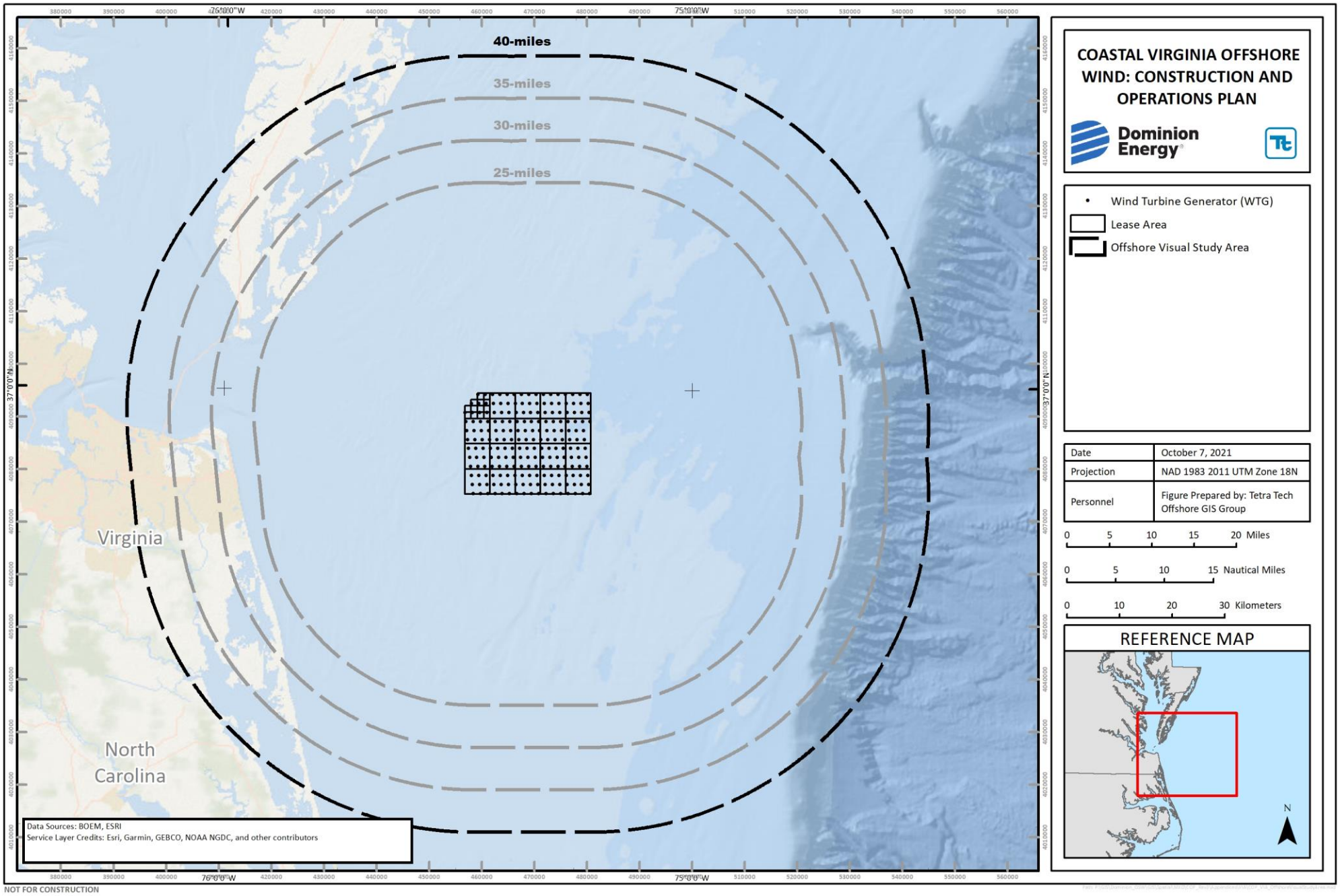

Figure I-1-9. Offshore Visual Study Area

Conditions that may vary with seasonality and/or time of day, such as atmospheric conditions and lighting angle that may reduce potential visibility, were not considered in establishing the Offshore Visual Study Area in order to be conservative. However, they were considered when evaluating visual impacts. Other factors affecting Project visibility are discussed in Section I-1.5.1.2.

I-1.4.1.1 Viewshed Analysis

Figure I-1-7 and Figure I-1-8 are based on the perspective of a viewer at sea level. Angle of observation refers to the angle between the viewer's line of sight and an object's location. Angles of observation are typically described as inferior (in which viewers are situated at a lower elevation than the object), level (in which viewers are at the same elevation as the object), and superior (in which viewers are situated at a higher elevation than the object). While Figure I-1-7 and Figure I-1-8 are helpful to inform views from the beaches, land masses within the 40-mi (64-km) Offshore Visual Study Area have varying topography and structures with some superior views toward the Project from potentially sensitive viewpoints. When distance from the WTGs is consistent, viewers at higher elevations (superior views) will see larger portions of the WTGs when compared to viewing conditions at beach level. Therefore, viewshed analyses were performed to evaluate how topography will influence potential views of the WTGs and how that potential visibility may be influenced by the screening effects of tall buildings and vegetation.

A topographic viewshed analysis conducted using the representative WTGs is shown in Figure I-1-10 and Figure I-1-11.

This analysis was conducted using Environmental Systems Research Institute ArcGIS Pro 2.2.0 software with the Spatial Analyst extension to process 10-m Digital Elevation Models (DEMs) based on the National Elevation Dataset and height zones of visible components of the WTGs (foundation, entire rotor swept area, hub and above, and maximum blade tip). The topographic viewsheds represent "bare earth" conditions and were developed from WTG locations looking out to determine areas with potential visibility. The viewsheds accounted for both curvature of the earth and refraction, using the default values identified in the software. Figure I-1-10 and Figure I-1-11 show potential visibility zones for the offshore WTGs based on distance and topography only. The bare-earth modeling approach results in a conservative assessment of potential visibility and likely overstates the potential visibility of the WTGs. On Figure I-1-10 and Figure I-1-11, in the areas shown in blue, the WTG from the hub up will be visible. In the areas shown in purple, only the WTG blade tips would be potentially visible as they rotate above the horizon. It is important to note that these zones indicate potential visibility based on topography only and do not account for vegetation or development. The computer-generated viewshed analysis is a conservative representation of visibility and may not always match actual conditions on the ground. Many of these locations were fully or partially obscured by vegetation and/or development such as buildings and infrastructure when visited in the field.

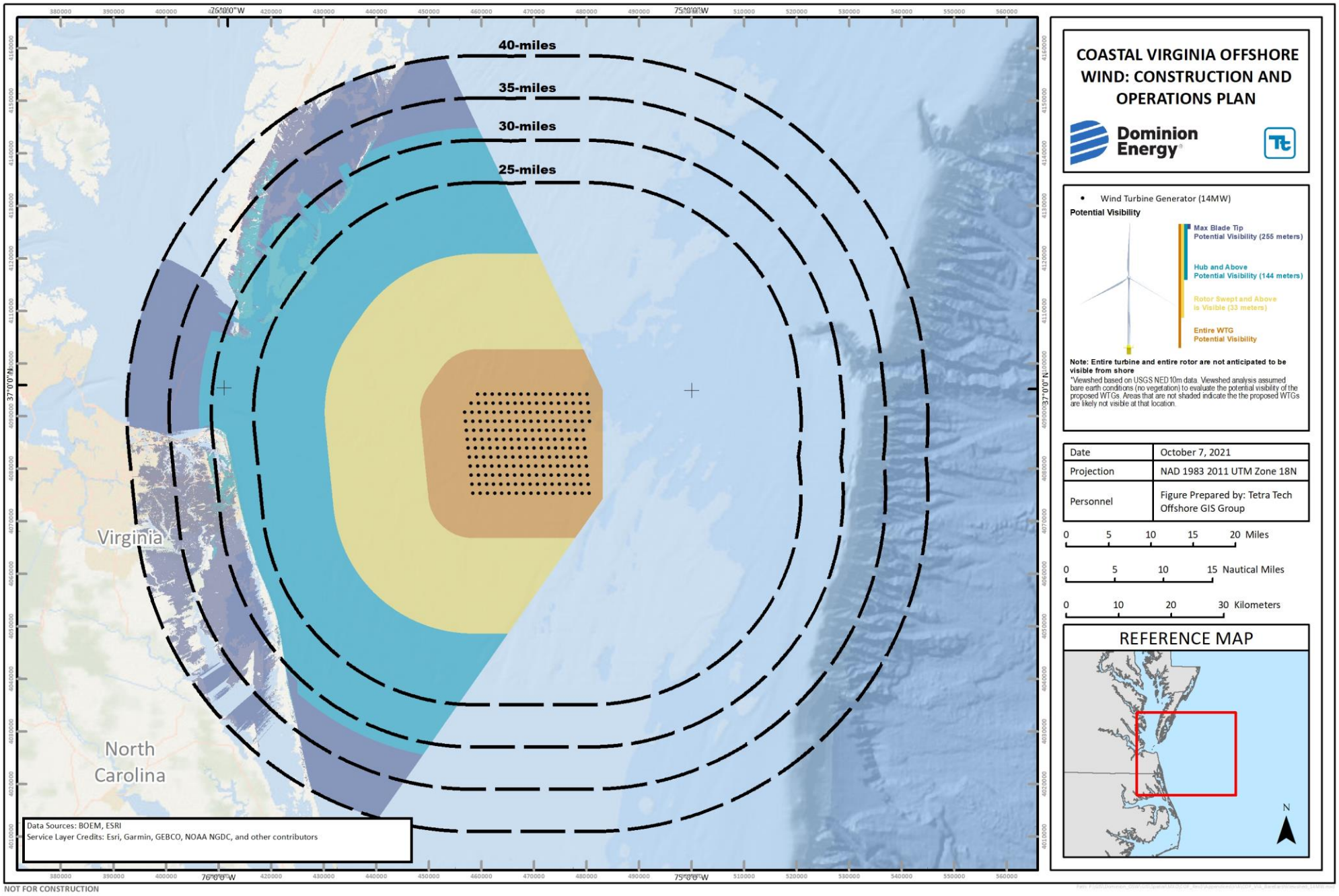

Figure I-1-10. Preferred Representative Wind Turbine Generator (14 MW) Indicative Layout Topographic Viewshed Analysis

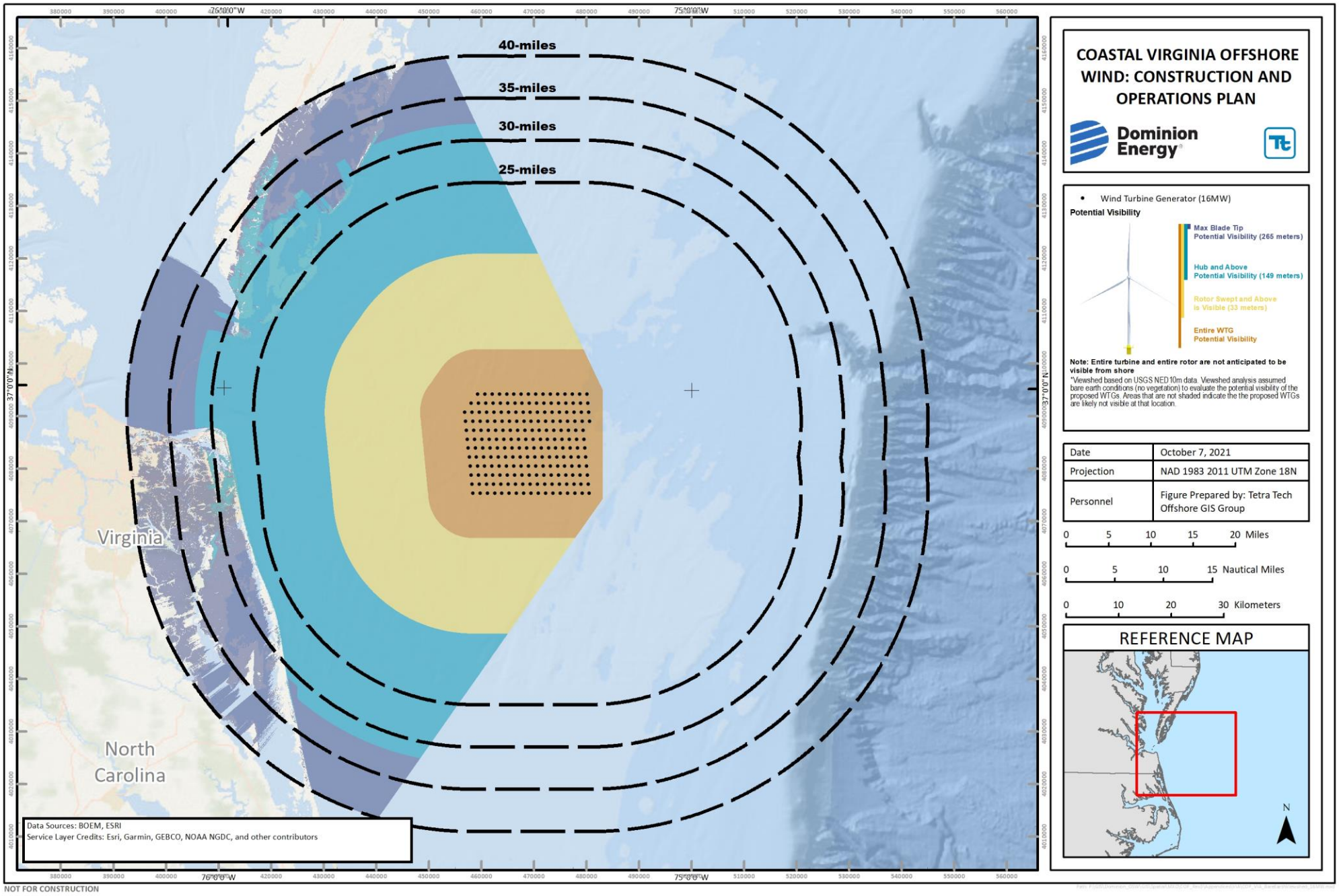

Figure I-1-11. Maximum Representative Wind Turbine Generator (16 MW) Indicative Layout Topographic Viewshed Analysis

To supplement the topographic viewshed analysis, viewsheds accounting for tall vegetation and buildings were also developed to identify areas within the Offshore Visual Study Area where visibility would be further limited by the screening provided by buildings and vegetation. These viewsheds helped to focus inventory and field visit efforts based on existing conditions (i.e., without-Project) within the landscape. These viewsheds were derived using a similar process as the topographic viewsheds described above. However, for these viewsheds, building footprints and heights were incorporated into the DEM model along with identifying the location and heights for tall vegetation to depict a more realistic assessment of potential visibility. Visibility results based on the viewshed analysis accounting for building heights and vegetation are shown in Figure I-1-12 and Figure I-1-13. As demonstrated in these viewsheds, WTG visibility will primarily be from shoreline areas and some elevated inland locations with ocean views.

I-1.4.2 Inventory Components

The inventory of visual resources considered the existing landscape and scenery as well as the viewers and KOPs within the Offshore Visual Study Area. These visual components are described below.

I-1.4.2.1 Seascape/Landscape and Scenery

Scenery is the aggregate of features that give character to the landscape (BLM 1984). Typically, every landscape comprises varying characteristics of landform, vegetation, existence of water, color, scarcity, adjacent scenery, and cultural modifications; all of which combine to exhibit landscape character (BLM 1986a). Seascape is a combination of adjacent land, coastline, and sea within an area defined by a mix of land-sea visibility and coastal landscape character assessment with divisions between points. Existing conditions in the Offshore Visual Study Area were evaluated by means of aerial photography and field reconnaissance to determine where and to what extent cultural modifications have affected natural settings. Existing conditions observed during the inventory processes are described in Section I-1.4.3.

I-1.4.2.2 Viewers/Key Observation Points

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

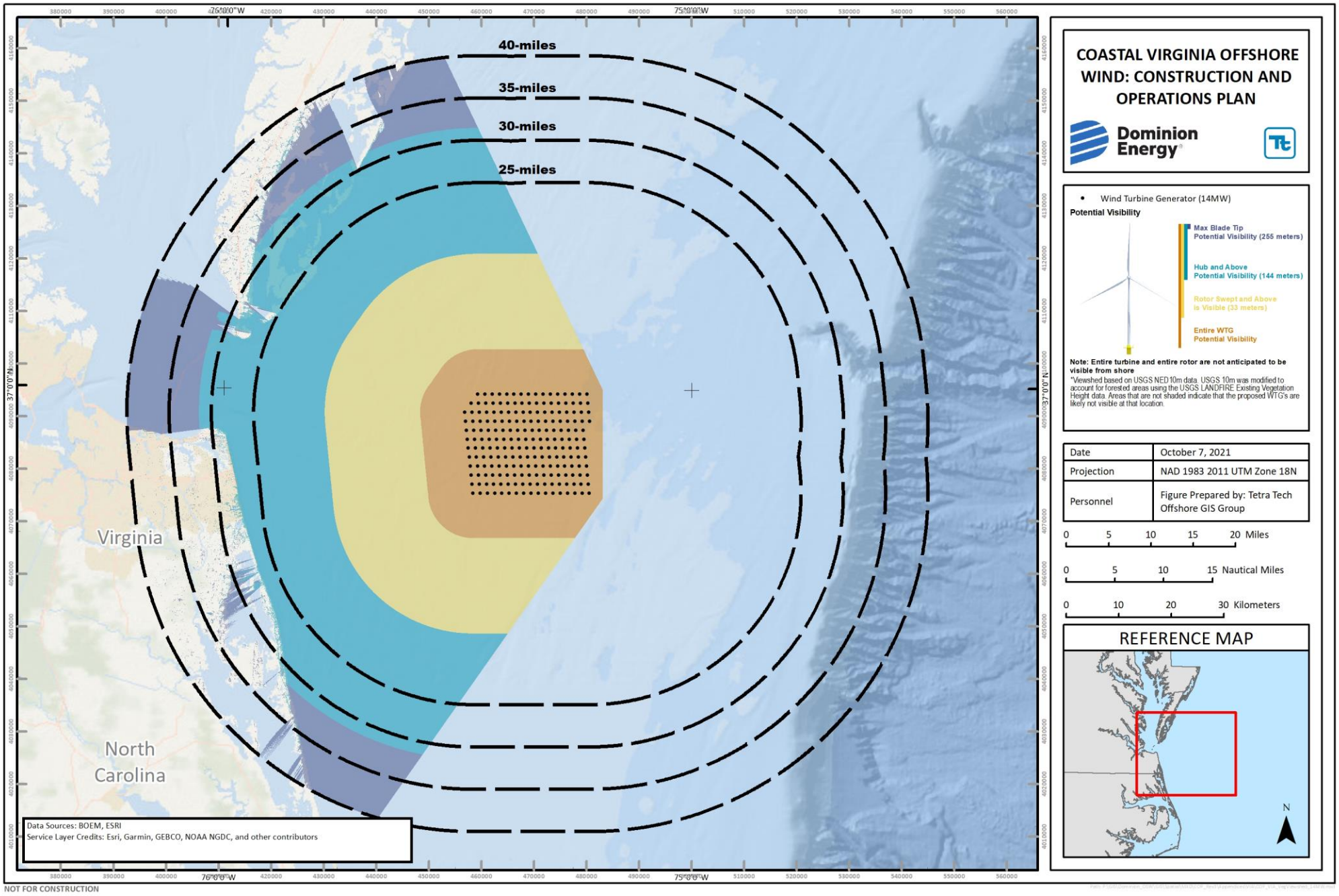

Figure I-1-12. Preferred Representative Wind Turbine Generator (14 MW) Indicative Layout Refined Viewshed Analysis

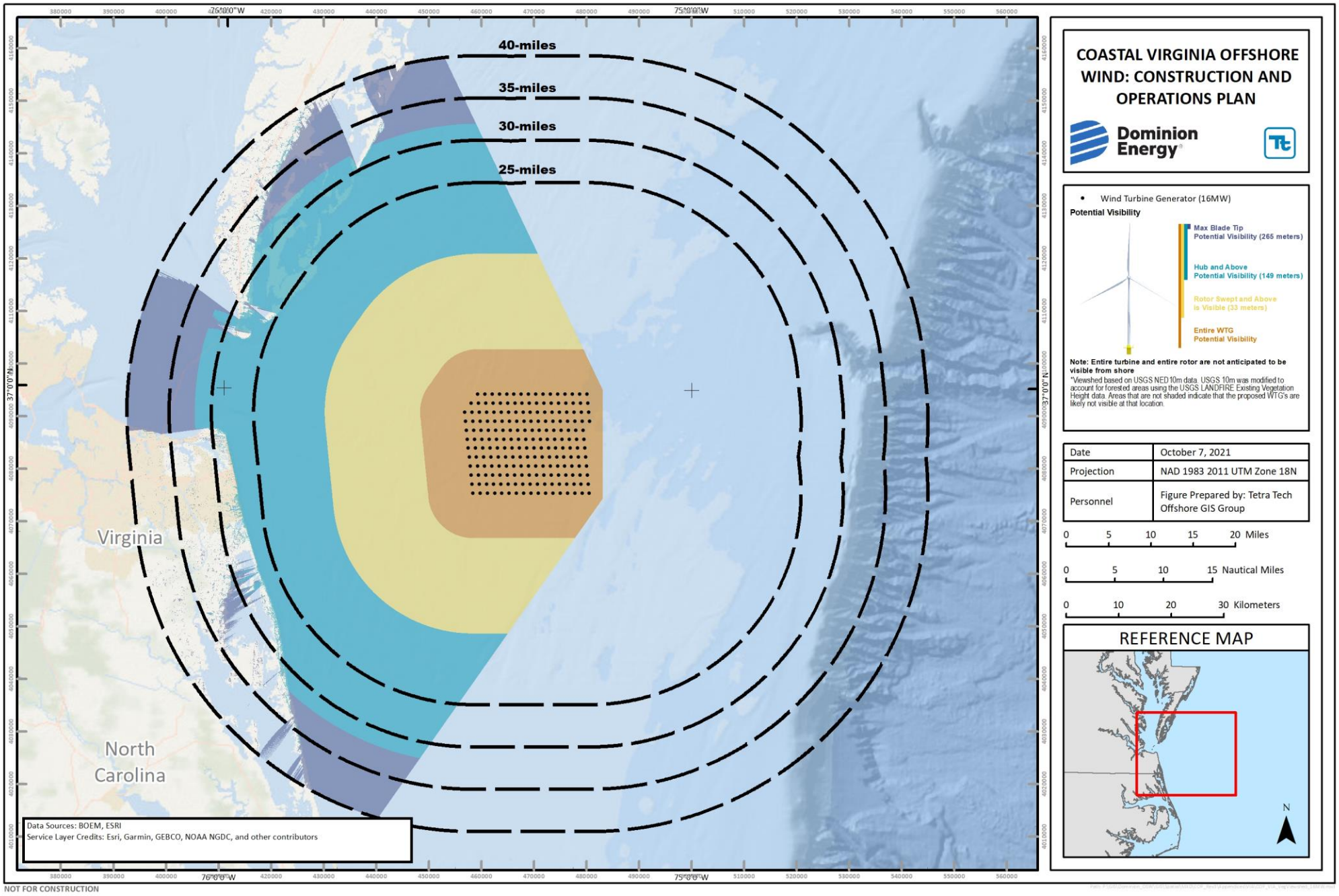

Figure I-1-13. Maximum Representative Wind Turbine Generator (16 MW) Indicative Layout Refined Viewshed Analysis

I-1.4.2.3 Field Visits

Field visits to the Visual Study Area were conducted to properly assess the existing visual character of the landscape and to inventory current conditions at a set of sensitive viewing locations. The field inventory included three components: (1) identification and photo-documentation of sensitive viewing locations; (2) classification of visual sensitivity at the locations visited; and (3) description of expected Project visibility from locations visited. Following the field inventory, a subset of the sensitive viewing locations was selected as representative KOPs for use in the impact evaluation. An initial field visit to the Visual Offshore Study Area was conducted May 2021 after preliminary KOPs had been identified. Additional field visits were conducted in July and September 2021 to complete the visual resource inventory for the Offshore Project Components by visiting and photo-documenting locations identified through agency and stakeholder outreach, and to capture nighttime photography and video documentation for the 24-hour time lapse video simulations.

Digital photographs were captured at each location visited in the field. Attachment I-1-1, Table I-1-1**,** and Table I-1-2 provide the locational details for photographs taken during the initial field visit and subsequent field visits and a description of the existing views for the locations initially identified as potential areas of interest within the Offshore Visual Study Area, as follows:

- Offshore Visual Study Area – 20 locations total:
  - 16 locations in Virginia; and
  - 4 locations in North Carolina.

I-1.4.3 Summary of Inventory Results

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

I-1.4.3.1 Landscape Character/Existing Conditions

I-1.4.3.1.1 Regional Seascape Character

The Offshore Visual Study Area for the Offshore Project Components is a vast area composed of a variety of landscapes and seascapes. The existing seascape character provides the context for assessing the effects of changes to the seascape. Seascape character is identified and described as the character of coastal and marine areas. Seascapes, like landscapes, reflect the relationship between people and place and the part it plays in forming the setting to our everyday lives. To assess impacts to the seascape's visual character and quality, it is important to establish the context for the visual environment at both a regional level and at a project-specific level.

The Offshore Project Area is located entirely within the Atlantic Ocean. This area is characterized by broad expanses of open water. The surface of the water varies from smooth and relatively level during calmer weather to undulating and choppy during more turbulent weather conditions. Also varying with weather conditions is the color of the water's surface, which can range from blue to silver to dark gray. Existing human-made visual intrusions that are evident near Offshore Project Components include marine vessel

traffic coming and going from Chesapeake Bay, including barges, container ships, cruise ships, commercial and recreational fishing, recreational boating, military vessels, and ferry transportation. In addition, buoys, channel markers, and warning lights are located within and around the Offshore Project Components. The Chesapeake Light is located 15 miles offshore and two existing WTGs associated with the Coastal Virginia Offshore Wind Pilot Project are located adjacent to the Lease Area. Closer to shore, whale and dolphin watching boat tours operate seasonally.

I-1.4.3.1.2 Regional Landscape Character

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

U.S. Environmental Protection Agency Level IV ecoregions of Virginia and North Carolina were used to develop a description of the existing landscape character within the Offshore Visual Study Area. Ecoregions provide a foundation for describing visual character at the regional level because they are defined based on multiple elements similar to those used in the BLM's VRM for inventorying and assessing scenic quality (BLM 1986a). These factors include physiographic elements of landform, vegetation, and water, and cultural modifications, defined as human/human-made modifications to the landscape. Level IV ecoregions of Virginia and North Carolina that cross the Offshore Visual Study Area include Chesapeake-Pamlico Lowlands and Tidal Marshes, Delmarva Uplands, and Virginian Barrier Islands and Coastal. Landscape conditions within these Level IV ecoregions are discussed below.

Chesapeake-Pamlico Lowlands and Tidal Marshes

The Chesapeake-Pamlico Lowlands and Tidal Marshes is a flat, low-elevation region mostly surrounding the Chesapeake Bay and the larger tidal rivers and sounds in North Carolina. This region is low elevation and almost completely level, and is characterized by extensive brackish wetlands, marshes, ponds, and swampy, slow-moving streams. Tidal marshes are most common on the flatter eastern shore of the Chesapeake Bay, as well as the portions of this region in North Carolina. Parts of the area, especially in the south, have soils that are seasonally wet in winter and early spring (bplant 2021).

Natural vegetation is Oak-Hickory-Pine forests on drier ground, with dominant species being hickory, longleaf pine, shortleaf pine, and loblolly pine, along with white oak and post oak. There are also southern floodplain forests and northern cordgrass prairies. This region also had a large portion of nonriverine wet hardwood forests, with dominant trees including swamp chestnut oak, cherrybark oak, laurel oak, water oak. Better-drained sites are commonly used for agriculture, including production of corn, wheat, soybean, and potato but significant forest cover also remains, and there is significant poultry production. Significant areas have been drained for agriculture. Although much of this region is sparsely populated, it contains significant urban and industrial areas around the Hampton Roads area, as well as some military installations (bplant 2021).

Portions of the Offshore Visual Study Area south of Chesapeake Bay into North Carolina are within this ecoregion.

Delmarva Uplands

The Delmarva Uplands are a region located on the interior uplands of the Delmarva Peninsula and covering the bulk of the peninsula.

The landscape ranges from gently rolling hills to relatively flat areas. The central ridge of the peninsula, which has only a subtle slope, runs through this region; local relief is at most 50 feet and much less in most places. The most rugged topography is found in the northwest of the region, with cliffs and gorges along the Chesapeake Bay. Especially along the eastern shore of the Chesapeake Bay, there are many wet, shallow depressions with sandy rims, similar to the Carolina Bays farther south, and sometimes called Delmarva Bays.

The original forests have been cleared in this area, and today this area is heavily utilized for agriculture. Major crops include corn, soybeans, fruits, and assorted truck crops. There is also significant poultry, livestock, and dairy farming, and some commercial forestry. About two-thirds of the Delmarva Bays have been altered or drained for agriculture.

The northern boundary of this region, with the Piedmont Uplands is marked by a fall line. A small border of this region to the northwest is marked by a more gradual transition to the slightly hillier Chesapeake Rolling Coastal Plain. To the west, this region transitions into the Chesapeake-Pamlico Lowlands and Tidal Marshes along the eastern shore of the Chesapeake Bay. To the east, this region is bordered by the Delaware River Terraces and Uplands along the Delaware River and Bay, and farther south, along the ocean, by the Virginian Barrier Islands and Coastal Marshes.

Portions of the Offshore Visual Study Area along the inland Delmarva Peninsula are within this ecoregion.

Virginia Barrier Islands and Coastal Marshes

The Virginia Barrier Islands and Coastal Marshes is a long, narrow region consisting mostly of beaches, sand dunes, and barrier islands, and the margins of lagoons and bays, and tidal wetlands sometimes extending for quite some distance behind the barrier islands. Elevations are from 35 ft (11 m) to sea level (bplant 2021).

This region is directly exposed to the ocean, and as a result, its landforms are dynamic, characterized both by erosion and deposition of sediment. The shoreline tends to move west at a rate of about 5 ft (1.5 m) per year, but this may accelerate due to rising sea levels associated with global warming and/or more severe hurricanes (bplant 2021).

Vegetation here consists of Northern Cordgrass Prairie, with Oak-Hickory-Pine Forest on upland sites, and Atlantic Coastal Plain Maritime Forest on the richest coastal sites. Salt spray, high soil salinity, sand and clay soils, and low nutrient accumulation all severely limit plant growth. Plants here must also be adapted to hurricanes and other storms. The flat topography and severe storms cause the maximum tree height to be lower here than in areas farther inland. However, the proximity to the ocean and low elevation protects this region against severe winters, leading some plants to occur farther north in this region than they do inland.

The combination of milder winter temperatures and nutrient-poor soils tends to favor evergreen vegetation, both in woody and herbaceous plants, so there is a greater portion of evergreens than areas farther inland (bplant 2021).

Portions of the Offshore Visual Study Area from the Delmarva Peninsula south to North Carolina, adjacent to the ocean, are within this ecoregion.

The broader ecoregions are meant to describe the natural landscape and are further subdivided into LSZs, in order to refine more specific landscapes within the region. This breaks the landscape down to urban type landscapes within the overall setting.

I-1.4.3.1.3 Landscape Similarity Zones

Landscape Similarity Zones provide a more specific framework within which to evaluate changes within the landscape and potential visual effects of the Facility. LSZs are split into seascape and landscape character areas and consist of unified geographic areas that are within the broader regional landscape and have similar landscape characteristics (Smardon et al. 1988). Seascape character areas are those areas where land and sea come together, whereas landscape character areas are those that are not contiguous to the ocean but have views and orientation to the ocean. In addition, the ocean character area is the portion of open ocean within the Offshore Visual Study Area viewshed and contains the offshore components of the Facility. It is the scenery from the ocean character area that contributes to the scenic value of both the seascape character area and landscape character area.

For this analysis, LSZs were defined based on like physiographic characteristics (such as landform, water, vegetation, and land use patterns) and user/receptor groups. National Land Cover Data, local zoning classifications, and recent aerial imagery were mapped using ArcGIS software and reviewed to identify areas within the Offshore Visual Study Area that had similar characteristics or designations. Within the Offshore Visual Study Area, the following LSZs were identified (Figure I-1-14, below, and shown enlarged in VIA Attachment I-1-3):

Ocean Character Area:

The Ocean LSZ (singularly comprising the ocean character area) represents the saltwater offshore areas characterized by the open water of the Atlantic Ocean. It by far represents the largest portion of the Offshore Visual Study Area and would offer the most frequent and closest opportunities to view the Project. It is also highly variable and dynamic, with views changing based upon the tides (daily, monthly, and annual variability), weather and atmospheric conditions, and time of day and light conditions.

Seascape Character Areas:

Lower Coastal Plain/Tide Water

This LSZ is characterized by the large lowland network of marshlands and brackish open water bays common between the mainland and barrier islands of Virginia and North Carolina. Conservation lands are common within this LSZ: National Wildlife Refuges, coastal reserves, state wildlife management areas, and others. Access from land is limited to boat ramp facilities.

Open Water

The Open Water LSZ represents non-ocean open water areas like Chesapeake Bay, Lynnhaven Bay, Broad and Linkhorn Bays, Back Bay, in addition to inland lakes like Lake Rudee, Lake Wesley, and Lake Christine. The perimeter areas of most of the Open Water features feature private residential property with lake-front views and/or conservation or military/industrial land. This LSZ also includes the numerous inland channels and rivers within the visual study area.

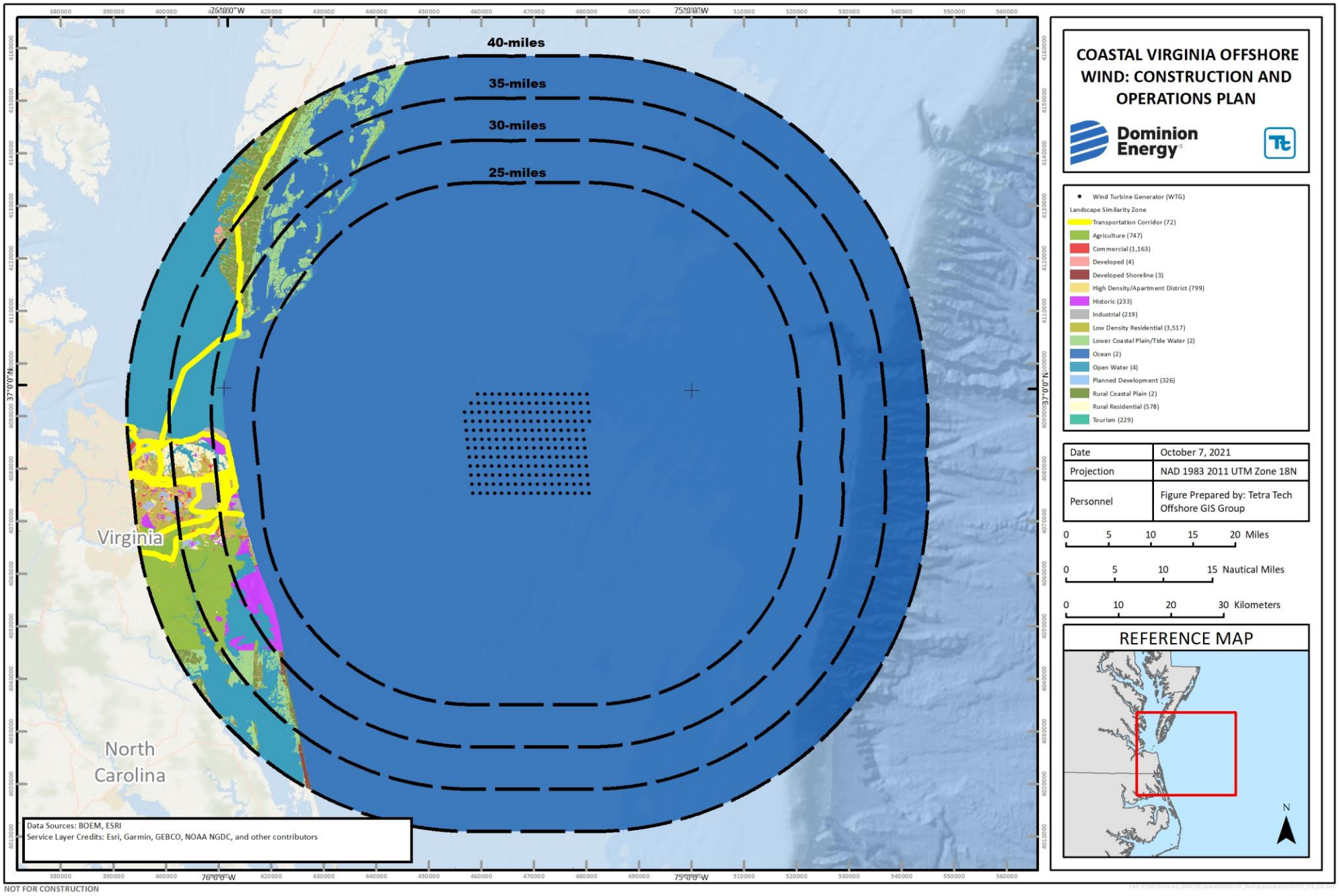

Figure I-1-14. Landscape Similarity Zones

Landscape Character Areas:

Transportation Corridor/Scenic Byways

This LSZ captures the major interstates and state highways within the Visual Study Area, including US 13, which parallels the coastline north-south through the interior of the Delmarva Peninsula into North Carolina. This LSZ also includes US 60, US 58, and Interstate 264. The highways pass through different landscapes (and LSZs), however, the motorists' viewing experience would similarly include the paved highway corridor, high traveling speeds, and infrastructure typical of heavily traveled regional highways.

Agriculture

This LSZ is characterized by relatively level terrain and frequently expansive views of working agricultural fields broken up by dense mixed vegetation. Within the visual study area, it is located primarily inland and south of Virginia Beach. Individual residences are present, but spaced far apart and commonly screened by landscaping. This LSZ would also experience highly variable views dependent upon time of year, time of day, and the kinds of crops being produced.

Commercial

This LSZ represents the retail and commercial buildings, shopping areas, and parking lots commonly found along major roads and highways. This LSZ is nearly all located inland, away from the coastline. Views of the Project from the Commercial LSZ are not anticipated.

Developed

The Developed LSZ captures local roads and streets in both residential and commercial settings. While the majority of these roads are located inland, this LSZ also includes local and neighborhood roads adjacent to the shoreline. Views are frequently limited to the immediate foreground by residential or commercial buildings and vegetation.

Developed Shoreline

This LSZ is characterized by low density residential developments located on the elevated dunes associated with the coastline. The eastern-most rows of residences typically include views of the ocean. Narrow residential lanes, two- and three-level single-family residences, and residential landscaping are commonly seen.

High Density/Apartment District

This LSZ is characterized by two- to four-story multi-family housing developments, located primarily between commercial and other residential housing land uses. Views are typically very limited to the foreground by clustered buildings, parking areas, and landscaping.

Historic

The Historic LSZ captures culturally important historic areas but also conservation areas and public open spaces. First Landing State Park and False Cape State Park in Virginia both fall within the Historic LSZ. Views from these historic/conservation areas vary depending upon the viewer's position, but views of the Project would be limited to the immediate shoreline, because of dense vegetation present.

Industrial/Military

This LSZ is characterized primarily by large military complexes around Virginia Beach: Fort Story, Joint Expeditionary Base Little Creek-Fort Story, Oceana Naval Air Station, Dam Neck Naval Base, and the State Military Reservation. These areas are not open to the public, but in addition to their official functions, they are effectively residential areas for military families. Fort Story, Dam Neck Naval Base, and State Military Reservation are each located adjacent to the coastline, and views from the coastline potentially have views toward the Project.

Low Density Residential and Planned Development

This LSZ is characterized by one- and two-story single-family residential areas both inland and near the coastline in Virginia Beach. Residential streets, homes, and residential landscaping are seen, and views are commonly limited to the foreground by buildings. This LSZ may extend to the beachfront in some instances in Virginia Beach, in which case the eastern-most residences would have ocean front views toward the Project.

Rural Coastal Plain

This LSZ is located primarily inland on the Delmarva Peninsula, and rural residential areas of North Carolina. It is characterized by a flat, rural landscape similar to the agricultural LSZ, having broad fields defined by straight lines broken up by patches of dense mixed vegetation and few roadways. Residences are situated far apart, and some rural commercial buildings are present. Views toward the project from this LSZ, if they exist, are very limited by vegetation and could only be located along the immediate eastern shore where views of the ocean are present.

Rural Residential

The Rural Residential LSZ is located in Virginia Beach, primarily situated around the inland Lynnhaven Bay, Broad Bay, and Linkhorn Bay. It is characterized by large-lot residential homes, many with Bay-front access, and residences organized around golf courses. The residences are each surrounded by mature landscaping and/or lawns, which combine to limit publicly accessible views to the immediate foreground. It is possible a small number of residences on the extreme eastern edge of the Rural Residential LSZ possess views of the Project from east-facing private decks or other elevated positions.

Tourism

This LSZ is located in the Virginia Beach city center within about 0.5 mi (0.8 km) of the shoreline, particularly those areas oriented toward the Virginia Beach Boardwalk, which parallels the shoreline from

40th Street to 3rd Street, totaling over 2.5 mi in length. The Tourism LSZ is characterized by a densely urbanized development pattern of multi-story hotels and condominium buildings, restaurants, and retail shops. This LSZ experiences a great deal of seasonal variation from visitors, with summer being the most popular.

Table I-1-3. Summary of Landscape Similarity Zones by Area

Landscape Similarity Zone	Total Area (Square Miles)	Area As Percentage of Visual Study Area	Potential Visibility to Project?
Seascape Character Areas			
Lower Coastal Plain/Tide Water	113.7	1.6%	Yes
Open Water	406	5.6%	Yes
Ocean	6,302.7	87.3%	Yes
Landscape Character Areas			
Transportation Corridor/Scenic Byways	Same as Developed LSZ		
Agriculture	126.5	1.8%	Unlikely
Commercial	10.3	0.1%	No
Developed	33.0	0.5%	Limited to immediate shoreline and/or elevated positions
Developed Shoreline	4.0	0.1%	Yes
High Density/Apartment District	7.7	0.1%	Limited to immediate shoreline and/or elevated positions
Historic	38.1	0.5%	Limited to immediate shoreline and/or elevated positions
Industrial/ Military	23.6	0.3%	Yes
Low Density Residential/Planned Development	48.9	0.7%	Limited to immediate shoreline and/or elevated positions
Rural Coastal Plain	89.6	1.2%	Limited to immediate shoreline
Rural Residential	17.6	0.2%	Limited to immediate shoreline
Tourism	1.5	fraction	Yes
Total	**7,223.1**		

Historic resources are evaluated in Section 4.3.3 and Appendices H-1 and H-2 of the Construction and Operations Plan for the Project. Socioeconomics and any identified disadvantaged or Environmental Justice communities are evaluated in Section 4.4.2 and Appendices EE-1 and EE-2 of the Construction and Operations Plan for the Project.

I-1.4.3.2 Viewer Types and Characteristics

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

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

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

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

I-1.4.3.2.1 Local Residents

The local residential viewer groups consist of people who live within the Offshore Visual Study Area. Many local residents are present on a year-round basis, whereas some have permanent residences elsewhere and are seasonal residents. Generally, they view the landscape from their yards and homes, and often from places of employment while engaged in daily activities. Residents of primary interest for the analysis are located along or near the shoreline in Virginia and North Carolina within the Offshore Visual Study Area that may have views of the Offshore Project Components. Particularly along the shoreline, elevated views are possible in multiple story buildings.

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

I-1.4.3.2.2 Travelers

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

Commuters traveling within the analysis area view the landscape from motor vehicles on their way to work or other business destinations. Within the Offshore Visual Study Area, this viewer group is rather large because of the large population and employment centers within the analysis area (including Newport News, Hampton, Norfolk, Virginia Beach, and Portsmouth, Virginia). Commuting activity occurs throughout the Offshore Visual Study Area, primarily in the larger cities of Virginia Beach and Portsmouth. Commuters do not tend to stop along their travel routes, have a relatively narrow field of view because they are focused on road and traffic conditions, and are destination oriented. Commuters may be more likely to notice change because they view this environment regularly. Passengers in commuter vehicles would have greater opportunities for prolonged off-road views toward landscape features and, accordingly, may have greater perception of changes in the visual environment.

Through travelers are typically moving, they have a relatively narrow field of view, and are destination-oriented. They would be concentrated on the major roads that traverse the Offshore Visual Study Area, including U.S. Routes 13, 58, and 60; Virginia State Routes 130, 225, 279; and North Carolina Highways 12 and 615. Generally, drivers in this group are focused on driving and on the road and traffic conditions but have the opportunity to observe roadside scenery from time to time. Both drivers and passengers may have greater opportunities for prolonged views toward landscape features and may take more notice of changes in the visual environment. Within the Offshore Visual Study Area, major arterial roads are typically set back from the shorelines and have limited significant or extended views of the water.

I-1.4.3.2.3 Tourists and Recreational Users

This viewer group includes local and seasonal residents engaged in recreational activities, and tourists and recreational users visiting from out of the local area. According to 2017 data, 19 million domestic visitors came to Virginia Beach (City of Virginia Beach 2018). These users can be involved in outdoor recreational activities at beaches, parks, and other developed recreational facilities or in undeveloped natural settings such as forests or preserves. Tourists and recreational users come to the area for the purpose of experiencing its cultural, scenic, and/or recreational resources. They may view the landscape while traveling to these destinations on scenic roads, local roads, or ferries, on whale or dolphin watching boat tours, or from the sites themselves. Particularly along the shoreline, elevated views are possible in multiple story buildings such as hotels or high-density housing. Scenic roads and byways[4] in the Offshore Visual Study Area include U.S. Routes 13 and 60, Sandbridge Road Scenic Byway, and a Virginia Scenic Byway along Blackwater Road/Pungo Ferry Road/Princess Anne Road. No scenic roads or byways are located within the Offshore Visual Study Area within North Carolina.

The recreational user group includes those involved in active recreation (e.g., bicyclists, hikers, walkers, joggers, swimmers, fishing, recreational boaters) and those involved in more passive recreational activities (e.g., lounging at the beach, picnicking, sightseeing, and wildlife observation). For some of these viewers, scenery is a very important part of their recreational experience, and recreational users often have continuous views of landscape features over relatively long periods of time. Most recreational viewers will only view the surrounding landscape from ground-level or water-level vantage points. Recreational users'

[4] A map of scenic roads and byways can be viewed online at https://www.dcr.virginia.gov/recreational-planning/sr-ivb or https://www.ncdot.gov/travel-maps/traffic-travel/scenic-byways/Pages/default.aspx.

perception of visual quality and landscape character will be variable, depending on their reason for visiting the area. However, recreators are generally considered to be highly perceptive to changes in scenic quality and landscape character.

Within the Offshore Visual Study Area, likely locations for this group to be concentrated include beaches along the southern coastline in Virginia and the eastern coastline of North Carolina, lighthouses along the coastal mainland, and trails and overlooks scattered throughout the Offshore Visual Study Area.

I-1.4.3.2.4 Military

A military viewer group was identified because several military establishments are found in this region of Virginia. This group is identified as working and visiting this region to conduct training exercises in the military areas. The State Military Reservation's (formerly known as Camp Pendleton) primary purpose is the training of personnel and organizations of the Virginia National Guard, as well as other states' National Guard units and components of the U.S. Armed Forces. When the facilities are not used by military organizations, state and local civilian agencies also conduct training at the site. The State Military Reservation lies on the Atlantic coast slightly east of Naval Air Station (NAS) Oceana, which is a Naval Air Station and military airport. NAS Oceana is home to 17 strike fighter squadrons. Joint Expeditionary Base-Fort Story, commonly called Fort Story, is a sub-installation of the Joint Expeditionary Base Little Creek–Fort Story, which is operated by the United States Navy.

The military viewer group consists of people who work and may live within the Offshore Visual Study Area, as well as visitors to the area for training purposes. Many workers are present on a year-round basis when not in active service. Generally, they view the landscape from their work environment, traveling to their work environment, and potentially also from their homes.

I-1.4.3.3 Identification of Field Inventory Locations and Key Observation Points

A list of potentially sensitive viewing locations was developed through completion of a desktop inventory, based on locations identified in BOEM's *Visualization Study for Offshore North Carolina* (2012), locations previously analyzed for the Virginia Offshore Wind Technology Advancement Project, BOEM's *Virginia Offshore Wind Technology Advancement Project on the Atlantic Outer Continental Shelf Offshore Virginia* (2014), geographic information system (GIS)-generated data, and additional potential locations within different categories (e.g., landscape zones, viewer types). After completion of the desktop inventory, as identified in the first column of Attachment I-1-2, field inventory viewpoints were identified, as identified in the second column of Attachment I-1-2 and Table I-1-4, with a focus on those locations with potential visibility of the Offshore Project Components based on the viewshed analysis. A final list of viewpoints was determined in coordination with BOEM and other agencies prior to conducting the remainder of the field inventory.

Table I-1-4. Field Inventory, KOP, Simulation, and Video Locations

Field ID No.	Field Inventory Location	Representative KOPs	Simulations and Time Lapse Video
Virginia			
1	Kendall Grove Historic District	No	—
2	Eastville Mercantile	No	—

Field ID No.	Field Inventory Location	Representative KOPs	Simulations and Time Lapse Video
3	Cessford	No	—
4	Coast Guard Station Cobb Island Public Boat Ramp	No	—
5	Oyster Village Horse Island Trail	Yes	Simulation
6	Stratton Manor	No	—
7	Kiptopeke State Park	No	—
8	Eastern Shore of Virginia National Wildlife Refuge	Yes	Simulation
9	Chesapeake Bay Bridge Tunnel Scenic Byway - Scenic Overlook Trail	No (no access)	—
10	Norfolk International Airport	No	—
11	Weblin House	No	—
12	Bayville Farms Park	No	—
13	Cape Henry Lighthouse/Fort Story Military Base a/ b/	Yes	Simulation
14	Great Neck Park	No	—
15a	North End Beach—Residential View 1 b/	Yes	Simulation
15b	North End Beach—Residential View 1 (Nighttime) b/	Yes	Simulation, Time-Lapse Video
16	First Landing State Park East Entrance b/	No	—
17	Dr. John Masure Miller House	No	—
18	Princess Anne Memorial Park	No	—
19	Pleasant Hall	No	—
20	Mount Trashmore Park	No	—
21a	Virginia Beach Boardwalk—North End	No	—
21b	Virginia Beach Boardwalk—Navy Seal Monument—38th St.	No	—
21c	Virginia Beach Boardwalk—Volleyball Courts	No	—
22	King Neptune Statue/Boardwalk	Yes	Simulation
23	Naval Aviation Monument Park	Yes	Simulation
24a	Virginia Beach Boardwalk—17th Street Park	Yes	Simulation
24b	Virginia Beach Boardwalk—16th St. Entrance (Nighttime)	Yes	Simulation
24d	Virginia Beach Boardwalk—Fishing Pier	Yes	Simulations
25	Atlantic Wildfowl Heritage Museum	No	—
26	Marriott Virginia Beach Oceanfront Hotel	Yes	Simulation
27	Boardwalk in Lake Holly	No	—
28	Seatack Park	No	—
29	Grommet Island Park/Boardwalk b/	Yes	Simulation
30a	Croatan Beach A a/	Yes	Simulation
30b	Croatan Beach B	No	—
30c	Croatan Beach C	Yes	Simulation, Time Lapse Video
31	Picnic Views on Beach b/	Yes	Simulation
32a	Wadsworth Shore Residential View 1 a/	No	—
33	Redwing Park	No	—
34	Pine Meadows Park	No	—
35	Old Dam Neck Park	No	—

Field ID No.	Field Inventory Location	Representative KOPs	Simulations and Time Lapse Video
36	Woodhouse House	No	—
37	Green Sea Scenic Byway (Sandbridge Road)	No	—
38	Sandbridge Beach—Sandfiddler Road	No	—
39	Military Aviation Museum	No	—
40	Fentress Naval Air Landing Field	No	—
41	North Landing River Natural Area Preserve	No	—
42	Pungo Ferry Rd Virginia Scenic Byway	No	—
43	Munden Point Park a/	No	—
44	Back Bay National Wildlife Refuge/Little Island Park	Yes	Simulation
45	False Cape State Park	No	—
North Carolina			
46	Currituck County Courthouse	No	—
47	Currituck National Wildlife Refuge	Yes	Simulation
48	Currituck Beach Lighthouse b/ c/	Yes	Simulation, Time Lapse Video
49a	Whale Head Bay Residential View 4	Yes	Simulation
49b	Whale Head Bay Corolla Village Entrance	No	—
49c	Whale Head Bay Shad St. Entrance—Elevated	No	—
49d	Whale Head Bay Residential View 3		
49e	Whale Head Bay Residential View 2		
49f	Whale Head Bay Residential View 1		
49g	Whale Head Bay Albacore Street Entrance—Elevated	Yes	Simulation

Notes:
a/ Viewpoint locations identified in the BOEM 2014 study.
b/ Public accessibility will be determined prior to the field visit with the intent to identify locations where elevated views could be evaluated.
c/ Denotes viewpoint locations identified in BOEM 2012 study.

Sixty-one locations were visited during an initial field visit completed in June 2021 (see Section I-1.4.2.3), and 20 KOPs within the Offshore Visual Study Area were selected for further study and simulation development. Certain KOPs were simulated in both day and nighttime conditions. Additional fieldwork was completed in July and September 2021, following discussion with BOEM regarding KOPs. Criteria used to select KOPs for analysis include the following:

- Locations representing the most critical viewpoints (i.e., views from communities, residential areas, or recreational areas, scenic areas specifically identified in planning documents);
- Geographic distribution representing locations closest to the Lease Area and at various distances within the Offshore Visual Study Area (i.e., 25 to 30 mi [40.2 to 48.3 km], 30 to 35 mi [48.3 to 56.3 km], and 35 to 40 mi [48.3 to 64.4 km]); and
- Locations representing level and elevated viewing conditions along the coast and inland within the Offshore Visual Study Area.

Based upon the field inventory, a select number of KOPs from the list of viewpoint locations were identified in coordination with BOEM and other agencies, for detailed assessment in the VIA. KOPs are representative

locations of viewing areas where viewers could notice a change in the existing landscape setting due to the presence of project facilities and are used to assess visual impacts of a proposed project. In this regard, sensitive viewing locations are typically associated with key travel routes, recreation areas, and residential areas.

Attachment I-1-2, the Visual Inventory List, identifies visual resources inventoried, locations selected for the field inventory points, as well as a subset for representative KOPs and suggested simulations and time lapse videos. Table I-1-5 and Figure I-1-15 provide a list of the potential viewpoint locations, which is a subset of the full list of viewpoints identified in Attachment I-1-2 and Attachment I-1-3.

Table I-1-5. List of Key Observation Points within the Offshore Visual Study Area

Field ID No.	Name	Location (County)	Resource Type	Distance to Nearest Project Component (mi [km])	Portion of the WTG Visible a/	
				14-MW and 16-MW WTG b/	14-MW WTG	16-MW WTG
Virginia						
5	Oyster Village Horse Island Trail	Northampton	Public Recreation	32.6 (52.5)	Max Tip	Max Tip
8	Eastern Shore of Virginia National Wildlife Refuge	Northampton	Public Recreation, Tourist Destination	28.2 (45.4)	Hub Up	Hub Up
13	Cape Henry Lighthouse/Fort Story Military Base	Virginia Beach	Tourist Destination, Public Recreation	29.1 (46.8)	Hub Up	Hub Up
22	King Neptune Statue/Boardwalk	Virginia Beach	Tourist Destination, Public Recreation	27.9 (45)	Hub Up	Hub Up
23	Naval Aviation Monument Park	Virginia Beach	Tourist Destination, Public Recreation	27.9 (45)	Hub Up	Hub Up
26	Marriott Virginia Beach Oceanfront Hotel	Virginia Beach	Tourist Destination	28 (45)	Turbine	Turbine
29	Grommet Island Park/Boardwalk	Virginia Beach	Tourist Destination, Public Recreation	27.7 (44.6)	Hub Up	Hub Up
31	Picnic Views on Beach	Virginia Beach	Tourist Destination, Public Recreation	27.7 (44.6)	Hub Up	Hub Up
44	Little Island Park	Virginia Beach	Historic	26.8 (43.1)	Hub Up	Hub Up
15a	North End Beach – Residential View 1	Virginia Beach	Tourist Destination, Public Recreation	28.1 (45.2)	Hub Up	Hub Up
15b	North End Beach – Residential View 1	Virginia Beach	Tourist Destination, Public Recreation	28.1 (45.2)	Hub Up	Hub Up
24a	Virginia Beach Boardwalk – 17th Street Park	Virginia Beach	Tourist Destination, Public Recreation	27.8 (44.7)	Hub Up	Hub Up
24b	Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime)	Virginia Beach	Tourist Destination, Public Recreation	27.8 (44.7)	Hub Up	Hub Up
24d	Virginia Beach Boardwalk – Fishing Pier	Virginia Beach	Tourist Destination, Public Recreation	27.6 (44.4)	Hub Up	Hub Up
30a	Croatan Beach A	Virginia Beach	Tourist Destination, Public Recreation	27.7 (44.6)	Hub Up	Hub Up

Field ID No.	Name	Location (County)	Resource Type	Distance to Nearest Project Component (mi [km])	Portion of the WTG Visible a/	
				14-MW and 16-MW WTG b/	14-MW WTG	16-MW WTG
30c	Croatan Beach C	Virginia Beach	Tourist Destination, Public Recreation	27.7 (44.6)	Hub Up	Hub Up
North Carolina						
47	Currituck Beach Lighthouse	Currituck	Tourist Destination, Public Recreation	36.8 (59.2)	Hub Up	Hub Up
48	Currituck National Wildlife Refuge	Currituck	Tourist Destination, Public Recreation	34.7 (55.8)	Hub Up	Hub Up
49a	Whale Head Bay Residential View 4	Currituck	Residential, Public Recreation	36.6 (58.9)	Max Tip	Max Tip
49g	Whale Head Bay Albacore Street Entrance – Elevated	Currituck	Residential, Public Recreation	39.1 (62.9)	Max Tip	Max Tip

Notes:
a/ Portion of the WTG visible is based on the topographic viewsheds noted in Section I-1.4.1.1 and does not account for vegetation and/or development. Analyses were conducted using Environmental Systems Research Institute ArcGIS Pro 2.2.0 software with the Spatial Analyst extension to process 10-meter Digital Elevation Models (DEMs) based on the National Elevation Dataset and height zones of visible components of the WTGs (foundation, entire rotor swept area, hub, and blade tip). The bare-earth modeling approach used in the viewshed analysis, based only on the effects of terrain on visibility, results in a conservative assessment of potential visibility.

b/ WTG placement for 14 MW and 16 MW is the same.

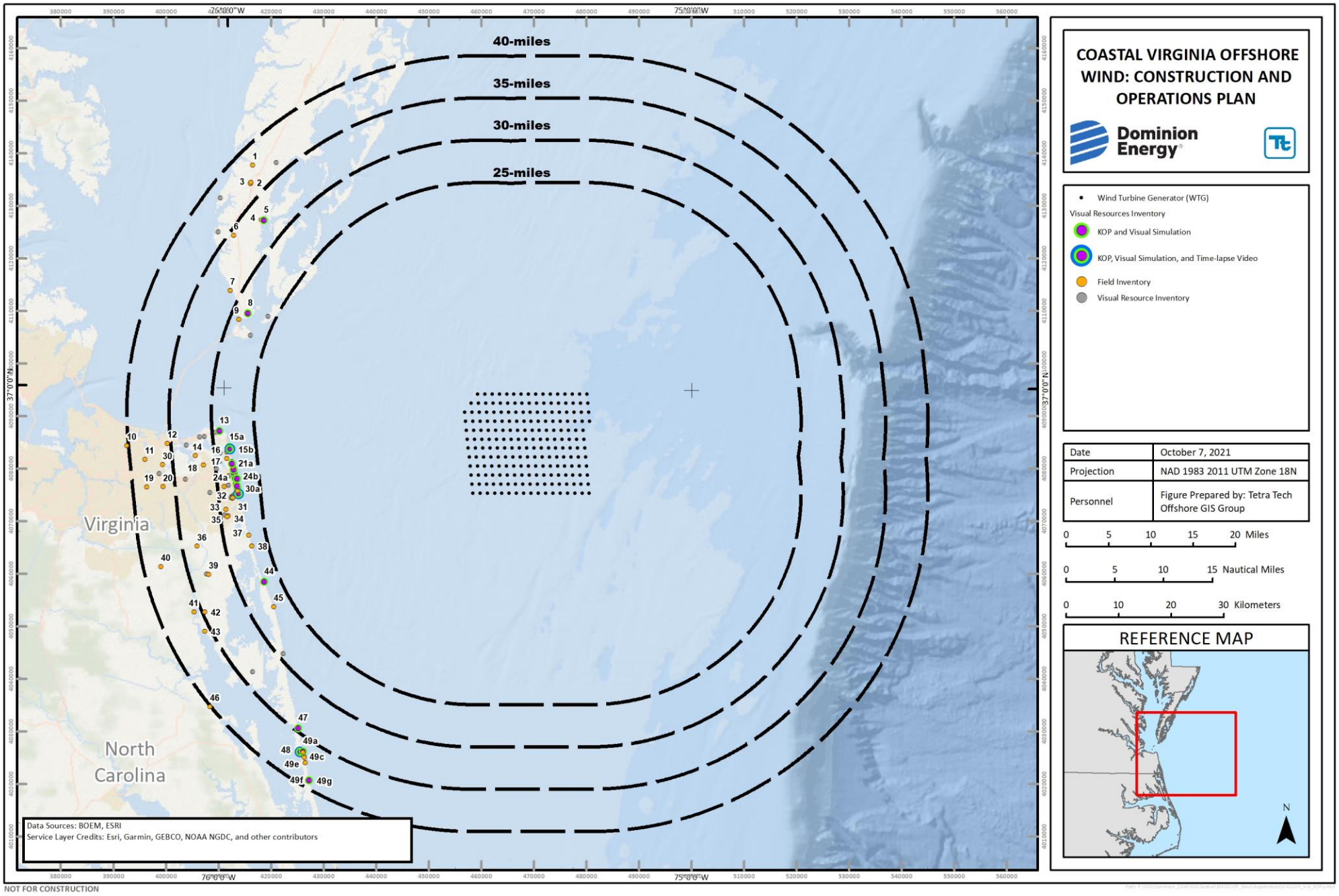

Figure I-1-15. Key Observation Points within the Offshore Visual Study Area

I-1.5 IMPACT ANALYSIS

I-1.5.1 Impact Analysis Methodology

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

I-1.5.1.1 Visual Contrast Rating

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

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

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

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

- None—The element contrast is not visible or perceived;
- Weak—The element contrast can be seen but does not attract attention;

- Moderate—The element contrast begins to attract attention and begins to dominate the characteristic landscape; and
- Strong—The element contrast demands attention, will not be overlooked, and is dominant in the landscape (BLM 1986b).

Additionally, the following criteria were incorporated from Sullivan et al. (2013a) which includes visibility ratings when looking at offshore wind projects, as illustrated in Table I-1-6.

Table I-1-6. Visibility Ratings for Offshore Wind Projects

Rating	Description
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

Visibility ratings of 1 or 2 would generally correspond with low levels of visual contrast, ratings of 3 or 4 would generally correspond with moderate levels of visual contrast, and ratings of 5 or 6 would generally correspond with high levels of visual contrast (Sullivan et al. 2013a).

Contrast rating worksheets were prepared for each of the KOPs (identified within the Offshore Visual Study Area) using a form adapted from the BLM's Visual Contrast Rating Worksheet (Form 8400-4) and the results are included in Attachment I-1-4.

I-1.5.1.2 Environmental Factors Affecting Project Visibility

The theoretical limit of visibility of an offshore structure is determined by the distance between the viewer and the structure, the height of the structure, the elevation of the viewer, and the curvature of the earth (BOEM 2007). WTG heights and the effects of curvature of the earth (as discussed below) are illustrated in Figure I-1-7, which shows a scaled graphic demonstrating how the representative WTGs will disappear below the curvature of the earth based on viewer distance, from the perspective of a viewer at sea level (on the beach). The nacelle (hub) is visible just above the horizon line at 16.6 mi (26.7 km) for the preferred and maximum representative WTG. However, the theoretical limit of visibility often exceeds the actual visibility or what is experienced in real life. In seascapes, atmospheric haze or weather patterns reduce the practical visibility, sometimes significantly. The presence of waves may also obscure objects low on the horizon. Limits to human visual acuity also reduce the ability to discern objects at great distances, suggesting that some WTG components, such as blades, will not be discernible, even though they are theoretically above the horizon. Other factors affecting the visibility include color and reflectivity of the object and the level of contrast with the visual background under varying lighting conditions (BOEM 2007).

I-1.5.1.2.1 Viewer Distance

Viewer distance from an area is a key factor in determining the level of visual effect, with perceived impact generally diminishing as distance between the viewer and the affected area increases (BOEM 2007). The BLM VRM categorizes views into foreground/middleground, background, and seldom seen distance zones for projects on land. Sullivan et al. (2013a) found that observed wind facilities were judged to be a major focus of visual attention at distances of up to 10 miles, were noticeable to casual observers at distances of almost 18 miles, and were visible with extended or concentrated viewing at distances beyond 25 miles. Therefore, the "foreground" area, identified as occurring from 0 to 10 mi (0 to 16 km) from the Project, is considered to be the location from which Project element details will be visually clear. The "middleground" area, identified as occurring from 10 to 18 miles (16 to 29 km) is considered to be the location from where viewers still have the potential to distinguish individual forms, and texture and color are still identifiable but become muted and less detailed. In the "background," classified as the area from 18 to 25 mi (29 to 40 km), texture has disappeared, and color has flattened making objects appear "washed out"; however, landform ridgelines are still distinguishable. The "seldom seen" area includes lands visible beyond 25 mi (40 km) or lands hidden from view from key locations.

Offshore Project Components will be within the seldom seen distance zone (beyond 25 mi [40.2 km]) for viewers located along the coast of Virginia and North Carolina. It is anticipated for this Project that the seldom seen zone includes the portion of the open ocean that falls below the visible horizon line. Views of

Offshore Project Components in the foreground/middleground distance zone (0 to 18 mi [0 to 29 km]) will be limited to marine or airborne traffic passing close to the Lease Area.

I-1.5.1.2.2 Curvature of the Earth and Atmospheric Refraction

In general, objects or features that are closer to a viewer's location will appear more detailed and more dominant. In the case of offshore wind projects in which WTGs are often located miles offshore, objects viewed on the horizon are often not seen in their entirety because they begin to fall below the visible horizon due the curvature of the earth's surface. As the distance from the viewing location to the object increases, less of the object will be visible. In addition, our line-of-sight curves downward at large distances because of the refraction of light in the Earth's atmosphere. This effectively lessens the impact of the earth's curvature on the relative height of an object. The effects of the curvature of the Earth and atmospheric refraction on the apparent height of objects is illustrated in Figure I-1-16.

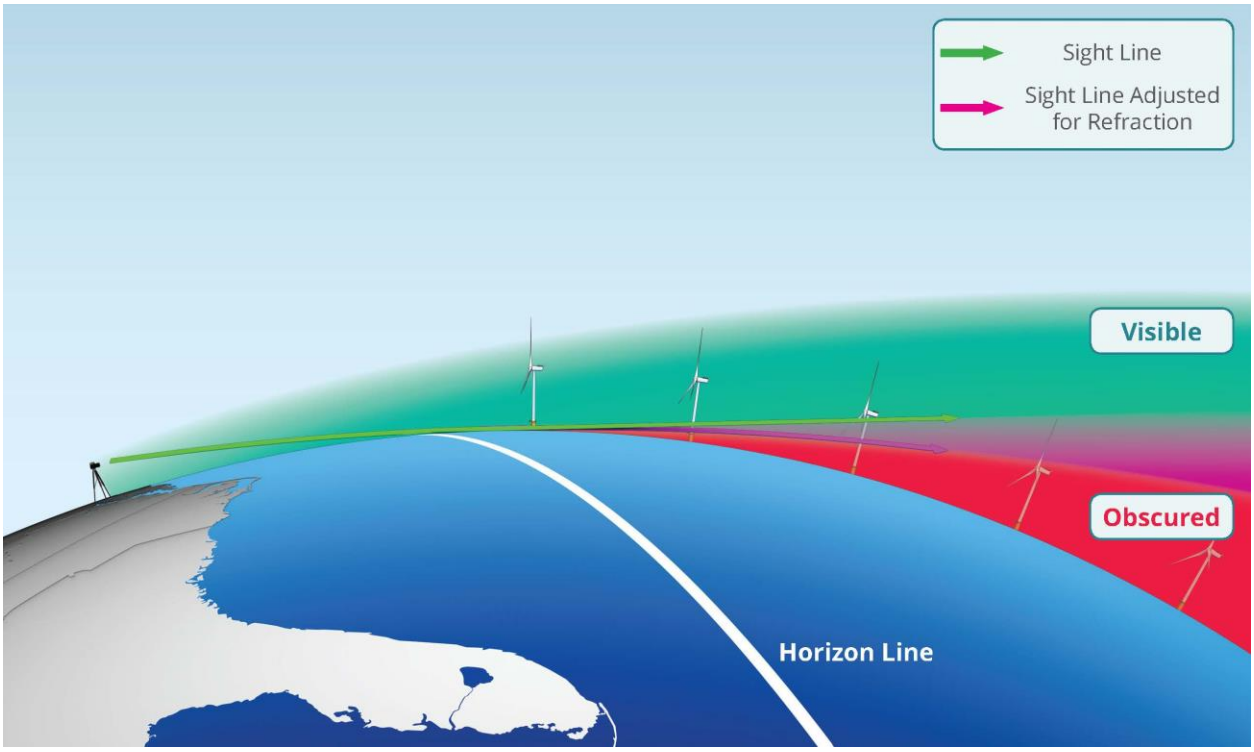

Figure I-1-16. The Effects of the Curvature of the Earth and Atmospheric Refraction on the Apparent Height of Objects

I-1.5.1.2.3 Angle of Observation

Angle of observation refers to the angle between the viewer's line of sight and an object's location (see Section I-1.4.1.1). While Figure I-1-8 is helpful to inform views from the beaches, there are some areas within the Offshore Visual Study Area that have superior views toward the Offshore Project Area from potentially sensitive viewpoints, such as the lighthouses in Virginia and North Carolina, as well as elevated views such as from the hotels along the Virginia Beach Boardwalk. When distance from the WTG is consistent, viewers at higher elevations (superior views) will see larger portions of the WTGs when compared to level viewing conditions at beach level.

I-1.5.1.2.4 Meteorological Conditions

BOEM completed a Visualization Study for Offshore North Carolina in December 2012 (BOEM 2012), which helped to characterize the visual impacts related to Points of Interest with respect to recorded weather conditions in the area. The Study specifically addressed locations identified as "*of special interest"* to the National Park Service and the public during the planning process for offshore wind energy facilities. Ten years of hourly meteorological data was obtained from the NOAA database for seven weather stations along the North Carolina coastline including Duck Pier, Billy Mitchell Airport, Bogue Field, Michael J. Smith Field, Cape Lookout, Wilmington International Airport, and Brunswick County Municipal Airport. The two nearest weather stations were assigned to each location (BOEM 2012).

Hourly measurements of visibility at each of the weather stations listed above were consolidated to determine average visibility metrics at each of the locations of interest. Table I-1-7 shows the average number of days that there is visibility for each season to 10 nm, 15 nm, and 20 nm at all locations combined. Daytime was assumed to be between the hours of 6 a.m. and 7 p.m., corresponding with average sunrises and sunsets in the region. During the day there is visibility to 10 nm (18.5 km) at least 50 percent of the day 34.8 percent of the time or 127 days per year. During the night there is visibility to 10 nm (18.5 km) at least 50 percent of the day 42.7 percent of the time or 156 nights per year. The variability across the 18 locations due to the consistent nature of meteorological conditions along the North Carolina coast (BOEM 2012).

Table I-1-7. Average Visibility for All Locations Combined

Condition/ Period	Days 50% Visible (%)	Days 75% Visible (%)	Days 90% Visible (%)	Days 50% Visible (days/year)	Days 75% Visible (days/year)	Days 90% Visible (days/year)
10 nm						
Days	34.8%	27.3%	23.2%	127	100	85
Nights	42.7%	21.8%	18.4%	156	80	67
24-Hour Periods	36.1%	21.1%	16.0%	132	77	58
15 nm						
Days	23.1%	18.4%	15.1%	84	67	55
Nights	26.2%	11.5%	10.1%	96	42	37
24-Hour Periods	21.6%	13.6%	9.9%	79	49	36
20 nm						
Days	18.1%	14.3%	11.1%	66	52	41
Nights	18.6%	8.2%	6.8%	68	30	25
24-Hour Periods	16.3%	10.1%	7.7%	60	37	28

Source: BOEM 2012

The Visualization Study also assessed meteorological data from two nearby weather stations to analyze the frequency of occurrence of various weather/sky conditions on a daily, seasonal, and annual basis. Day, night, and 24-hour periods were analyzed for the visibility assessment. Daylight hours and time of day were organized by season since daylight hours vary by time of year. In addition, because the data analysis is based on daylight conditions, it was determined that seasons would follow the astronomical definition. During the daytime, there is visibility to 10 nm (18.5 km) at least 50 percent of the day 39.6 percent of the days in the winter and 27.3 percent of the days in the summer. Table I-1-8 below shows the average visibility for all locations combined for each season. This is expected due to hazy and/or overcast conditions

during the summer. As with annual visibility and for the same reasons, these conditions do not vary greatly at locations along on North Carolina coast (BOEM 2012).

Table I-1-8. Average Visibility for All Locations Combined for Each Season

Condition/ Period	Days 50% Visible [%]	Days 75% Visible [%]	Days 90% Visible [%]	Condition/ Period	Days 50% Visible [%]	Days 75% Visible [%]	Days 90% Visible [%]
Winter (December 22 – March 21)				Summer (June 22 – September 21)			
10 nm				**10 nm**			
Days	39.6%	31.6%	25.7%	Days	27.3%	20.8%	17.1%
Nights	46.0%	23.2%	20.3%	Nights	36.6%	18.2%	15.0%
24-Hour Periods	39.4%	24.2%	18.4%	24-Hour Periods	29.1%	16.5%	12.7%
15 nm				15 nm			
Days	27.2%	21.7%	17.6%	Days	16.9%	13.3%	10.7%
Nights	30.6%	13.4%	11.3%	Nights	19.8%	8.7%	6.9%
24-Hour Periods	25.7%	16.7%	11.8%	24-Hour Periods	15.7%	10.1%	7.1%
20 nm				20 nm			
Days	22.1%	17.8%	14.1%	Days	12.6%	9.5%	7.3%
Nights	22.7%	9.8%	8.2%	Nights	12.8%	5.1%	4.8%
24-Hour Periods	19.9%	12.7%	8.7%	24-Hour Periods	11.5%	6.6%	4.7%
Spring (March 22 – June 21)				Fall (September 22 – December 21)			
10 nm				**10 nm**			
Days	33.4%	24.9%	20.5%	Days	39.3%	32.2%	28.5%
Nights	42.4%	20.9%	18.1%	Nights	46.5%	24.7%	20.7%
24-Hour Periods	35.8%	19.1%	14.1%	24-Hour Periods	39.9%	25.9%	19.4%
15 nm				**15 nm**			
Days	20.9%	15.8%	12.7%	Days	28.3%	23.2%	19.1%
Nights	23.6%	9.8%	8.7%	Nights	30.1%	14.4%	12.7%
24-Hour Periods	19.1%	11.2%	7.9%	24-Hour Periods	27.1%	17.3%	13.0%
20 nm				**20 nm**			
Days	14.8%	11.3%	8.9%	Days	22.7%	18.3%	15.1%
Nights	15.8%	6.8%	6.0%	Nights	22.9%	10.4%	9.1%
24-Hour Periods	12.9%	8.4%	6.0%	24-Hour Periods	21.2%	13.2%	10.0%

Source: BOEM 2012

In conclusion, summer days have the lowest opportunity for visibility and winter nights have the highest. As stated above and in Table I-1-8, during the day visibility drops to 27.3 percent of the days in the summer. Across the year, the sky is clear 67.8 percent of the time and cloudy the remaining 32.2 percent of the time during the daytime hours. It is rarely foggy, and it is also documented that visibility and appearance of lighting at night is influenced by meteorological conditions. Clear nighttime skies may provide better views of lit turbines while dense clouds and haze may obscure turbine lighting. Under certain conditions, lights viewed at night may result in a halo effect or residual light dome creating a dome-like glow that covers the

night sky. At night, reflections of clouds, the moon, and other light sources may be visible on the surface of the ocean when calm and may appear choppier or distorted in less calm conditions (BOEM 2012).

I-1.5.1.3 Photographic Simulations

Photographic simulations (simulations) were created for 20 of the 61 field inventory locations to depict the Project components and their potential changes to the existing landscape, including consideration of daytime and nighttime views. The simulations were used to determine the level of contrast between the existing landscape and the expected landscape after the Project is implemented. Approximately one-third of the KOPs, primarily those representing locations with high viewer sensitivity and high potential for impacts to existing visual resources, were selected for development of simulations to demonstrate how the constructed Project will appear to future viewers. Two simulation sets were created for each selected KOP within the Offshore Visual Study Area, one depicting the proposed 14-MW representative WTGs and one depicting the proposed 16-MW representative WTGs. Nighttime simulations were also completed for three KOPs: Residential Beach View 1 (Nighttime), Virginia Beach Boardwalk – 16th Street Entrance (Nighttime), and Virginia Beach Boardwalk – Fishing Pier (Nighttime). Simulation locations are listed in Table I-1-9 and are included in Attachment I-1-5. Simulations depict actual weather conditions at the time photography was taken during the field visits (see Section I-1.4.2.3). Dominion Energy also prepared simulations depicting how the WTGs would appear with the sun at various angles throughout the day to assist in identifying when the WTGs would be most noticeable. A series of computer-generated, time-lapse video simulations were prepared for three KOP locations: North End Beach – Residential View 1 (Nighttime), Croatan Beach C and Currituck Beach Lighthouse, and are included in Attachment I-1-6.

Table I-1-9. Photographic Simulation Locations

Name	Location (County)	Simulations			
		Daytime	Nighttime	Computer Generated	Time-Lapse Video
Virginia					
Oyster Village Horse Island Trail	Northampton	X			
Eastern Shore of Virginia National Wildlife Refuge	Northampton	X			
Cape Henry Lighthouse/Fort Story Military Base	Virginia Beach	X			
King Neptune Statue/Boardwalk	Virginia Beach	X			
Naval Aviation Monument Park	Virginia Beach	X			
Marriott Virginia Beach Oceanfront Hotel	Virginia Beach	X			
Grommet Island Park/Boardwalk	Virginia Beach	X			
Picnic Views on Beach	Virginia Beach	X			
Back Bay National Wildlife Refuge/Little Island Park	Virginia Beach	X			
North End Beach – Residential View 1	Virginia Beach	X			
North End Beach – Residential View 1 (Nighttime)	Virginia Beach		X		X
Virginia Beach Boardwalk – 17th Street Park	Virginia Beach	X			

Name	Location (County)	Simulations			
		Daytime	Nighttime	Computer Generated	Time-Lapse Video
Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime)	Virginia Beach		X		
Virginia Beach Boardwalk – Fishing Pier	Virginia Beach	X	X		
Croatan Beach A	Virginia Beach	X			
Croatan Beach C	Virginia Beach	X			X
North Carolina					
Currituck Beach Lighthouse	Currituck	X			X
Currituck National Wildlife Refuge	Currituck	X			
Whale Head Bay Residential View 4	Currituck	X			
Whale Head Bay Albacore Street Entrance – Elevated	Currituck	X			

At each photo point, a panorama, or an overlapping series of photographs, was captured using a digital camera. A global positioning system (GPS) device is used to record the latitude, longitude, elevation, date and time of each photo point location.

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

Simulations for Offshore Project Components and nighttime simulations are included in Attachment I-1-5.

I-1.5.1.3.1 Nighttime Lighting and Video Simulation

The WTGs and Offshore Substations will be lit and marked in accordance with FAA, BOEM, and USCG guidelines and requirements for aviation and navigation obstruction lighting. For the WTGs, Federal Aviation Administration lighting (FAA lights) will include two FAA Type L-864 lights mounted on opposite rear sides of the nacelle on the representative WTGs. The representative WTGs may also require three or more FAA Type L-810 lights spaced around the mast located midway between the nacelle and aMSL. The L-810 lights will be configured to flash in sync with the L-864 lights. FAA-required lighting

will be red. USCG lighting will be located on the foundation of each WTG. The proposed lighting for the Offshore Substations will include lights around the perimeter of each deck level for safety and FAA lights will be mounted to lightning protection rods. Potential impacts associated with nighttime lighting for Offshore Project Components is discussed in Section I-1.1.1.1.

Condensed 24-hour time-lapses from two unique locations, each one depicting the representative WTGs, will be developed and submitted to BOEM (Attachment I-1-6). The time-lapse videos depict the WTGs at different times of the day in different lighting conditions. Furthermore, the videos depict the frequency and intensity of proposed FAA lighting during nighttime hours.

I-1.5.2 Potential Effects to Visual Resources

Where visible and noticeable, the Offshore Project Components have the potential to create visual effects. Sections below describe potential visual effects anticipated from the construction and operation of the Offshore Project Components. At the end of the Project's operational life, it will be decommissioned in accordance with a detailed Project decommissioning plan that will be developed in compliance with applicable laws, regulations, and best management practices at that time. Decommissioning activities will be similar to construction activities but in reverse and will occur over a shorter period of time than initial construction. Once Offshore Project Components are removed, the visual character of the Offshore Project Area will return to baseline conditions.

I-1.5.2.1 Effects During Construction

Short-term visual effects will occur during construction of the Offshore Project Components (i.e., WTGs, Offshore Substations, Foundations, and submarine Offshore Export Cables and Inter-Array Cables) and will result from construction activities and the presence of vessels used to transport components from fabrication and manufacturing facilities directly to the Lease Area, or from the construction laydown area and construction port to the Lease Area.

Vessel traffic is common along the Atlantic Coast, and frequent ship traffic is especially common in this area. It is anticipated that the vessels required to transport Project components from shore to the Lease Area will not substantially increase the volume of traffic along the coast of Virginia and North Carolina. There are several ports along the coastline of Virginia and North Carolina. The majority of the vessels that will be used for Project construction will be similar in size and shape to existing commercial and military vessels; therefore, weak contrast will be introduced for viewers along the coasts of Virginia and North Carolina, who will see vessels in the foreground to middleground traveling from ports on the mainland to the Lease Area.

Installation of the Offshore Export Cables in nearshore waters will introduce vessels relatively close to shore along the coast of Virginia and North Carolina. While these vessels will be easily visible from shore, they will not remain in any area for more than several weeks. Because of the relatively short duration that they will be in any single location, they are not anticipated to adversely affect visual resources.

Nighttime construction activities are also proposed to occur within the Lease Area. Navigation lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform construction activities may be visible from coastal vantage points. However, visual effects resulting from nighttime

construction activities will be limited to select locations within the Lease Area. These visual effects will also be short term because large vessels and lights necessary to perform construction activities will not be present overnight once construction is complete.

I-1.5.2.2 Effects During Operation and Maintenance

Long-term visual effects are expected during the operation and maintenance phases of the Project as a result of introducing several vertical objects (i.e., WTGs) and up to three Offshore Substations into a landscape setting dominated by open expanses of water and defined by the horizon line. The western boundary of the Lease Area is located approximately 27 statute miles (23.5 nm, 43.5 km) off the Virginia Beach coastline. At these distances, the WTGs will appear in the background distance zone (18 to 25 mi [29 to 40.2 km]) and seldom seen distance zone (25 mi [40.2 km] or greater) from onshore viewing locations. The farther away objects are from the viewer the smaller they appear, features lose details and become less distinct, and surface textures become difficult to discern. In addition, objects viewed on the horizon are often not seen in their entirety because they begin to fall below the visible horizon due the curvature of the earth's surface (see Section I-1.5.1.2). Not all WTGs will be seen at any given location, and no substations are anticipated to be viewed from shore due to their size and distance from the coastline (see I-1.5.2.2.3).

Based on the viewshed analysis and initial field visits (see Section 0 and Section I-1.4.2.3, respectively), it is anticipated that views of the Offshore Project Components from the coasts of Virginia and North Carolina will be limited primarily to locations on coastal beaches that have unobstructed views of the Atlantic Ocean and elevated locations farther inland. It is anticipated that viewers along coastal beaches closest to the Project that are looking toward the Offshore Project Area will experience greater visibility of Project turbines than viewers located elsewhere on the coastline who are farther away from with the Project Area.

At a distance of approximately 23 mi (37 km) or less it is anticipated that the representative WTGs will be noticeable to viewers along the coast. However, the degree to which the WTGs will be noticeable will vary depending upon atmospheric conditions. Under certain atmospheric conditions the WTGs located out on the horizon will be "skylined" or seen in front of a contrasting color such as blue sky or sunrise (where the WTGs may be backlit or side-lit depending on the viewers location in relation to the Project) and will be more likely to draw the viewers' attention. The structures potentially will produce visual contrast by virtue of their design attributes (form, color, and line) and the reflectivity of their surfaces (USDI 2013). In addition, the movement of the rotors will likely be discernible, based on findings by Sullivan et al. (2013a) that blade movement was visible for smaller sized WTGs at up to 24 mi (39 km). If the weather is overcast, hazy, or foggy, the WTGs will produce less contrast, or even no contrast at these distances, because the white/light grey color of the WTG structures will be similar to the white/grey color of the backdrop and will be less noticeable.

I-1.5.2.2.1 Views from the Closest Proximity to the Project Area

Delmarva Peninsula

The shore location that is closest to the Project is the Delmarva Peninsula, Virginia, which is within approximately 21 mi (33.8 km) of the Lease Area. However, this area is not easily accessible except by boat. The Delmarva Peninsula is rural/agricultural with many large patches of woodland, and aerial imagery

shows a nearly continuous dense woodland along the east side coastline so views from inland areas are minimal. There are no beaches in this area of Delmarva. Theoretically, viewers will have views of the turbine blades of both representative WTGs. From this distance, the perceived scale of the WTGs will be small, amounting to fractions of an inch for viewers onshore (measured at arm's length). Given the proximity of the representative WTGs, the portion of the WTGs visible, the introduction of vertical elements into a primarily horizontal landscape setting, the motion of the blades, and the spatial dominance within the landscape setting, the Project is not expected to attract attention and will not become a focal point within the view. As such, the representative WTGs will create negligible to weak visual contrast on the peninsula, with a visibility rating between 0 and 1.

Virginia Beach

The location along the mainland that is closest to the Project is Virginia Beach at 24 mi (38.6 km). Virginia Beach contains a dense urban center of 10-20 story buildings, residential areas, and commercial/military areas along the coastline. Ground level viewers will have views of the hub height and up for both WTG scenarios while elevated views may also have views of the turbine towers. Views from this area are likely to be weak to moderate at ground level but will become more distinct as the viewer becomes elevated (e.g., in multiplexes, hotels). The Marriott Virginia Beach Oceanside Hotel (KOP Field ID 26) will have elevated views towards the Lease Area and contrast is determined to be moderate given the distance to the WTGs.

I-1.5.2.2.2 Elevated Views Towards the Project Area

Viewers located away from the immediate beachfront will typically not have views of the Offshore Project Components because they will be screened by vegetation and/or urban development. Exceptions will be viewers with an elevated or superior viewing position who have unobstructed or partial views toward the Offshore Project Area (e.g., multi-story apartment buildings, hotels along the shoreline, and lighthouses). For example, for visitors at the Cape Charles, Old Cape Henry, and Currituck Beach lighthouses, at distances ranging between approximately 29.1 mi (46.8 km) and 36.8 mi (59.2 km) or more from the nearest WTG within the Offshore Project Area and elevated viewing conditions, a larger portion of the WTG would be visible than from ground level (in both scenarios, ground level would have no visibility of the Lease Area due to existing structures and vegetation). The Project will introduce several vertical elements into the landscape setting. Although a few vertical elements exist within the view, such as two pilot wind turbines and frequent ship traffic, that extend above the horizon, the Project will introduce greater contrast (moderate in both scenarios) in size and scale due to the number of WTGs concentrated along the horizon. The distance of the WTGs from the viewer will help to reduce their prominence within the landscape setting, however, given the number of WTGs visible and the horizontal spread across the horizon, the introduction of the WTGs may change the natural character of the existing landscape. In elevated viewing areas, the WTGs will be visible to the casual observer but does not attract visual attention or dominate the view because they appear very small on the horizon, particularly compared to the larger ships and barges that frequently pass along the horizon. Along the shoreline at ground-level, the WTGs will be less visible and, in many cases, may only be viewed while scanning in the general direction of the Lease Area but otherwise are likely to be missed by the casual observer. The WTGs may be more visible while the WTG blades are rotating. Simulations depicting views from elevated views from Cape Henry Lighthouse in Virginia and Currituck Beach Lighthouse in North Carolina are included in Attachment I-1-5.

I-1.5.2.2.3 Offshore Substations

The Offshore Substations are not anticipated to be visible from most vantage points along the Virginia and North Carolina shoreline and are not viewed from any of the KOPs, even those at higher elevations. The distances to the Offshore Substations from the coast of Virginia vary between 31 and 37 mi (49.8 and 59.5 km) for the representative WTG scenario, and between 35 and 40 mi (56.3 and 64.3 km) to the coast of North Carolina for the representative WTG scenario. At these distances, and given their size, it is anticipated that the Offshore Substations will not be noticeable or perceived from coastal vantage points. They are not anticipated to be visible from vantage points farther up and down the coastline that are farther away from with the Offshore Project Area because the Offshore Substations will fall completely below the horizon line.

Table I-1-10 provides a summary of the level of contrast created by the Offshore Project Components for each KOP. A Contrast Rating Worksheet for each KOP is located in Attachment I-1-4. In addition, results describing views with the Offshore Project Components implemented for each KOP are included in Attachment I-1-7.

Table I-1-10.Summary of Contrast Rating of Key Observation Points for Offshore Project Components

Field ID	Name	Location	Landscape Similarity Zone	Distance to Nearest Project Component (mi [km])	Contrast Rating a/		Daytime/ Nighttime Simulation Created for KOP b/
				14 MW and 16 MW WTG	14 MW WTG	16 MW WTG	
Virginia							
5	Oyster Village Horse Island Trail	Northampton	Rural Coastal Plain	32.6 (52.5)	Weak	Weak	Daytime
8	Eastern Shore of Virginia National Wildlife Refuge (Simulation from Wise Point boat ramp)	Northampton	Lower Coastal Plain/Tidewater	28.2 (45.4)	None	None	Daytime
13	(Old) Cape Henry Lighthouse/Fort Story Military Base	Virginia Beach	Industrial	29.1 (46.8)	Moderate	Moderate	Daytime
22	King Neptune Statue/Boardwalk	Virginia Beach	Tourism	27.9 (45)	Moderate	Moderate	Daytime
23	Naval Aviation Monument Park	Virginia Beach	Rural Coastal Plain/ Tourism	27.9 (45)	Weak	Weak	Daytime
26	Marriott Virginia Beach Oceanfront Hotel	Virginia Beach	Tourism	28 (45)	Moderate	Moderate	Daytime
29	Grommet Island Park/Boardwalk	Virginia Beach	Rural Coastal Plain/Developed Shoreline	27.7 (44.6)	Weak	Weak	Daytime
31	Picnic Views on Beach	Virginia Beach	Industrial	27.7 (44.6)	Weak	Weak	Daytime
44	Back Bay National Wildlife Refuge (Little Island Park)	Virginia Beach	Historic	26.8 (43.1)	Weak	Weak	Daytime
15	North End Beach – Residential View 1	Virginia Beach	Developed	28.1 (45.2)	Weak	Weak	Daytime
15	North End Beach – Residential View 1 (Nighttime)	Virginia Beach	Developed	28.1 (45.2)	Moderate	Moderate	Nighttime
24a	Virginia Beach Boardwalk – 17th Street Park	Virginia Beach	Rural Coastal Plain/ Tourism	27.8 (44.7)	Moderate	Moderate	Daytime
24b	Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime)	Virginia Beach	Rural Coastal Plain/ Tourism	27.8 (44.7)	Moderate	Moderate	Nighttime
24d	Virginia Beach Boardwalk – Fishing Pier	Virginia Beach	Ocean/Open Waters	27.6 (44.4)	Weak	Weak	Daytime
30a	Croatan Beach A	Virginia Beach	Low Density Residential	27.7 (44.6)	Weak	Weak	Daytime
30c	Croatan Beach C	Virginia Beach	Historic	27.7 (44.6)	Weak	Weak	Daytime

Field ID	Name	Location	Landscape Similarity Zone	Distance to Nearest Project Component (mi [km])	Contrast Rating a/		Daytime/ Nightime Simulation Created for KOP b/
				14 MW and 16 MW WTG	14 MW WTG	16 MW WTG	
North Carolina							
48	Currituck Beach Lighthouse	Currituck	Rural Coastal Plain	36.8 (59.2)	Moderate	Moderate	Daytime
47	Currituck National Wildlife Refuge	Currituck	Lower Coastal Plain/Tide Water	34.7 (55.8)	Weak	Weak	Daytime
49a	Whale Head Bay Residential View 4	Currituck	Rural Coastal Plain/Developed Shoreline	36.6 (58.9)	Weak	Weak	Daytime
49g	Whale Head Bay Albacore Street Entrance – Elevated	Currituck	Rural Coastal Plain/Developed Shoreline	39.1 (62.9)	Weak	Weak	Daytime

Notes:
a/ Visual Contrast Rating Worksheets for each KOP is included in Attachment I-1-4. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in this table.
b/ Visual simulations are included in Attachment I-1-5.

I-1.5.2.3 Nighttime Lighting

A viewshed analysis based on nighttime conditions of the Project has not been prepared because such an analysis here is unnecessary to adequately assess such effects . Based on a 2013 study prepared for the BLM (Sullivan et al. 2013b), FAA lights were noted as being visible at a distance of 36.2 mi (58.3 km). FAA lights will be mounted on the top of each WTG structure and will include two red lights, one on either side of the nacelle, so they are visible to pilots approaching from any direction. The FAA lights will be applicable to both the representative WTGs. The representative WTGs may also require mid-tower lighting, which will consist of three to four red lights mounted midway between the top of the nacelle which will flash in unison with the nacelle lights. The need and number of mid-tower lights will be dependent upon FAA requirements as well as the diameter of the tower. The proposed lighting for the Offshore Substations will include lights around the perimeter of each deck level for safety and will be mounted to lightning protection rods. Where visible, the proposed Offshore Substation lighting will be seen in the context of the FAA lights and therefore is not discussed separately.

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

The introduction of nighttime lights into the relatively dark setting of the Atlantic Ocean will be most noticeable from the Virginia and North Carolina coasts. Areas around Virginia Beach, Chesapeake Bay, and Delmarva Peninsula have more continuous vessel traffic and therefore lighting of WTGs with hub up views may not be as noticeable as areas with darker skies. Areas south of Virginia Beach and North Carolina may have darker skies and the lights may seem more pronounced from these locations. It is anticipated that more contrast will be introduced in areas that are relatively void of human-made light sources, such as beaches and natural areas along barrier islands. However, given that these areas are primarily used during daytime hours and most of the local, state, and federal parks and beaches close at sunset, the number of affected viewers will be limited. In areas where boardwalks and other development parallel beaches, nighttime lighting associated with the Project will be seen in the context of human-made lights such as pedestrian lights along the boardwalk and lights associated with restaurants, hotels, arcades, and other commercial businesses. For viewers along the coasts of Virginia and North Carolina, the additional lights will introduce more contrast and may make the WTGs stand out more against the dark sky. Contrast is anticipated to be reduced elsewhere along the coastline as the distance between the mainland and Offshore Project Area increases. At greater distances, WTGs in portions of the Offshore Project Area will not be visible because the nacelle of some WTGs will fall below the horizon. Visibility at these distances may be reduced or completely obscured by wave action and/or atmospheric conditions, such as haze or fog.

Dominion Energy is considering implementing an ADLS (or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Dominion Energy has conducted an analysis of historical air traffic operations to determine how often the ADLS would activate the obstruction lights for

the Project. The ADLS analysis report is included as Appendix T, Obstruction Evaluation and Additional Analysis.

Additionally, the USCG requires navigation lights on all WTGs including three white lights mounted no less than 20 ft (6 m) above mean high water. In addition, flashing yellow SPS lighting will be located on corner towers or significant points on the periphery of the wind farm. Both array and SPS lighting are designed to be visible up to approximately 5 nm (9.2 km). The nearest onshore vantage point is approximately 25 mi (40.2 km) from the Project Area. It is anticipated that USCG navigation lights will not be visible from most viewpoints on land because the lights will fall below the horizon line. Elevated viewpoints in areas such as the lighthouses may have views of the USCG navigation lights, because more of the WTG structures will be visible above the horizon. However, because the lighthouses are closed at night the numbers of affected viewers will be limited. In addition, since USCG navigation lights are designed to be visible up to 5 nm (9 km), it is anticipated that these lights will be relatively inconspicuous to onshore viewers (BOEM 2007). On a clear night, it is anticipated that the WTG lights will create moderate contrast with the dark skies.

I-1.6 MITIGATION

In general, opportunities to mitigate visual effects for offshore wind projects are limited, given the size and physical characteristics of the WTGs and the open ocean environment in which they are located. Furthermore, most viewpoints where WTGs will be visible are from beaches and residential areas along the coast and elevated viewing areas, such as lighthouses, where views of the ocean are desirable. Therefore, measures to screen views from the viewing locations, such as constructing berms or fences or planting vegetation, would not be a viable option. Two existing offshore WTGs (CVOW Pilot) are discernable in the view towards the Project; however, they are several hundred feet shorter than the proposed WTGs.

WTGs will be uniform in shape and color, and it is anticipated that the WTGs will be uniform in size of rotor blades, nacelle, and towers. Because the WTGs will be viewed against a sky background, a light color, such as white or light gray, will be used for the structures, as dictated by USCG and BOEM requirements. The use of light-colored WTGs will help to minimize contrast with the sky under most conditions. The proposed WTG design and appearance align with mitigation measures recommended by BOEM (BOEM 2007).

FAA and USCG lights on the WTGs will contribute to their visual effect, as demonstrated in the visual simulations included in Attachment I-1-5. These warning lights are a required safety measure; therefore, they cannot be reduced in number or eliminated. However, lighting-related impacts can be minimized by limiting the WTG lighting to the minimum time duration allowable by the FAA and USCG. Visual effects could be further reduced by implementing an ADLS. Dominion Energy is evaluating the possibility of implementing a radar-based ADLS (or a similar system) to turn the aviation obstruction lights on and off in response to detection of aircraft near the wind farm, as a base case, pending commercial availability, technical feasibility, and agency review and approval. These systems are intended to reduce the amount of time that the lights are illuminated, thereby potentially minimizing the time that WTGs are visible from shore at night.

I-1.7 CONCLUSIONS

The level of change perceived by viewers within the Offshore Visual Study Area is dependent upon distance between the viewer and the structure, the height of the structure, the elevation of the viewer, earth curvature, meteorological conditions, and individual viewer expectations. Based on analysis of the simulations prepared for 20 KOPs, changes to the landscape conditions that will occur as the result of offshore Project components will vary from negligible to moderate for viewers within the Offshore Visual Study Area.

I-1.7.1 Impacts During Construction

Viewers within the Offshore Visual Study Area will be able to observe marine traffic associated with the Project on a short-term basis during the construction period for offshore Project components. It is anticipated the level of change perceived by viewers during the construction period will vary both among locations and over time at a specific location. The degree of change will be greater along the coastline and within elevated areas along the coast, particularly around Virginia Beach and Delmarva Peninsula where vessels will at times be seen in the foreground to middleground (0 to 18 mi [29 km]); the degree of change will lessen as the vessels move farther away from shore. As noted earlier, commercial and recreational vessel traffic is commonly seen within the Offshore Visual Study Area. Overall, visual impacts during construction will be temporary, and are expected to be negligible to minor.

I-1.7.2 Impacts During Operations

The visual simulations depict visibility of the Project from a variety of distances, elevations, atmospheric conditions, times of day, times of year, and site contexts. On a long-term basis during operation of the Project, views of the WTGs would be limited primarily to shoreline areas of the Delmarva Peninsula, Virginia Beach, and the Carova and Carolla Beach areas of North Carolina. The most apparent views of WTGs were found to be within 27 to 28 mi (43.5 to 45.1 km) from the Offshore Project Area, where views are oriented toward the ocean and horizon. Within these areas, beach/shoreline and elevated viewpoints, such as multi-story buildings or lighthouses, will have the most conspicuous views. As represented by the visual simulations, the foundations and deck of the WTGs would be below the visual horizon and would not be visible for most WTGs from most KOPs. The visible elements (tower, nacelle and rotors) would be minimally discernable to distinct during the best visibility conditions (a clear, low humidity day). Atmospheric haze or cloud cover greatly reduces visibility, as weather conditions reduce visual contrast at the horizon. Refer to the simulation at KOP: Croatan Beach A and C (Field ID 30a and 30c) for typical depictions of this condition.

In addition to the variable effects atmospheric/meteorological conditions have on visibility, the quality and direction of the sun as it changes throughout the day would also affect how the WTGs are seen by viewers. Time lapse videos simulating views of the Project from selected KOP locations created for this analysis demonstrate these effects during clear conditions (Attachment I-1-6). During early morning, the turbines would be backlit by the rising sun to the east, and thus relatively more noticeable as darker grey silhouettes against the orange early morning sky. During dusk and sunset, the western sunlight would briefly catch the light grey surfaces of the WTGs rotors, nacelle, and tower, resulting in the WTGs appearing as light-colored objects in contrast with the darkening sky.

The viewshed analyses conducted for this VIA show theoretical visibility from most of the LSZs, focused in areas where proximity to the shoreline and/or lack of screening by vegetation and topography creates a line-of-sight to the Project. The onshore LSZs with the most occurrence of theoretical views of the Project[5] include:

- Historic - 6.19 square miles showing potential visibility. This is likely due to the large proportion of lands categorized as Historic being adjacent to the shoreline.
- Rural Coastal Plain – 4.61 square miles showing theoretical visibility.
- Industrial/Military - 2.36 square miles showing theoretical visibility.

In addition to these theoretical visibility results, fieldwork and the simulations show that visibility to the Project would occur in high concentrations within the Tourism LSZ where many high-rise hotels and residential buildings have elevated views toward the Project.

Viewers along the immediate coastline from Delmarva Peninsula to Corolla Beach, North Carolina will perceive some change to ocean views during perfect viewing conditions, where the visual simulations show contrast created by the change will vary from negligible to moderate (Table I-1-10). Concluding results are given below for Delmarva Peninsula, Virginia Beach, and North Carolina.

I-1.7.2.1 Delmarva Peninsula

Eastside shoreline areas on the Delmarva Peninsula will have indistinguishable to faint views of the nacelle (hub), most of the rotor blades and tops of the towers. Simulations from the Delmarva Peninsula (for example, at Oyster Village/Horse Island Trail) indicate contrast would be weak to none. The very few publicly accessible east-facing shoreline locations on the Peninsula primarily function as boat ramps, so viewers at these locations would likely be focused on that activity and less focused on elements on the distant horizon. Overall, visual impacts to the Delmarva Peninsula would be negligible.

I-1.7.2.2 Virginia Beach

In Virginia Beach, viewers on the beach with focused views toward the ocean would experience weak to moderate contrast as they view the WTGs for an extended duration. Beachgoers (e.g., sunbathers), drawn to the beach during clear, sunny weather, may experience relatively greater impacts to their experience because their activity would predominantly place them within view of the Project under optimal viewing conditions. However, as discussed above (Section I-1.5.1.2.4) weather data shows 90 percent visibility reaching 20 nm is limited to just 7.3 percent of summer days (i.e., 6-7 days of the season). Viewers enjoying the Virginia Beach Boardwalk would primarily be focused on views to the north or south as they move along the promenade, but could notice the WTGs when they turned to face the ocean directly. Inland elevated views, such as from rooftop restaurants and bars and/or upper story residential units, would experience relatively more conspicuous views of the Project, because the superior position offsets some of the earth curvature screening, therefore more of the WTGs can be seen. Refer to KOP from a rooftop

[5] Square miles shown represent theoretical areas, as determined by the ArcGIS viewshed analyses, having a line-of-sight to the nacelle and upwards of the preferred turbine (i.e., 14 MW).

restaurant on the 23rd floor of the Marriott Virginia Beach Oceanfront Hotel (Field ID 26). Overall, visual impacts to KOPs in Virginia Beach would be minor to moderate.

I-1.7.2.3 North Carolina

In North Carolina, the nearest viewing publicly accessible location would be over 30 miles from the nearest WTG, so even under perfect viewing conditions, visibility would be faint. Viewers in the lens room of Currituck Lighthouse may notice the WTGs as faintly contrasting white objects at the horizon, but the degree of change from this distance (38.6 mi [62 km]), even from an elevated position, would be slight. Other simulations at Whale Head Bay show the WTGs are imperceptible. Overall, impacts to visual resources in North Carolina would be negligible to minor.

I-1.8 REFERENCES

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Attachment I-1-1 Representative Photographs

Dominion Energy®

Coastal Virginia Offshore Wind

VIA Attachment I-1-1

Visual Resource Inventory Photo Log and KOP Context (Visual Offshore Study Area)

October 2021

Eastern Shore, VA

KOP location



Oyster/Cobb Island Station, Horse Island Trail

Field ID: 5
Latitude 37.2876, Longitude -75.9179
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

SE

Shoreline walking trail, public boat ramp and docks.



Panoramic View

Contextual Site Photos



1: Trailhead interpretive signage



2: Southwest-facing view toward Oyster boat ramp, opposite the narrow slip from Horse Island Trail

Eastern Shore, VA

KOP location



Eastern Shore of Virginia NWR Boat Ramp

Field ID: 8
Latitude 37.1278, Longitude -75.9499
Landscape Similarity Zone: Lower Coastal Plain

Viewing Direction

SE

Public boat ramp and dock within USFW-managed wildlife refuge



Panoramic View

Contextual Site Photos



1: View southwest toward boat ramp; Chesapeake Bay Bridge is visible in the background



2: Facing west from boat ramp parking lot

Fort Story, VA

KOP location



(Old) Cape Henry Lighthouse

Field ID: 13
Latitude 36.9257, Longitude -76.0081
Landscape Similarity Zone: Industrial

Viewing Direction

E

National Historic Landmark lighthouse on military base with elevated views.



Panoramic View

Contextual Site Photos



1: Exterior View of Old Cape Henry Lighthouse



2: View facing northeast toward newer lighthouse from the elevated plaza surrounding the Old Cape Henry Lighthouse

Virginia Beach, VA

KOP location



Beach Residential View 1 - 72nd St

Field ID: 15a
Latitude 36.8983, Longitude -75.9867
Landscape Similarity Zone: Developed

Viewing Direction

ESE

Public beach with residential neighborhood and beach front houses



Panoramic View

Contextual Site Photos



1: View looking west toward beach front residential development.



2: View looking south toward Virginia Beach.

Virginia Beach, VA

KOP location



Beach Residential View 1 - 72nd St
Nighttime View

Field ID: 15a
Latitude 36.8983, Longitude -75.9867
Landscape Similarity Zone: Developed

Viewing Direction

ESE

Public beach with residential neighborhood and beach front houses



Panoramic View

Virginia Beach, VA

KOP location



Marriott Virginia Beach Oceanside Hotel

Field ID: 26
Latitude 36.8701, Longitude -75.9804
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Newly constructed 23-story hotel at Virginia Beach's North End, offering rooftop restaurant and ocean view rooms



Panoramic View

Contextual Site Photos



1: View facing north from hotel rooftop



2: View facing south from hotel rooftop



VA Beach Boardwalk - North End

Field ID: 21a
Latitude 36.8673, Longitude -75.9795
Landscape Similarity Zone: Developed Shoreline

Viewing Direction

SE

Heavy beach use, foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 39th St. entrance



Panoramic View

Contextual Site Photos



1: West-facing view toward oceanfront hotels along Virginia Beach Boardwalk



2: East-facing view from boardwalk toward Atlantic Ocean

Virginia Beach, VA

KOP location



Virgina Beach Boardwalk & Fishing Pier

Field ID: 24d
Latitude 36.8437, Longitude -75.9699
Landscape Similarity Zone: Ocean/Open Water

Viewing Direction

E

Public fishing pier with heavy foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 16th St. entrance



Panoramic View

Contextual Site Photos



1: View looking west along the fishing pier toward Virginia Beach.



2: View looking southeast from entrance to pier.

Virginia Beach, VA

KOP location



Virgina Beach Boardwalk & Fishing Pier-nighttime Views

Field ID: 24d
Latitude 36.8437, Longitude -75.9699
Landscape Similarity Zone: Ocean/Open Water

Viewing Direction

E

Public fishing pier with heavy foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 16th St. entrance



Panoramic View at shoreline



Alternate Panoramic View from Virgina Beach Boardwalk

Virginia Beach, VA

KOP location



VA Beach Boardwalk - Naval Aviation Monument

Field ID: 23
Latitude 36.8538, Longitude -75.9757
Landscape Similarity Zone: Tourism

Viewing Direction

E

Heavy beach use, foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 25th St. entrance



Panoramic View

Contextual Site Photos



1: West-facing view of monument plaza from boardwalk



2: North-facing view of boardwalk from monument plaza

Virginia Beach, VA

KOP location



VA Beach Boardwalk - Neptune Statue

Field ID: 22
Latitude 36.8594, Longitude -75.9773
Landscape Similarity Zone: Tourism

Viewing Direction

E

Heavy beach use, foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 31st St. entrance



Panoramic View

Contextual Site Photos



1: King Neptune statue, east facing view



2: North facing view along Virginia Beach Boardwalk

Virginia Beach, VA

KOP location



VA Beach Boardwalk - 16th St. Entrance Nighttime Views

Field ID: 24b
Latitude 36.8448, Longitude -75.9731
Landscape Similarity Zone: Developed Coastline

Viewing Direction

E

Heavy foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 16th St. entrance

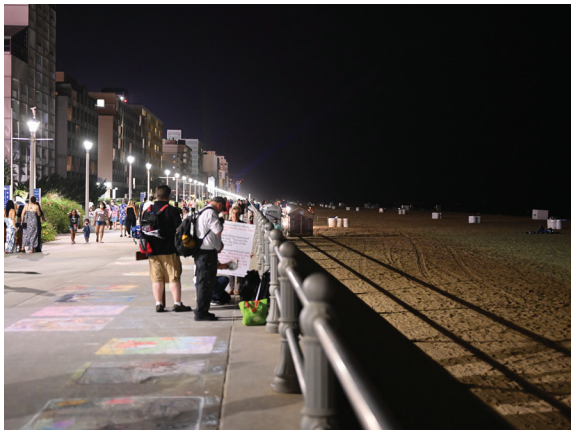


Panoramic View

Contextual Site Photos



1: South-facing view of boardwalk activity after dark



2: North-facing view of boardwalk activity after dark



VA Beach Boardwalk - Volleyball Courts

Field ID: 21c
Latitude 36.8646, Longitude -75.9787
Landscape Similarity Zone: Developed Shoreline/ Rural Coastal Plain

Viewing Direction

SE

Heavy foot traffic, athletics, and beach use. Tourism and commercial use on the Virginia Beach Boardwalk, 36th St. entrance



Panoramic View

Contextual Site Photos



1: View facing north along the Virginia Beach Boardwalk



2: View facing south along the Virginia Beach Boardwalk

Virginia Beach, VA

KOP location



Virginia Beach Boardwalk - 17th St Park

Field ID: 24a
Latitude 36.8455, Longitude -75.9733
Landscape Similarity Zone: Rural Coastal Plain/ Commercial

Viewing Direction

E

Community park with heavy beach use, foot traffic, tourism and commercial use on the Virginia Beach Boardwalk, 31st St. entrance



Panoramic View

Contextual Site Photos



1: View facing west toward 17th Street Park from Virginia Beach Boardwalk



2: View facing west within 17th Street Park of John Wareing statue

Virginia Beach, VA

KOP location



Grommet Island Park/Boardwalk

Field ID: 29
Latitude 36.8314, Longitude -75.9697
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

ENE

Heavily used public playground, tourism and commercial use at South end of the Virginia Beach Boardwalk



Panoramic View

Contextual Site Photos



1: View facing east toward playground with beach beyond



2: Hotel and development directly north of Grommet Island Park

Virginia Beach, VA

KOP location



Croatan Beach A - North

Field ID: 30a
Latitude 36.8276, Longitude -75.9686
Landscape Similarity Zone: Low Density Residential

Viewing Direction

NE

Heavily used public beach with beach front residences, shipping lane and channel views



Panoramic View

Contextual Site Photos



1: View facing south along the shoreline



2: Looking west toward beach access and residential area



Croatan Beach B - South

Field ID: N/A
Latitude 36.8236, Longitude -75.9680
Landscape Similarity Zone: Low Density Residential

Viewing Direction

NE

Heavily used public beach with beach front residences, shipping lane and channel views



Panoramic View

Contextual Site Photos



1: View facing north toward Rudee Inlet Jetty and Virginia Beach city center



2: View facing west toward dune and beach front residential development



Developed Shoreline - Sandpiper Rd

Field ID: N/A
Latitude 36.7288, Longitude -75.9365
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: Facing north along shoreline adjacent to residential areas



2: Facing west toward dune and beach front residences



Public Beach View - S Atlantic Avenue

Latitude 36.8180, Longitude -75.9668

Viewing Direction

E

Heavily used public beach with beach front residences, shipping lane views



Panoramic View

Contextual Site Photos



1: Looking south along the shoreline



2: Looking west toward beach access and residential area

Virginia Beach, VA

KOP location



Back bay National Wildlife Refuge
(Little Island Park)

Field ID: 45
Latitude 36.6232, Longitude -75.8911
Landscape Similarity Zone: Historic

Viewing Direction

NE

9,250-acre USFWS-managed wetland and shoreline with walking trails; adjoins False Cape State Park



Panoramic View

Contextual Site Photos



1: View of foredune within the park



2: South-facing view along the shoreline



False Cape State Park

Field ID: 45
Latitude 36.6232, Longitude -75.8911
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

SE

Protected shoreline with walking trails, dunes, and woodlands. Site includes primitive camp sites. Vehicle access is not permitted.

Contextual Site Photos



1: View from the shoreline



2: View from the shoreline

Virginia Beach, VA

KOP location



Picnic Beach Views at State Military Reservation

Field ID: 31
Latitude 36.8156 Longitude -75.9669
Landscape Similarity Zone: Historic/Military

Viewing Direction

E

Publicly accessible small day use area on the shore side of an Army National Guard resident facility. Positioned on the foredune overlooking the beach and ocean.



Panoramic View

Contextual Site Photos



1: View from beach adjacent to picnic sites



2: West-facing view near picnic area

Corolla, NC

KOP location



Currituck Beach Lighthouse

Field ID: 48
Latitude 36.3767, Longitude -75.8308
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Historic lighthouse, village, and museums with potential elevated views from observation deck



Panoramic View

Contextual Site Photos



1: Exterior view of Currituck Beach Lighthouse, facing east



2: Currituck Beach Lighthouse Museum stands near the lighthouse



Whale Head Bay Residential View 1

Field ID: 49f
Latitude 36.3294, Longitude -75.8104
Landscape Similarity Zone: Developed Shoreline

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: View toward foredune and residential properties



2: South-facing view along the shoreline

Corolla, NC

KOP location



Whale Head Bay Albacore St. Entrance - Elevated

Field ID: 49g
Latitude 36.3283, Longitude -75.8105
Landscape Similarity Zone: Developed Shoreline

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: View toward foredune and residential properties



2: South-facing view along the shoreline



Whale Head Bay Residential View 2

Field ID: 49e
Latitude 36.3584, Longitude -75.8190
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: View toward foredune and residential area access



2: North-facing view along the shoreline



Whale Head Bay Residential View 3

Field ID: 49d
Latitude 36.3675, Longitude -75.8214
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: View toward foredune and residential area access



2: South-facing view along the shoreline



Whale Head Bay Shad St. Entrance - Elevated

Field ID: 49c
Latitude 36.3696, Longitude -75.8224
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: View toward foredune and residential area access



2: South-facing view along the shoreline

Corolla, NC

KOP location



Whale Head Bay Residential View 4

Field ID: 49a
Latitude 36.3776, Longitude -75.8242
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: West-facing view toward foredune and beach front residences



2: South-facing view along the shoreline



Whale Head Bay Corolla Village Entrance

Field ID: 49b
Latitude 36.3763, Longitude -75.8242
Landscape Similarity Zone: Rural Coastal Plain

Viewing Direction

NE

Heavily used public beach with beach front residences



Panoramic View

Contextual Site Photos



1: West-facing view toward foredune and beach front residences



2: South-facing view along the shoreline

Contextual Field Photos



Atlantic Wildfowl Heritage Museum

Latitude 36.8404, Longitude -75.97223

Boardwalk museum & community area with potential views of the project



Bayville Farms Park

Latitude 36.9034, Longitude -76.1191

Community park with sports fields and recreational facilities - No view of the project

Contextual Field Photos



Beach Residential View 2 b/

Latitude 36.8734, Longitude -75.9806

Public beach with potential views of the project Residential area



Beach View 1 - 72nd St.

Latitude 36.8983 Longitude -75.9867

Public beach with potential views of the project Residential area

Contextual Field Photos



Cessford

Latitude 37.3500, Longitude -75.9475

Historic building - heavily forested - no views of project area



Coast Guard Station Cobb Island Public Boat Ramp

Latitude 37.2888 Longitude -75.9233

Public use boat ramp and docks adjacent to historic coast guard station



Dr. John Masure Miller House

Latitude 36.8785, Longitude -75.9913

Residential heavily forested - no view



Eastville Shops/
James Brown Dry Goods Store

Latitude 37.3526, Longitude -75.9465

Rural residential local shops heavily forested - no view

Contextual Field Photos



Hilton Virginia Beach Oceanfront

Latitude 36.8392, Longitude -75.9721

Virginia Beach ocean front hotel with private balconies. Would have views of the Project area.



Fentress Naval Air Landing Field

Latitude 36.6922, Longitude -76.1304

Historic air landing field heavily forested
- No view of project area

Contextual Field Photos



First Landing State Park East Entrance b/

Latitude 36.8899, Longitude -75.9919

State park heavily forested - no view of project area



Great Neck Park

Latitude 36.8830, Longitude -76.0596

Community park with sports fields and recreational facilities - No view of project area

Contextual Field Photos



Kiptopeke State Park

Latitude 37.1668, Longitude -75.9882

State park with bay views, waterfront access, rec facilities - No view of project area



Lake Holly Boardwalk - Pacific Ave

Latitude 36.8354, Longitude -75.9731

Community boardwalk and gazebo - oceanfront buildings block any potential views

Contextual Field Photos



Military Aviation Museum/
Virginia Beach Airport
Latitude 36.6795, Longitude -76.02783

Local museum with considerable amount of visitors
- No view of project area



Mount Trashmore Park

Latitude 36.8291, Longitude -76.1274

Community park with recreational facilities
- No view of project area



Munden Point Park b/

Latitude 36.5821, Longitude -76.0351

Forested community park with recreational facilities, water access - no view of project area



Navy Seal Monument

Latitude 36.8661, Longitude -75.9794

Virginia beach boardwalk monument/community area

Contextual Field Photos



Norfolk International Airport

Latitude 36.8988, Longitude -76.2054

Heavily forested - no view



North Landing River Natural Area Preserve

Latitude 36.6154, Longitude -76.0586

Rural - elevated bridge but no views of project

Contextual Field Photos



Old Dam Neck Park

Latitude 36.7788, Longitude -75.9895

Residential Community park with pool and recreational facilities - no view of project area



Pine Meadows Park

Latitude 36.7804, Longitude -75.9882

Small Residential park with recreational facilities - No view of project area

Contextual Field Photos



Pleasant Hall/Kempsville Baptist Church

Latitude 36.8282, Longitude -76.1620

Historic Kempsville, residential/commercial - No view of project area



Princess Anne Memorial Park

Latitude 36.8672, Longitude -76.0418

Cemetery- no view of project area



Pungo Ferry Road - Virginia Scenic Byway

Latitude 36.6150, Longitude -76.0356

Rural residential - no view of project area



Red Wing Park

Latitude 36.7913, Longitude -75.9928

Community park with recreational facilities - No view of project area

Contextual Field Photos



Seatack Park

Latitude 36.8302, Longitude -75.9972

Small community park with recreational facilities
- No view of project area



Stratton Manor

Latitude 37.2617, Longitude -75.9826

No view of project area

Contextual Field Photos



Virginia Legends Park

Latitude 36.8416, Longitude -75.9735

Residential/community area



Volleyball Courts on Beach

Latitude 36.8646, Longitude -75.9786

Community use volleyball courts on beach with potential views of project

Contextual Field Photos



Wadsworth Shore Residential View

Latitude 36.8115, Longitude -75.9784

Military base and housing - restricted access - No view of the project area



Webland Manor

Latitude 36.8749, Longitude -76.1670

Residential area

Contextual Field Photos



Wood House House -
Indian River Plantation Neighborhood

Latitude 36.7287, Longitude -76.0557

Upscale residential/agricultural - no view of project area



Currituck County Courthouse

Latitude 36.4518, Longitude -76.0224

No view of project area

Attachment I-1-2 Visual Resource Inventory

Table I-1-2-1. Visual Resource Inventory

Field ID No.	Viewpoint Locations	Maximum Layout Topographic Viewshed	Maximum Layout Vegetated Viewshed	Landscape Similarity Zone	User Group
24a	Virginia Beach Boardwalk—17th Street Park	Hub Up	Hub Up	Rural Coastal Plain/Tourism	Tourist/Residential
24c	Virginia Beach Boardwalk—16th St. Entrance (Nighttime)	Hub Up	Hub Up	Rural Coastal Plain/Tourism	Tourist/Residential
—	Virginia Beach Boardwalk—Fishing Pier—16th St.	Hub Up	Hub Up	Ocean/Open Water	Tourist /Residential/Recreation
24d	Virginia Beach Boardwalk—Fishing Pier	Hub Up	Hub Up	Ocean/Open Water	Tourist /Residential/Recreation
—	24th Street Park	Hub Up	Hub Up	Tourism	Tourist/Recreation
25	Atlantic Wildfowl Heritage Museum	Hub Up	Hub Up	Tourism	Tourist/Residential
12	Bayville Farms Park	Max Tip	Views Unlikely	Historic	Tourist/Residential
15a	North End Beach—Residential View 1	Hub Up	Hub Up	Developed	Tourist/Residential
15b	North End Beach—Residential View 1 (Nighttime)	Hub Up	Hub Up	Developed	Tourist/Residential
—	North End Beach—Residential 2	Views Unlikely	Views Unlikely	Developed	Tourist/Residential
29	Boardwalk 2 Along Grommet Island Park	Hub Up	Hub Up	Developed Shoreline	Tourist/Residential
27	Boardwalk in Lake Holly	Views Unlikely	Views Unlikely	Developed	Tourist/Residential
—	Boy Scout Campground	Views Unlikely	Hub Up	Historic	Residential/Recreation
—	Boy Scout Field	Max Tip	Views Unlikely	Historic	Residential/Recreation
—	Briarwood	Hub Up	Views Unlikely	Rural Residential	Residential/Tourist
39	State Military Reservation	Max Tip	Views Unlikely	Historic	Military
—	Cape Charles Historic District	Views Unlikely	Views Unlikely	Developed/Industrial	Military
—	Cape Charles Lighthouse	Hub Up	Views Unlikely	Industrial	Military
13	Cape Henry Lighthouse/Fort Story Military Base	Hub Up	Hub Up	Industrial	Military
—	Cavalier Hotel	Views Unlikely	Views Unlikely	Tourism	Tourist
3	Cessford	Views Unlikely	Views Unlikely	Lower Coastal Plain/Tide Water / Rural Residential	Residential
—	Chesapeake Bay Bridge Tunnel Scenic Byway—Scenic Overlook Trail	Hub Up	Hub Up	Travel Corridor/Scenic Byway	Tourist/Residential
30a	Croatan Beach A	Hub Up	Hub Up	Low Density Residential	Tourist/Residential
46	Currituck County Courthouse	Views Unlikely	Views Unlikely	Developed	Residential

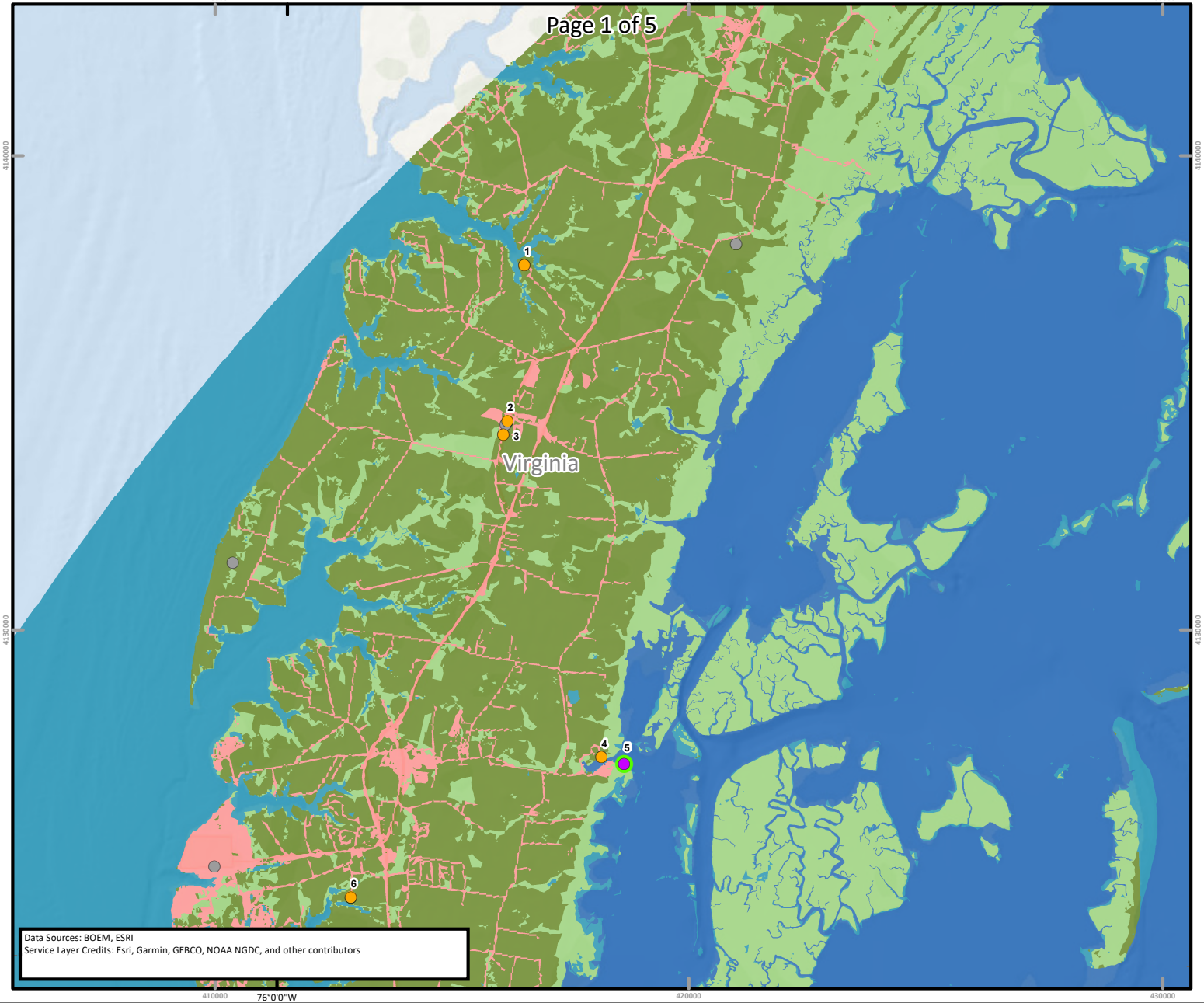
Field ID No.	Viewpoint Locations	Maximum Layout Topographic Viewshed	Maximum Layout Vegetated Viewshed	Landscape Similarity Zone	User Group
48	Currituck Beach Lighthouse	Views Unlikely	Hub Up	Rural Coastal Plain	Tourist/Residential
47	Currituck National Wildlife Refuge	Views Unlikely	Hub Up	Lower Coastal Plain/Tide Water	Tourist/Recreation
38	Sandbridge Beach—Sandfiddler Road	Hub Up	Hub Up	Developed Shoreline	Tourist/Residential
17	Dr. John Masure Miller House	Views Unlikely	Views Unlikely	Low Density Residential	Tourist
8	Eastern Shore of Virginia National Wildlife Refuge	Hub Up	Hub Up	Lower Coastal Plain/Tide Water	Recreation
2	Eastville Mercantile	Max Tip	Views Unlikely	Developed	Residential
21a	Virginia Beach Boardwalk—North End	Hub Up	Hub Up	Rural Coastal Plain	Tourist/Residential
21b	Virginia Beach Boardwalk—Navy Seal Monument—38th St.	Hub Up	Hub Up	Rural Coastal Plain	Tourist/Residential
21c	Virginia Beach Boardwalk—Volleyball Courts	Hub Up	Hub Up	Rural Coastal Plain	Tourist/Residential
45	False Cape State Park/Back Bay National Wildlife Refuge	Views Unlikely	Views Unlikely	Historic	Recreation
40	Fentress Naval Air Landing Field	Max Tip	Views Unlikely	Agriculture/Industrial	Military
16	First Landing State Park East Entrance	Hub Up	Views Unlikely	Developed	Recreation
—	First Landing State Park East Viewpoint	Max Tip	Views Unlikely	Historic	Recreation
—	First Landing State Park End of Walking Trail	Max Tip	Views Unlikely	Historic	Recreation
—	First Landing State Park Parking	Views Unlikely	Views Unlikely	Historic	Recreation
13	Fort Story Military Base	Hub Up	Views Unlikely	Industrial	Military
—	Fisherman Island National Wildlife Refuge	Max Tip	Views Unlikely	Open Water	Recreation
—	Francis Land House	Max Tip	Views Unlikely	Commercial/Historic	Residential
14	Great Neck Park	Max Tip	Hub Up	Historic	Residential
—	Green Hill	Max Tip	Views Unlikely	Rural Residential	Residential
29	Grommet Island Park/Boardwalk	Hub Up Views	Hub Up	Rural Coastal Plain/Developed Shoreline	Rural Coastal Plain/Developed Shoreline
—	James Brown Dry Goods Store	Views Unlikely	Views Unlikely	Developed	Residential
1	Kendall Grove Historic District	Hub Up	Views Unlikely	Rural Coastal Plain/Historic	Residential
34	Pine Meadows Park	Max Tip	Views Unlikely	Low Density Residential	Recreation
7	Kiptopeke State Park	Hub Up	Views Unlikely	Rural Coastal Plain	Recreation
—	Kneeling House	Views Unlikely	Views Unlikely	Rural Residential	Residential

Field ID No.	Viewpoint Locations	Maximum Layout Topographic Viewshed	Maximum Layout Vegetated Viewshed	Landscape Similarity Zone	User Group
—	Machipongo International Airport	Hub Up	Views Unlikely	Rural Coastal Plain	Tourist
—	Mackay Island National Wildlife Refuge	Views Unlikely	Views Unlikely	Lower Coastal Plain/Tide Water	Recreation
—	Marshview Park	Hub Up	Views Unlikely	Historic	Recreation
39	Military Aviation Museum	Hub Up	Views Unlikely	Agriculture	Recreation/Tourism
20	Mount Trashmore Park	Max Tip	Views Unlikely	Historic	Recreation
43	Munden Point Park	Max Tip	Views Unlikely	Historic	Recreation
23	Naval Aviation Monument Park	Hub Up	Hub Up	Rural Coastal Plain/Developed Shoreline	Recreation/Tourism
22	King Neptune Statue/Boardwalk	Hub Up	Hub Up Views	Tourism	Tourism
10	Norfolk International Airport	Max Tip	Views Unlikely	Commercial	Tourism
—	North Carolina Residential View	Hub Up	Hub Up	Rural Coastal Plain/Rural Residential	Residential
—	North Landing River Natural Area Preserve	Max Tip	Views Unlikely	Agriculture	Recreation
—	Oceana Naval Air Station	Max Tip	Views Unlikely	Industrial	Military
35	Old Dam Neck Park	Max Tip	Views Unlikely	Historic	Recreation
—	Old Donation Church	Max Tip	Views Unlikely	Rural Residential	Residential
—	Pembroke Manor	Max Tip	Views Unlikely	Commercial	Residential
31	Picnic Views on Beach	Hub Up	Hub Up	Historic/Industrial	Historic/Industrial
19	Pleasant Hall	Views Unlikely	Views Unlikely	Commercial	Residential
18	Princess Anne Memorial Park	Max Tip	Views Unlikely	Low Density Residential	Recreation
30c	Croatan Beach C	Hub Up	Hub Up	Historic	Recreation/Tourist
33	Redwing Park	Hub Up	Views Unlikely	Historic	Recreation
—	Savage Park Dunes State Natural Area Preserve	Views Unlikely	Views Unlikely	Rural Coastal Plain	Recreation
28	Seatack Park	Hub Up	Views Unlikely	Low Density Residential	Recreation
—	Shirley House	Max Tip	Views Unlikely	Rural Residential	Residential
26	Marriott Virginia Beach Oceanfront Hotel	Turbine	Views Unlikely	Tourism/High Density/Apartment District	Tourist
6	Stratton Manor	Views Unlikely	Views Unlikely	Rural Coastal Plain	Residential
—	Upton Estates Municipal Park	Max Tip	Views Unlikely	Low Density Residential	Recreation
—	Virginia Beach Airport	Max Tip	Views Unlikely	Agriculture/Developed	Tourist

Field ID No.	Viewpoint Locations	Maximum Layout Topographic Viewshed	Maximum Layout Vegetated Viewshed	Landscape Similarity Zone	User Group
—	Virginia Legends Park	Max Tip	Views Unlikely	Developed	Recreation
	Virginia Museum of Contemporary Art	Max Tip	Views Unlikely	Historic	Recreation/Tourit
—	Volleyball Courts on Beach View	Hub Up	Hub Up	Rural Coastal Plain/Developed Shoreline	Tourist/Recreation
32a	Wadsworth Shore Residential View 1	Max Tip	Views Unlikely	Industrial/Low Density Residential	Military/Residential
32b	Wadsworth Shore Residential View 2	Max Tip	Hub Up	Industrial/Low Density Residential	Military/Residential
32c	Wadsworth Shore Residential View 3	Max Tip	Views Unlikely	Industrial/Low Density Residential	Military/Residential
11	Weblin House	Views Unlikely	Views Unlikely	Low Density Residential/Historic	Residential
49f	Whale Head Bay Residential View 1	Max Tip	Max Tip	Developed Shoreline	Residential/Tourism
49g	Whale Head Bay Albacore Street Entrance—Elevated	Max Tip	Max Tip	Developed Shoreline	Residential/Tourism
49e	Whale Head Bay Residential View 2	Max Tip	Max Tip	Rural Coastal Plain/ Developed Shoreline	Residential/Tourism
49d	Whale Head Bay Residential View 3	Max Tip	Max Tip	Rural Coastal Plain/ Developed Shoreline	Residential/Tourism
49c	Whale Head Bay Shad St. Entrance—Elevated	Max Tip	Max Tip	Rural Coastal Plain/ Developed Shoreline	Residential/Tourism
49a	Whale Head Bay Residential View 4	Max Tip	Max Tip	Rural Coastal Plain/ Developed Shoreline	Residential/Tourism
49b	Whale Head Bay Corolla Village Entrance	Max Tip	Max Tip	Rural Coastal Plain/ Developed Shoreline	Residential/Tourism
36	Woodhouse House	Max Tip	Views Unlikely	Agriculture/Historic	Residential
30b	Croatan Beach B	Hub Up	Hub Up	Low Density Residential	Tourist/Recreation
4	Coast Guard Station Cobb Island Public Boat Ramp	Hub Up	Max Tip	Rural Coastal Plain	Recreation
42	Pungo Ferry Rd Virginia Scenic Byway	Max Tip	Views Unlikely	Transportation Corridor/Scenic Byway	Traveler
37	Sandbridge Rd Virginia Scenic Byway	Max Tip	Views Unlikely	Transportation Corridor/Scenic Byway	Traveler
5	Oyster Village Horse Island Trail	Max Tip	Max Tip	Rural Coastal Plain	Recreation

Field ID No.	Viewpoint Locations	Maximum Layout Topographic Viewshed	Maximum Layout Vegetated Viewshed	Landscape Similarity Zone	User Group
—	Beach Residential—45th Street Access	Hub Up	Hub Up	Low Density Residential	Residential
44	Back Bay National Wildlife Refuge/Little Island Park	Hub Up	Hub Up	Historic	Recreation

Attachment I-1-3 Landscape Similarity Zones/Key Observation Points Sheet Maps



COASTAL VIRGINIA OFFSHORE WIND: CONSTRUCTION AND OPERATIONS PLAN

Dominion Energy®

Visual Resources Inventory

- KOP and Visual Simulation
- KOP, Visual Simulation, and Time-lapse Video
- Field Inventory
- Visual Resource Inventory

Landscape Similarity Zone

- Agriculture
- Commercial
- Developed
- Developed Shoreline
- High Density/Apartment District
- Historic
- Industrial
- Low Density Residential
- Lower Coastal Plain/Tide Water
- Ocean
- Open Water
- Planned Development
- Rural Coastal Plain
- Rural Residential
- Tourism

Date	October 7, 2021
Projection	NAD 1983 2011 UTM Zone 18N
Personnel	Figure Prepared by: Tetra Tech Offshore GIS Group

0 1 2 3 Miles

0 1 2 Nautical Miles

0 1 2 3 4 Kilometers

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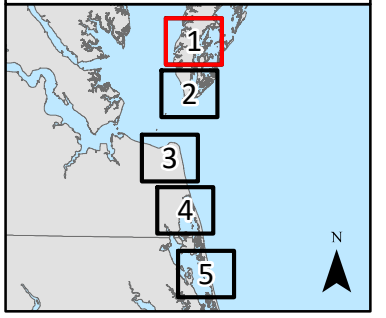

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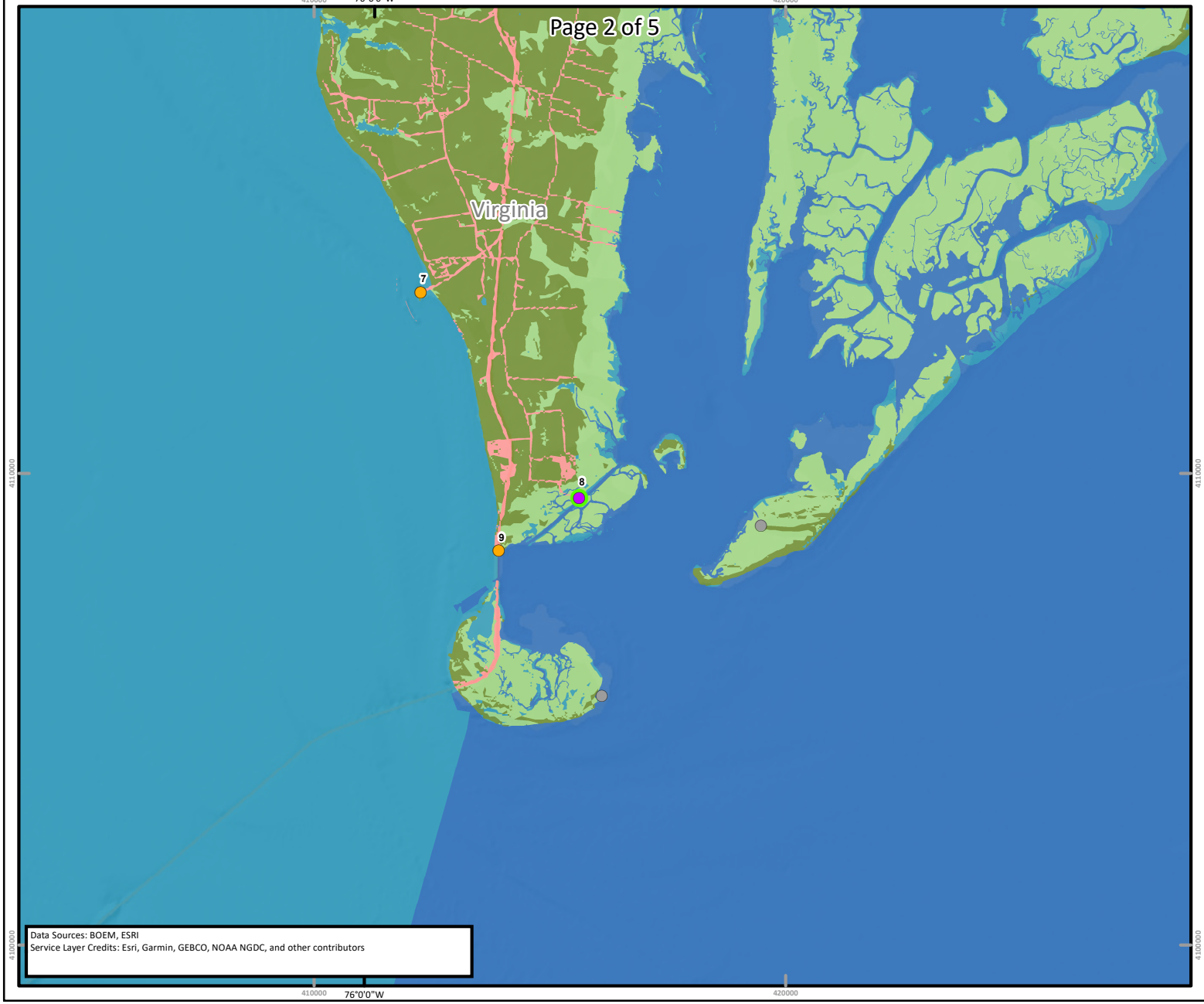

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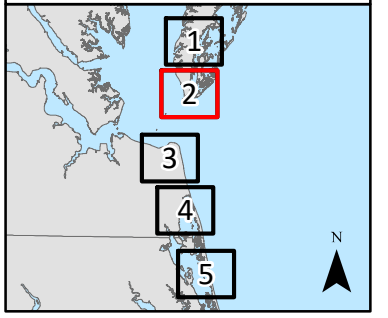
0 1 2 3 Miles

0 1 2 Nautical Miles

0 1 2 3 4 Kilometers

REFERENCE MAP



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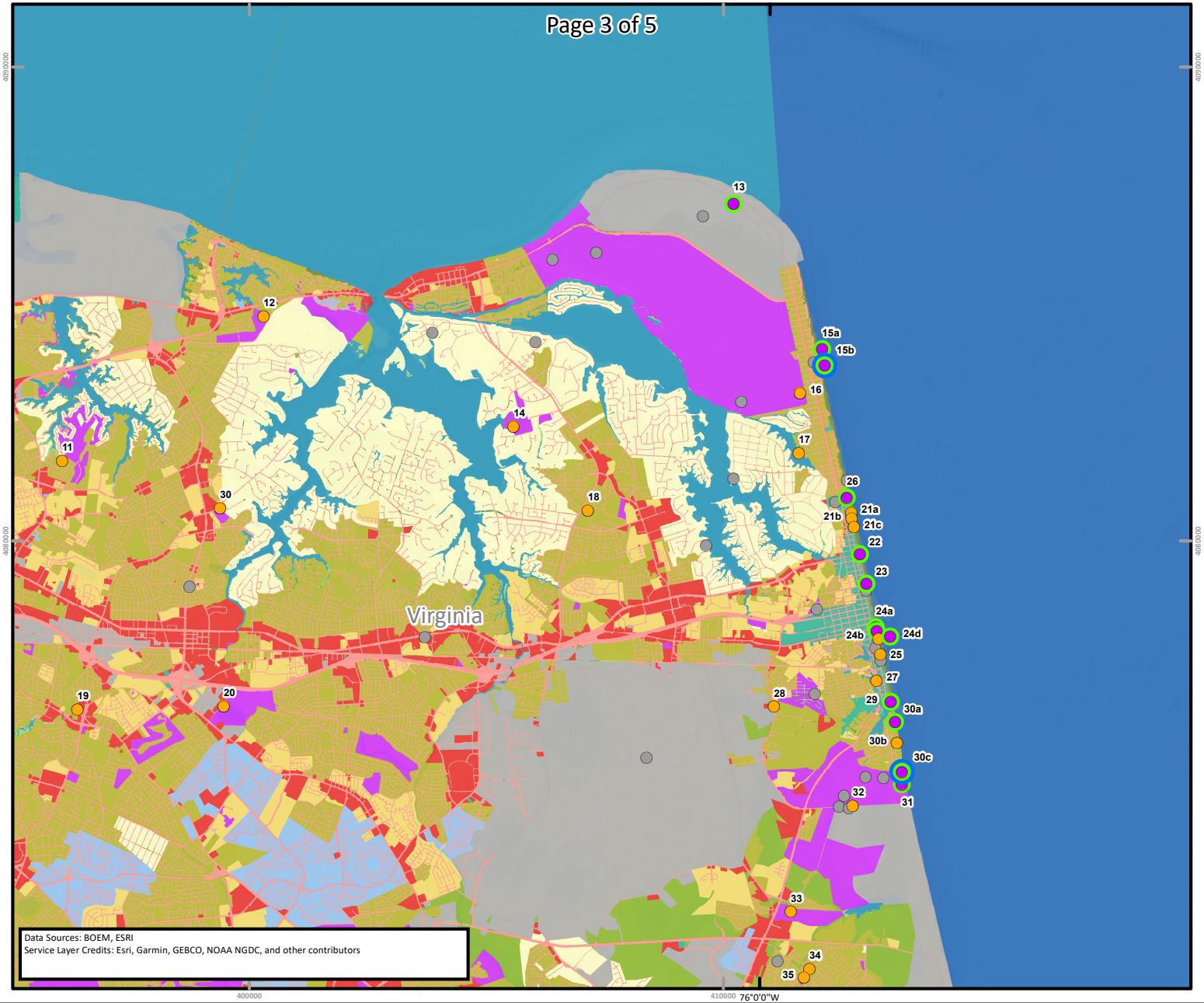

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- Open Water
- Planned Development
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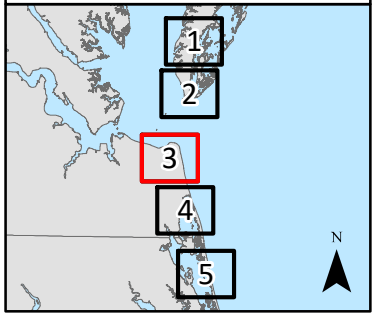
Date	October 7, 2021
Projection	NAD 1983 2011 UTM Zone 18N
Personnel	Figure Prepared by: Tetra Tech Offshore GIS Group

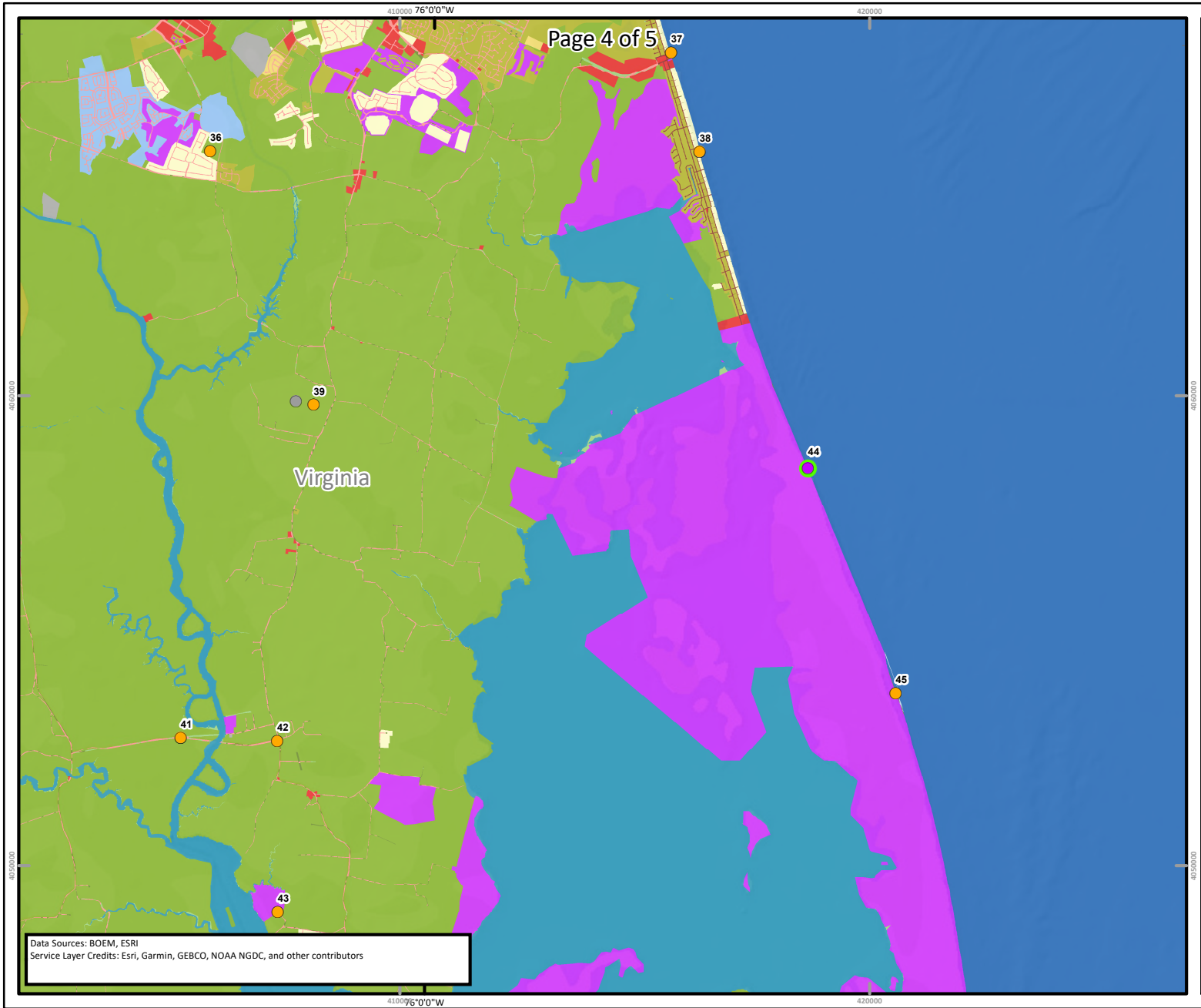
0 1 2 3 Miles

0 1 2 Nautical Miles

0 1 2 3 4 Kilometers

REFERENCE MAP





COASTAL VIRGINIA OFFSHORE WIND: CONSTRUCTION AND OPERATIONS PLAN

Dominion Energy®

Visual Resources Inventory

- KOP and Visual Simulation
- KOP, Visual Simulation, and Time-lapse Video
- Field Inventory
- Visual Resource Inventory

Landscape Similarity Zone

- Agriculture
- Commercial
- Developed
- Developed Shoreline
- High Density/Apartment District
- Historic
- Industrial
- Low Density Residential
- Lower Coastal Plain/Tide Water
- Ocean
- Open Water
- Planned Development
- Rural Coastal Plain
- Rural Residential
- Tourism

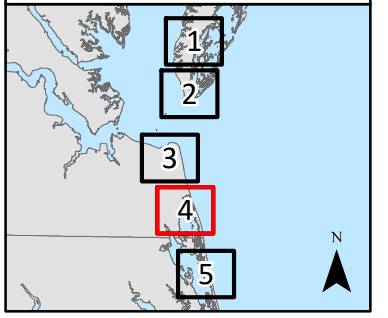
Date	October 7, 2021
Projection	NAD 1983 2011 UTM Zone 18N
Personnel	Figure Prepared by: Tetra Tech Offshore GIS Group

0 1 2 3 Miles

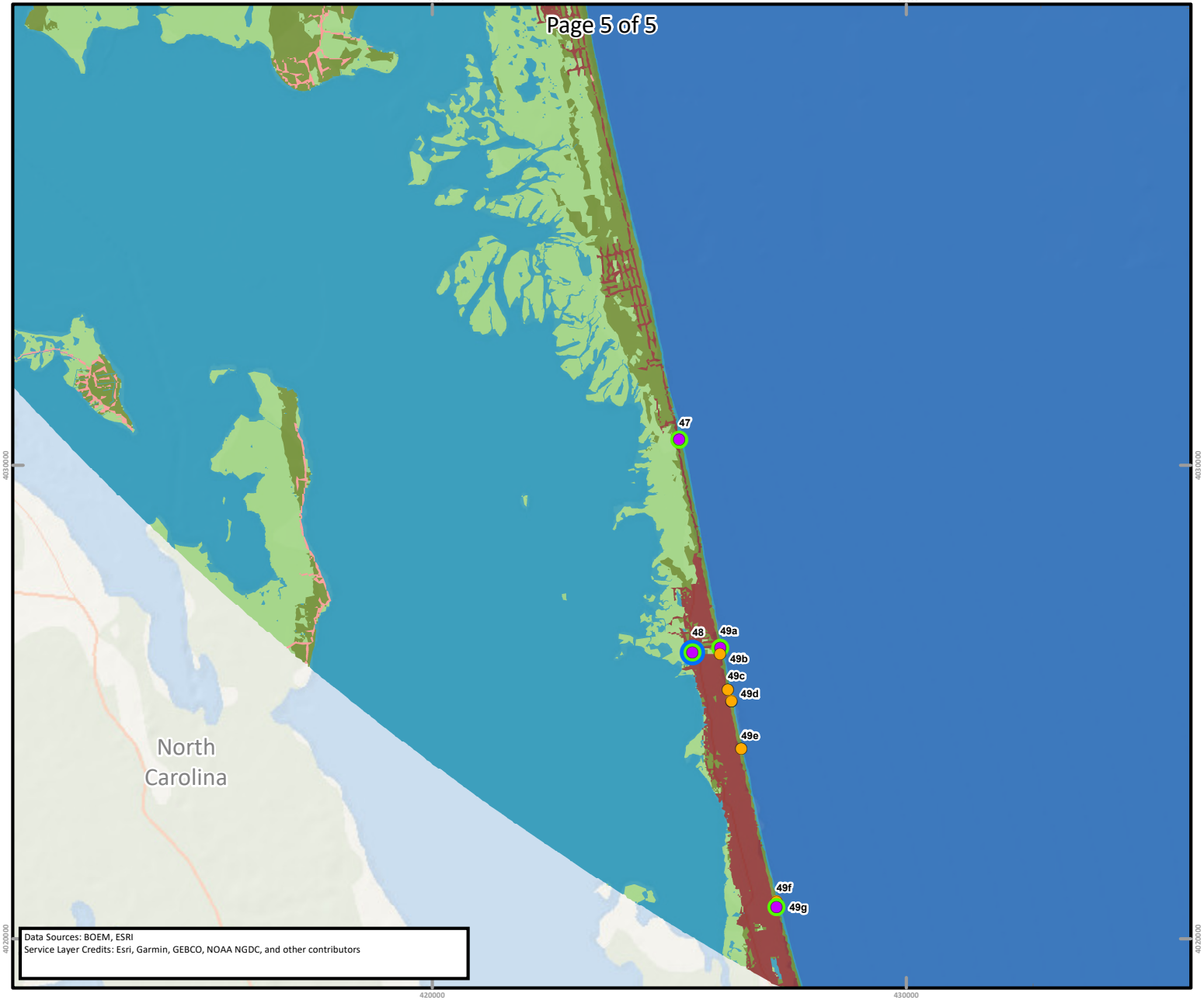
0 1 2 Nautical Miles

0 1 2 3 4 Kilometers

REFERENCE MAP



NOT FOR CONSTRUCTION



COASTAL VIRGINIA OFFSHORE WIND: CONSTRUCTION AND OPERATIONS PLAN

Dominion Energy®

Visual Resources Inventory

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Landscape Similarity Zone

- Agriculture
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- Developed
- Developed Shoreline
- High Density/Apartment District
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- Low Density Residential
- Lower Coastal Plain/Tide Water
- Ocean
- Open Water
- Planned Development
- Rural Coastal Plain
- Rural Residential
- Tourism

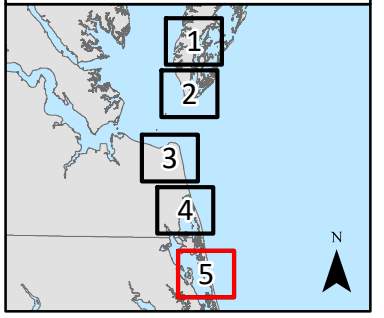
Date	October 7, 2021
Projection	NAD 1983 2011 UTM Zone 18N
Personnel	Figure Prepared by: Tetra Tech Offshore GIS Group

0 1 2 3 Miles

0 1 2 Nautical Miles

0 1 2 3 4 Kilometers

REFERENCE MAP



NOT FOR CONSTRUCTION

Attachment I-1-4 Visual Contrast Rating Worksheets

Visual Contrast Rating Worksheets for Offshore Project Components:

- Oyster Village Horse Island Trail, Virginia
- Eastern Shore of Virginia National Wildlife Refuge, Virginia
- Cape Henry Lighthouse/Fort Story Military Base, Virginia
- King Neptune Statue/Boardwalk, Virginia
- Naval Aviation Monument Park, Virginia
- Marriott Virginia Beach Oceanfront Hotel, Virginia
- Grommet Island Park/Boardwalk, Virginia
- Picnic Views on Beach, Virginia, Virginia
- Little Island Park, Virginia
- North End Beach – Residential View 1, Virginia
- North End Beach – Residential View 1 (Nighttime), Virginia
- Virginia Beach Boardwalk – 17th Street Park, Virginia
- Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime), Virginia
- Virginia Beach Boardwalk – Fishing Pier, Virginia
- Virginia Beach Boardwalk – Fishing Pier (Nighttime), Virginia
- Croatan Beach A, Virginia
- Croatan Beach C, Virginia
- Currituck Beach Lighthouse, North Carolina
- Currituck National Wildlife Refuge, North Carolina
- Whale Head Bay Residential View, North Carolina
- Whale Head Bay Albacore Street Entrance – Elevated, North Carolina

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Oyster Village Horse Island Trail		
Evaluator's Name: S. Brooks			Distance from Turbines: 32.6 mi (52.5 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain		Longitude: -75.91794142°		Latitude: 37.28757092°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, hiking	Horizontal Field View Occupied: 14°	Atmospheric Conditions: 63% Humidity, Fair	Sun Angle: 112° Altitude: 60° Heading: 130°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat	FG: flat, wide MG/BG/SS: Not Applicable (N/A)	FG/MG/BG/SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG: irregular MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Color	FG/MG//BG/SS: grayish blue	FG: tan, light beige	FG: dark green, green MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Texture	FG/MG/BG/SS: wavy	FG: fine, granular (sand)	FG: medium MG/BG/SS: N/A	FG/MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be partially obstructed by the landform creating a dark line along the horizon, in both scenarios. From this KOP only a portion of the WTG blades of the WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 32.6 mi (52.5 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is likely to be during the warmer summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will likely drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project and at this distance, the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 1 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Eastern Shore of Virginia National Wildlife Refuge		
Evaluator's Name: S. Brooks			Distance from Turbines: 28.2 mi (45.4 km)		Date: 10/2/2021
Landscape Similarity Zone: Lower Coastal Plain/Tide Water		Longitude: -75.9499078°		Latitude: 37.12784181°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: boating, water activities	Horizontal Field View Occupied: 14°	Atmospheric Conditions: 61% Humidity, Mostly Cloudy	Sun Angle: 275° Altitude: 32° Heading: 114°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG): straight Middleground (MG)/Background (BG)/Seldom Seen (SS): Not Applicable (N/A)	FG: flat, level	FG: linear, straight MG/BG/SS: N/A	FG: small blocky, rectangular MG/BG/SS: N/A
Line	FG: straight MG/BG/SS: N/A	FG: straight, horizontal	FG: horizontal, vertical MG/BG/SS: Not Applicable (N/A)	FG: vertical MG/BG/SS: N/A
Color	FG: blue MG//BG/SS: N/A	FG: tan, beige	FG: dark green, light green MG/BG/SS: Not Applicable (N/A)	FG: brown, gray MG/BG/SS: N/A
Texture	FG: wavy MG/BG/SS: N/A	FG: medium	FG: medium MG/BG/SS: Not Applicable (N/A)	FG: medium MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: Not discernible	FG/MG/BG/SS: Not discernible
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: Not discernible	FG/MG/BG/SS: Not discernible
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: Not discernible	FG/MG/BG/SS: Not discernible
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: Not discernible	FG/MG/BG/SS: Not discernible

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: None

16 MW

Features

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

Overall Level of Contrast: None

ANALYSIS COMMENTS

This KOP primarily represents views of residents and tourists that are accessing the boat ramp from this location. Views towards the WTGs will be mostly obstructed by the Virginia Inside Passage which blocks most views towards the Atlantic Ocean. A small portion of the WTG blades in both scenarios that are closest to the viewer and visible above the landform will be viewed from this location. At a distance of approximately 28.2 mi (45.4 km) or more, the majority of the WTGs will fall below the passage landform. The thin lines created by the blades will likely not be noticeable or perceived by users at the boat dock. As such, the Project will create no visual contrast.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Cape Henry Lighthouse		
Evaluator's Name: S. Brooks			Distance from Turbines: 29.1 mi (46.8 km)		Date: 10/2/2021
Landscape Similarity Zone: Industrial		Longitude: -76.00809°		Latitude: 36.9257983°	
Angle of Observation: Level ☐	Inferior ☐	Superior ☒	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Military, Tourist	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, viewing	Horizontal Field View Occupied: 21°	Atmospheric Conditions: 74% Humidity, Fair	Sun Angle: 175° Altitude: 76° Heading: 92°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: sloping	FG: clumpy MG/BG/SS: Not Applicable (N/A)	FG: geometric MG/BG/SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG: irregular, patchy MG/BG/SS: N/A	FG: straight, horizontal MG/BG/SS: N/A
Color	FG/MG//BG/SS: light blue, medium blue	FG: tan	FG: dark green, light green MG/BG/SS: N/A	FG: dark gray MG/BG/SS: N/A
Texture	FG/MG/BG/SS: wavy, smooth, shiny	FG: medium	FG: medium MG/BG/SS: N/A	FG: smooth MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub up. From this KOP only a portion of the WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 29.1 mi (46.8 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. This view is open to military personal daily during daylight hours. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at this distance the Project can be seen after a brief glance in the direction of the WTGs. As such, the WTGs will create moderate visual contrast which corresponds to a visibility rating of 3.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Beach Residential View 1		
Evaluator's Name: S. Brooks			Distance from Turbines: 28.1 mi (45.2 km)		Date: 10/2/2021
Landscape Similarity Zone: Developed		Longitude: -75.9866959°		Latitude: 36.89833528°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 22°	Atmospheric Conditions: 69% Humidity, Fair	Sun Angle: 108° Altitude: 58° Heading: 89°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG: small block (boat); rectangular SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG: straight, simple, geometric SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, light beige	FG/MG/BG/SS: N/A	FG/MG/BG: black SS: N/A
Texture	FG/MG/BG/SS: rough, glossy (water)	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG: simple, fine SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. From this distance and with the minimal cloud cover, the visual contrast is not as visible as it may be on a clear day with sun shining on the turbines. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 28.1 mi (45.2 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

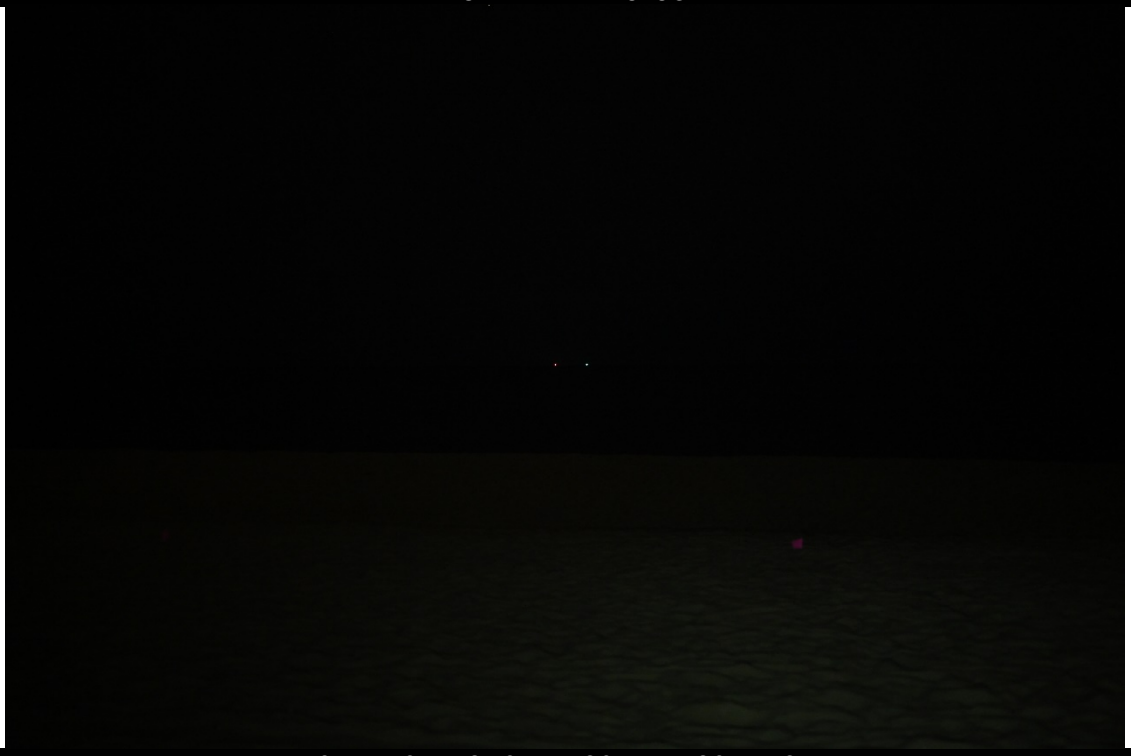
CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Beach Residential View 1 (Nighttime)		
Evaluator's Name: S. Brooks			Distance from Turbines: 28.1 mi (45.2 km)		Date: 10/2/2021
Landscape Similarity Zone: Developed		Longitude: -75.98610438°		Latitude: 36.89517988°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 64% Humidity, Fair	Sun Angle: 333 Altitude: -26° Heading: 88°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): Not Applicable (N/A)	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Line	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Color	FG/MG//BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Texture	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A

VISUAL CONTRAST RATING WORSHEET

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, horizontal	FG/MG/BG: N/A SS: straight, horizontal
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: red, flashing	FG/MG/BG: N/A SS: red, flashing
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: N/A SS: N/A	FG/MG/BG: N/A SS: N/A

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

A nighttime photographic simulation depicting both scenarios was prepared. FAA lights on wind turbines where the nacelles are visible during the day would be visible during nighttime hours and would appear as a linear row of small red dots. The synchronized flashing of the FAA lights would attract viewers attention. However, FAA lights would only be visible for a portion of the wind turbines as WTGs located farther from the viewer begin to fall below the horizon. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with clear dark skies and contrast will be more discernible however, viewers will be partaking in a variety of nighttime activities. User activity will drop during the winter months and the turbine lights will be less discernible. The FAA lights would be seen in the context of a dark night for approximately 28.1 mi (45.2 km). The FAA lights would add a new source of nighttime lighting, however, at this distance it is not likely to dominate the view. The maximum representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45° from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: King Neptune Statue/Boardwalk		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.9 mi (45 km)		Date: 10/2/2021
Landscape Similarity Zone: Tourism		Longitude: -75.97729392°		Latitude: 36.8593843°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, shoppers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 59% Humidity, Fair	Sun Angle: 175° Altitude: 75° Heading: 84°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: rolling, horizontal MG//BG/SS: Not Applicable (N/A)	FG/MG//BG/SS: N/A	FG: geometric, polygon
Line	FG/MG/BG/SS: straight, horizontal	FG: horizontal MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: straight, horizontal
Color	FG/MG//BG/SS: blue	FG: tan MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: red, blue, white
Texture	FG/MG/BG/SS: wavy (water)	FG: fine (sand) MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: smooth

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Additional Comments:

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. The Project will introduce several new vertical elements into the viewscape along the horizon. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible; however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.9 mi (45 km), the Project can be seen when looking. As such the Project will create moderate contrast and have a visibility rating of 3 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Naval Aviation Monument Park		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.9 mi (45 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain, Tourism		Longitude: -75.97565274°		Latitude: 36.85377794°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, shoppers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 57% Humidity, Fair	Sun Angle: 191° Altitude: 75° Heading: 84°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: rolling, horizontal MG//BG/SS: Not Applicable (N/A)	FG/MG//BG/SS: N/A	FG: geometric, polygon
Line	FG/MG/BG/SS: straight, horizontal	FG: horizontal MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: straight, horizontal
Color	FG/MG//BG/SS: blue	FG: tan MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: red, blue, white
Texture	FG/MG/BG/SS: wavy (water)	FG: fine (sand) MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: smooth

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Additional Comments:

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. The Project will introduce several new vertical elements into the viewscape along the horizon. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible; however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.9 mi (45 km), the Project will be visible after a brief glance but will not attract attention and dominate the view. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Virginia Beach Boardwalk – 17th Street		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.8 mi (44.7 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain, Tourism		Longitude: -75.97333104°		Latitude: 36.84551561°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, anglers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 53% Humidity, Partly Cloudy	Sun Angle: 237° Altitude: 66° Heading: 83°	
Has a Photo Simulation Been Created for KOP?		☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5		

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: rolling, horizontal MG//BG/SS: Not Applicable (N/A)	FG/MG//BG/SS: N/A	FG: geometric, polygon
Line	FG/MG/BG/SS: straight, horizontal	FG: horizontal MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: straight, horizontal
Color	FG/MG//BG/SS: blue	FG: tan MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: red, blue, white
Texture	FG/MG/BG/SS: wavy (water)	FG: fine (sand) MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: smooth

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Additional Comments:

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. The Project will introduce several new vertical elements into the viewscape along the horizon. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible; however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.8 mi (44.7 km), the Project can be plainly seen but will not attract attention and dominate the view. As such the Project will create moderate contrast and have a visibility rating of 4 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Virginia Beach Boardwalk – 16th Street (Nighttime)		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.8 mi (44.7 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain, Tourism		Longitude: -75.97333104°		Latitude: 36.84551561°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, anglers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 68% Humidity, Fair	Sun Angle: 326° Altitude: -23° Heading: 83°	
Has a Photo Simulation Been Created for KOP?		☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5		

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): Not Applicable (N/A)	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG: rounded, wide MG/BG/SS: N/A
Line	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG: horizontal, vertical MG/BG/SS: N/A
Color	FG/MG//BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG: white, tan MG/BG/SS: N/A

Texture	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG: smooth MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, horizontal	FG/MG/BG: N/A SS: straight, horizontal
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: red, flashing	FG/MG/BG: N/A SS: red, flashing
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: N/A SS: N/A	FG/MG/BG: N/A SS: N/A

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Additional Comments:

A nighttime photographic simulation depicting both scenarios was prepared. FAA lights on wind turbines where the nacelles are visible during the day would be visible during nighttime hours and would appear as a linear row of small red dots. The synchronized flashing of the FAA lights would attract viewers attention. However, FAA lights would only be visible for a portion of the wind turbines as WTGs located farther from the viewer begin to fall below the horizon. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with clear dark skies and contrast will be more discernible however, viewers will be partaking in a variety of nighttime activities with existing light sources. User activity will drop during the winter months and the turbine lights will be less discernible. The FAA lights would be seen in the context of a dark night for approximately 27.8 mi (44.7 km). The FAA lights would add a new source of nighttime lighting, however, at this distance it is not likely to dominate the view. The maximum representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Virginia Beach Boardwalk – Fishing Pier		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.6 mi (44.4 km)		Date: 10/2/2021
Landscape Similarity Zone: Ocean/Open Water		Longitude: -75.96988059°		Latitude: 36.84375556°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, anglers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 53% Humidity, Partly Cloudy	Sun Angle: 243° Altitude: 63° Heading: 83°	
Has a Photo Simulation Been Created for KOP?		☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5		

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG/MG//BG/SS: Not Applicable (N/A)	FG/MG//BG/SS: N/A	FG: geometric, rectangular
Line	FG/MG/BG/SS: straight, horizontal	FG/MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: straight, horizontal
Color	FG/MG//BG/SS: grayish blue, white	FG/MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: gray, brown, blue, white
Texture	FG/MG/BG/SS: rough, glossy (water)	FG/MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: smooth, rough

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Additional Comments:

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.6 mi (44.4 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible; however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.6 mi (44.4 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Virginia Beach Fishing Pier/Boardwalk		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.6 mi (44.4 km)		Date: 10/2/2021
Landscape Similarity Zone: Ocean/Open Water		Longitude: -75.96988059°		Latitude: 36.84375556°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, anglers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 6% Humidity, Fair	Sun Angle: Altitude: -21° Heading: 83°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): Not Applicable (N/A)	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Line	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Color	FG/MG//BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Texture	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A

VISUAL CONTRAST RATING WORSHEET

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, horizontal	FG/MG/BG: N/A SS: straight, horizontal
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: red, flashing	FG/MG/BG: N/A SS: red, flashing
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG/SS: N/A SS: N/A	FG/MG/BG: N/A SS: N/A

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Additional Comments:

A nighttime photographic simulation depicting both scenarios was prepared. FAA lights on wind turbines where the nacelles are visible during the day would be visible during nighttime hours and would appear as a linear row of small red dots. The synchronized flashing of the FAA lights would attract viewers attention. However, FAA lights would only be visible for a portion of the wind turbines as WTGs located farther from the viewer begin to fall below the horizon. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with clear dark skies and contrast will be more discernible however, viewers will be partaking in a variety of nighttime activities. User activity will drop during the winter months and the turbine lights will be less discernible. The FAA lights would be seen in the context of a dark night for approximately 27.6 mi (44.4 km). The FAA lights would add a new source of nighttime lighting, however, at this distance it is not likely to dominate the view. The maximum representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Marriott Virginia Beach Oceanfront Hotel		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.8 mi (44.7 km)		Date: 10/2/2021
Landscape Similarity Zone: Tourism, High Density Apartment		Longitude: -75.97216613°		Latitude: 36.83929053°	
Angle of Observation: Level ☐	Inferior ☐	Superior ☒	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User/Type of Activity: Tourist, Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, tourists, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 61% Humidity, Fair	Sun Angle: 158° Altitude: 48° Heading: 86°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG/MG//BG/SS: Not Applicable (N/A)	FG/MG//BG/SS: N/A	FG: geometric, rectangular
Line	FG/MG/BG/SS: straight, horizontal	FG/MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: straight, horizontal
Color	FG/MG//BG/SS: grayish blue, white	FG/MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: white
Texture	FG/MG/BG/SS: rough, glossy (water)	FG/MG//BG/SS: N/A	FG/MG//BG/SS: N/A	FG: rough

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Additional Comments:

Views toward the Project will be elevated and unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up and part of the turbine. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 28 mi (45 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible; however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 28 mi (45 km), the Project can be seen but will not dominate the view. As such the Project will create moderate contrast and have a visibility rating of 4 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Grommet Island Park		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.7 mi (44.6 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain, Developed Shoreline		Longitude: -75.96965566°		Latitude: 36.83142729°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 23°	Atmospheric Conditions: 79% Humidity, Rain	Sun Angle: 177° Altitude: 75° Heading: 81°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG: small, blocky (jet skis and barrels) SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG: straight, vertical, wide SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, beige, brown	FG/MG/BG/SS: N/A	FG/MG/BG: black, white SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, medium, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG: fine SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. From this distance with cloud cover, the visual contrast is not as visible as it may be on a clear day with sun shining on the turbines. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.7 mi (44.6 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Croatan Beach A		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.7 mi (44.6 km)		Date: 10/2/2021
Landscape Similarity Zone: Low Density Residential		Longitude: -75.96860952°		Latitude: 36.82757023°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 22.5°	Atmospheric Conditions: 90% Humidity, Light Rain, Windy	Sun Angle: 131° Altitude: 69° Heading: 81°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG: small, blocky (buoy) SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG: straight, vertical, wide SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, beige	FG/MG/BG/SS: N/A	FG/MG/BG: black SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG: fine SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. From this distance with cloud cover, the visual contrast is not as visible as it may be on a clear day with sun shining on the turbines. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.7 mi (44.6 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Croatan Beach C		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.7 mi (44.6 km)		Date: 10/2/2021
Landscape Similarity Zone: Historic		Longitude: -75.96682879°		Latitude: 36.81804011°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 22.5°	Atmospheric Conditions: 72% Humidity, Mostly Cloudy	Sun Angle: 140° Altitude: 72° Heading: 80°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG: small, blocky (buoy) SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG: straight, vertical, wide SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, beige	FG/MG/BG/SS: N/A	FG/MG/BG: black SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG: fine SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. From this distance with cloud cover, the visual contrast is not as visible as it may be on a clear day with sun shining on the turbines. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.7 mi (44.6 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Picnic Views On Beach		
Evaluator's Name: S. Brooks			Distance from Turbines: 27.7 mi (44.6 km)		Date: 10/2/2021
Landscape Similarity Zone: Historic, Industrial		Longitude: -75.96698158°		Latitude: 36.81566965°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential; Military	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, picnicking, beachgoers, water activities	Horizontal Field View Occupied: 22°	Atmospheric Conditions: 51% Humidity, Fair	Sun Angle: 209° Altitude: 46° Heading: 79°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG: uniform	FG: square, geometric MG/BG/SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG: straight, vertical	FG: straight MG/BG/SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, light beige	FG: tan, green	FG: gray, tan MG/BG/SS: N/A
Texture	FG/MG/BG/SS: rough, glossy (water)	FG: fine, granular (sand)	FG: fine, medium	FG: smooth MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Additional Comments:

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. From this distance, the WTGs will introduce several new vertical elements into the viewscape. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible; however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 27.7 mi (44.6 km), the Project can be seen but will not attract attention unless the observer is looking for it. As such the Project will create weak contrast and have a visibility rating of 1 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Back Bay NWR / Little Island Park		
Evaluator's Name: S. Brooks			Distance from Turbines: 26.8 mi (43.1 km)		Date: 10/2/2021
Landscape Similarity Zone: Historic		Longitude: -75.90990902°		Latitude: 36.66827451°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 26°	Atmospheric Conditions: 72% Humidity, Fair	Sun Angle: 97° Altitude: 48° Heading: 62°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG: small, blocky (buoy) SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG: straight, vertical, wide SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, beige	FG/MG/BG/SS: N/A	FG/MG/BG: black SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG: fine SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub and up. From this distance with cloud cover, the visual contrast is not as visible as it may be on a clear day with sun shining on the turbines. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 26.8 mi (43.1 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 2 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Currituck Beach Lighthouse		
Evaluator's Name: S. Brooks			Distance from Turbines: 36.8 mi (59.2 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain		Longitude: -75.8307058°		Latitude: 36.3766481°	
Angle of Observation: Level ☐	Inferior ☐	Superior ☒	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, viewing	Horizontal Field View Occupied: 22.5°	Atmospheric Conditions: 38% Humidity, Fair	Sun Angle: 243° Altitude: 63° Heading: 36°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: sloping	FG: clumpy MG/BG/SS: Not Applicable (N/A)	FG: geometric MG/BG/SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG: irregular, patchy MG/BG/SS: N/A	FG: straight, horizontal, vertical, diagonal MG/BG/SS: N/A
Color	FG/MG//BG/SS: light blue, medium blue	FG: tan	FG: dark green MG/BG/SS: N/A	FG: white, tan, dark gray, light gray, red, brown, yellow, turquoise MG/BG/SS: N/A
Texture	FG/MG/BG/SS: wavy, smooth	FG: medium	FG: medium MG/BG/SS: N/A	FG: smooth, medium MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Moderate

16 MW

Features

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

Overall Level of Contrast: Moderate

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the hub up. From this KOP only a portion of the WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 36.8 mi (59.2 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity is prohibited from late November to early spring and the turbines will not be visible from the ground due to existing vegetation and structures. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 36.8 mi (59.2 km), the Project can be seen after a brief glance in the direction of the WTGs. As such, the WTGs will create moderate visual contrast which corresponds to a visibility rating of 3.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45° from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Currituck National Wildlife Refuge		
Evaluator's Name: S. Brooks			Distance from Turbines: 34.7 mi (55.8 km)		Date: 10/2/2021
Landscape Similarity Zone: Lower Coastal Plain/Tide Water		Longitude: -75.83424122°		Latitude: 36.4171621°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 12.5°	Atmospheric Conditions: 57% Humidity, Fair	Sun Angle: 129° Altitude: 69° Heading: 38°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG/SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, light beige	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the max tip. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 34.7 mi (55.8 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project, the WTGs will create weak visual contrast which corresponds to a visibility rating of 1.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

PROJECT INFORMATION

Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Whale Head Bay View 4		
Evaluator's Name: S. Brooks			Distance from Turbines: 36.9 mi (58.9 km)		Date: 10/2/2021
Landscape Similarity Zone: Rural Coastal Plain/ Developed Shoreline		Longitude: -75.82415186°		Latitude: 36.37762837°	
Angle of Observation: Level ☒	Inferior ☐	Superior ☐	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 14.5°	Atmospheric Conditions: 48% Humidity, Fair	Sun Angle: 188 Altitude: 75° Heading: 36°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: flat, level	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG: small blocky (boat); rectangular SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG: straight, horizontal, geometric SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, light beige	FG/MG/BG/SS: N/A	FG/MG/BG: white SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG: simple, fine SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white, gray	FG/MG/BG: N/A SS: white, gray
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the max tip. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 36.9 mi (58.9 km) or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will be less discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 36.9 mi (58.9 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 1 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

VISUAL CONTRAST RATING WORSHEET

PROJECT INFORMATION					
Project Name: Coastal Virginia Offshore Wind Commercial Project			Key Observation Point: Whale Head Bay Albacore Street Entrance		
Evaluator's Name: S. Brooks			Distance from Turbines: 39.1 mi (62.9 km)		Date: 10/2/2021
Landscape Similarity Zone: Developed Shoreline, Beach		Longitude: -75.81044861°		Latitude: 36.3283367°	
Angle of Observation: Level ☐	Inferior ☐	Superior ☒	Visibility: Screened ☐ (Partially/Completely)	Backdropped ☐	Skylined ☒
Type of User: Residential, Tourist/Recreation	User Expectation: High	Duration of View: Moderate to High	Use Volume: Moderate to High	Overall Sensitivity: High	
	Type of Activity: Strolling, beachgoers, water activities	Horizontal Field View Occupied: 9°	Atmospheric Conditions: 42% Humidity, Fair	Sun Angle: 240° Altitude: 65° Heading: 33°	
Has a Photo Simulation Been Created for KOP?	☒ Yes ☐ No	If yes, Figure Number: Attachment I-1-5			

REPRESENTATIVE PHOTOGRAPH



CHARACTERISTIC LANDSCAPE DESCRIPTION

	Ocean	Land/Water	Vegetation	Structures
Form	Foreground (FG)/Middleground (MG)/Background (BG)/Seldom Seen (SS): flat, level	FG: sloping	FG/MG/BG/SS: Not Applicable (N/A)	FG/MG/BG/SS: N/A
Line	FG/MG/BG/SS: straight, horizontal	FG: straight, horizontal	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Color	FG/MG//BG/SS: grayish blue, white	FG: tan, light beige	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A
Texture	FG/MG/BG/SS: rough, glossy	FG: fine, granular (sand)	FG/MG/BG/SS: N/A	FG/MG/BG/SS: N/A

PROPOSED ACTIVITY DESCRIPTION								
	Ocean		Land/Water		Vegetation		Structures	
	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW	14 MW	16 MW
Form	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: low	FG/MG/BG: N/A SS: low
Line	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: straight, vertical	FG/MG/BG: N/A SS: straight, vertical
Color	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: white	FG/MG/BG: N/A SS: white
Texture	N/A	N/A	N/A	N/A	N/A	N/A	FG/MG/BG: N/A SS: fine, smooth	FG/MG/BG: N/A SS: fine, smooth

CONTRAST RATING

14 MW

Features

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

Overall Level of Contrast: Weak

16 MW

Features

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

Overall Level of Contrast: Weak

ANALYSIS COMMENTS

Views toward the Project will be unobstructed and the portion of the WTGs from both scenarios that are closest to the viewer and visible above the horizon include the max tip. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 39.1 mi (62.9 km)or greater from the viewer. The turbines will not be visible when there is fog or thick cloud cover. User activity is at its height during the summer months and viewers will have similar views with blue skies, partial to no cloud cover, and contrast will be more discernible however, viewers will be partaking in a variety of activities and may not see the turbines unless looking towards the water. User activity will drop during the winter months and the turbines will not be discernible. WTGs located farther from the viewer begin to fall below the horizon. Given the small area along the horizon occupied by the Project at a distance of over 39.1 mi (62.9 km), the Project can be seen but will not attract attention unless the observer is scanning the horizon or looking more closely at an area. As such the Project will create weak contrast and have a visibility rating of 1 under both scenarios.

VISUAL CONTRAST RATING WORSHEET

CONTRAST RATING CRITERIA	
Degree of Contrast	**Rating Criteria**
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.
Moderate	The element contrast attracts attention and begins to dominate or appears as a co-dominant feature in the characteristic landscape.
Weak	The element contrast can be seen and may attract attention but appears subordinate in the characteristic landscape.
None	The element contrast is not visible or perceived.

VISIBILITY RATING	
Rating	**Description**
1 Visibility only after extended, close viewing; otherwise invisible.	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance and looking for it. Even under those circumstances, the object can be seen only after looking at it closely for an extended period.
2 Visible when scanning in the general direction of the study subject; otherwise likely to be missed by casual observers.	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by casual observers; however, most people would not notice it without some active looking.
3 Visible after a brief glance in the general direction of the study subject and unlikely to be missed by casual observers.	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
4 Plainly visible, so could not be missed by casual observers, but does not strongly attract visual attention or dominate the view because of its apparent size, for views in the general direction of the study subject.	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape/seascape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's visual field.
5 Strongly attracts the visual attention of views in the general direction of the study subject. Attention may be drawn by the strong contrast in form, line, color, or texture, luminance, or motion.	An object/phenomenon that is not large but contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
6 Dominates the view because the study subject fills most of the visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.	An object/phenomenon with strong visual contrasts that is so large that it occupies most of the visual field, and views of it cannot be avoided except by turning one's head more than 45º from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

Attachment I-1-5 Visual Simulations

Visual Simulations for Offshore Project Components:

- Oyster Village Horse Island Trail, Virginia
- Eastern Shore of Virginia National Wildlife Refuge, Virginia
- Cape Henry Lighthouse/Fort Story Military Base, Virginia
- King Neptune Statue/Boardwalk, Virginia
- Naval Aviation Monument Park, Virginia
- Marriott Virginia Beach Oceanfront Hotel, Virginia
- Grommet Island Park/Boardwalk, Virginia
- Picnic Views on Beach (at SMA), Virginia,
- Little Island Park, Virginia
- North End Beach – Residential View 1, Virginia
- North End Beach – Residential View 1 (Nighttime), Virginia
- Virginia Beach Boardwalk – 17th Street Park, Virginia
- Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime), Virginia
- Virginia Beach Boardwalk – Fishing Pier, Virginia
- Virginia Beach Boardwalk – Fishing Pier (Nighttime), Virginia
- Croatan Beach A, Virginia
- Croatan Beach C, Virginia
- Currituck Beach Lighthouse, North Carolina
- Currituck National Wildlife Refuge, North Carolina
- Whale Head Bay Residential View, North Carolina
- Whale Head Bay Albacore Street Entrance – Elevated, North Carolina

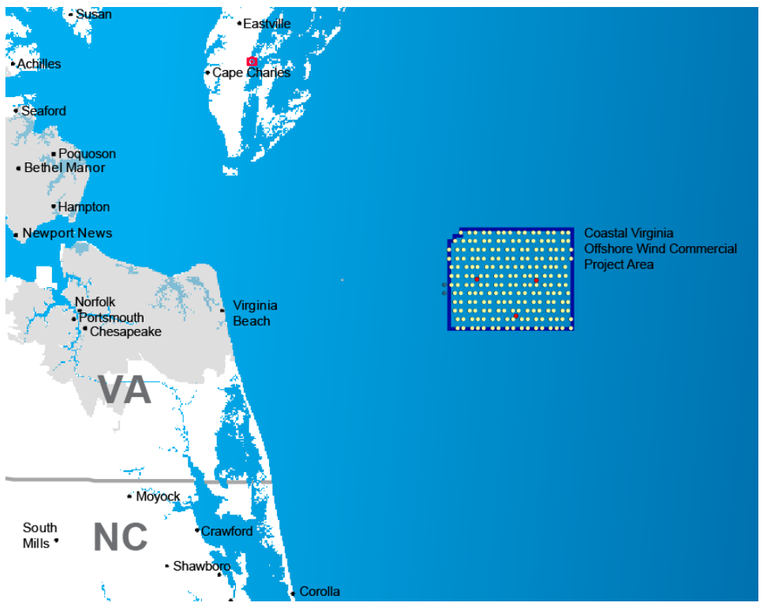
Coastal Virginia Offshore Wind Commercial Project

Attachment I-1-5: Visual Simulations

Horse Island Trail

Northhampton County, VA

Vicinity Map



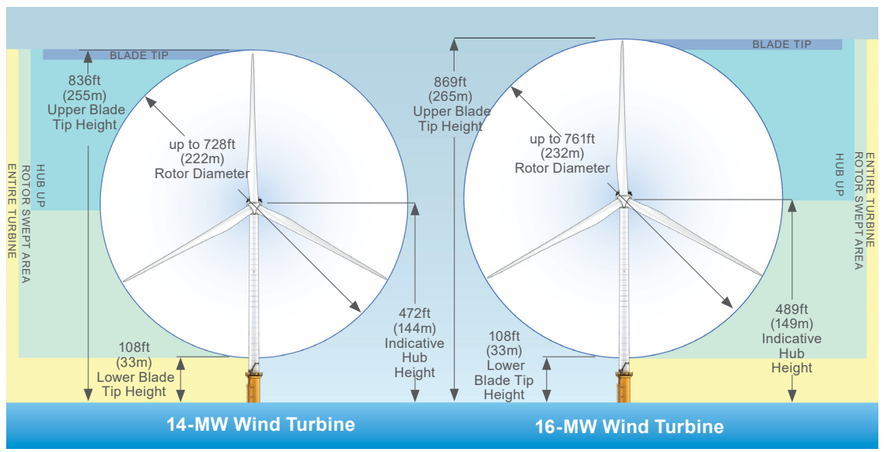
Pilot Project Turbine · Turbine Location · Photo Point
Chesapeake Light Tower · Offshore Substation · Lease Area

Existing Panoramic View

Located near Oyster Village Horse Island Trail



Turbine Dimensions



Turbine Visibility

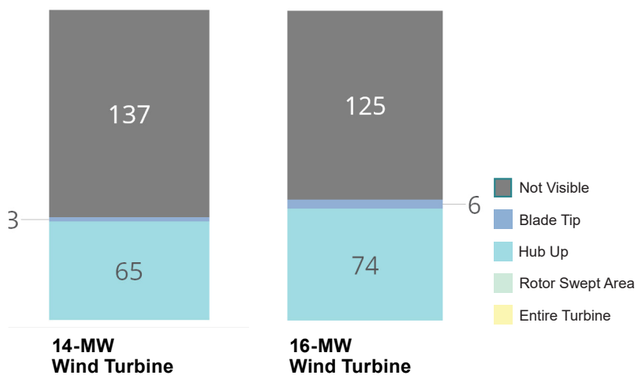


Image Data

PHOTO INFORMATION

Field ID #	5
Date	7/12/2021
Time	10:12 AM
Latitude	36.37763°
Longitude	-75.8242°
Direction of View	SE
Elevation	10’

ENVIRONMENTAL

Temperature	92° F
Humidity	52%
Wind Direction	SW
Wind Speed	8.7 mph
Weather Condition	Partly Cloudy

PROJECT VIEW

Distance to Nearest Turbine	32.5 miles
Horizontal Area Occupied by Visible Turbines	14°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Horse Island Trail

Northhampton County, VA

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



Visual Simulation: 14-MW Wind Turbine

Horse Island Trail

Northhampton County, VA

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

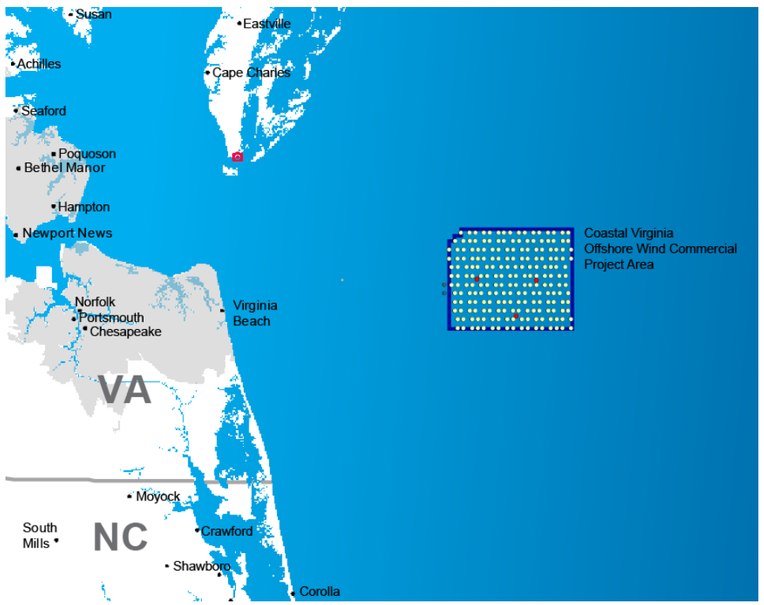


Visual Simulation: 16-MW Wind Turbine

Eastern Shore of Virginia National Wildlife Refuge

Northhampton County, VA

Vicinity Map



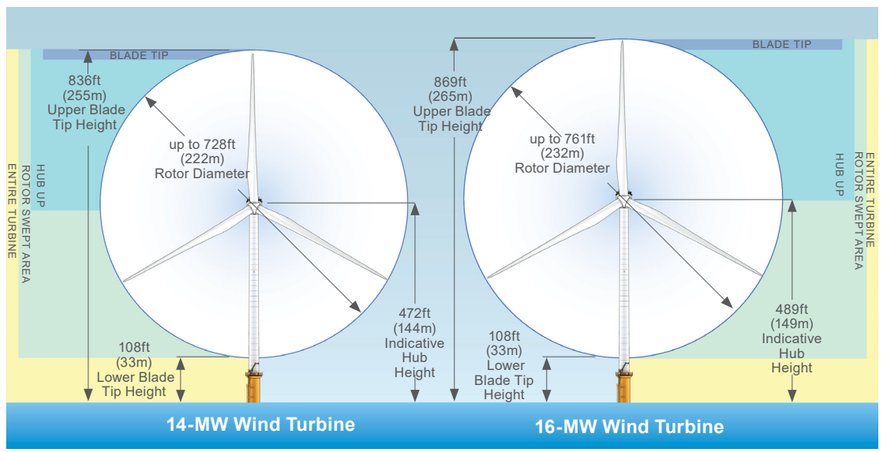
- Pilot Project Turbine
- Chesapeake Light Tower
- Turbine Location
- Offshore Substation
- Photo Point
- Lease Area

Existing Panoramic View

Located on Wise Point Boat Ramp



Turbine Dimensions



Turbine Visibility

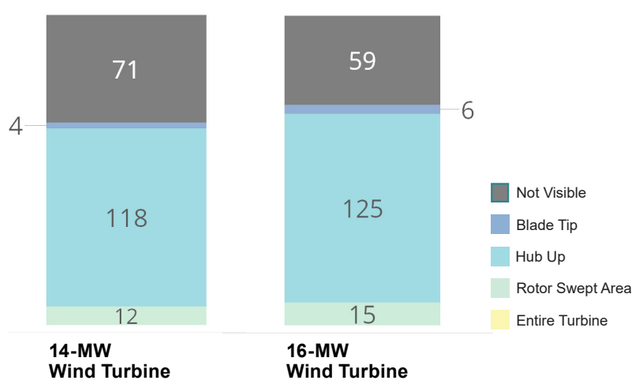


Image Data

PHOTO INFORMATION	
Field ID #	8
Date	7/12/2021
Time	10:12 AM
Latitude	36.3776°
Longitude	-75.824°
Direction of View	SE
Elevation	8’

ENVIRONMENTAL	
Temperature	92° F
Humidity	52%
Wind Direction	SW
Wind Speed	8.7 mph
Weather Condition	Partly Cloudy

PROJECT VIEW	
Distance to Nearest Turbine	28.1 miles
Horizontal Area Occupied by Visible Turbines	14°

PROJECT INFRASTRUCTURE	
Turbines	205
Offshore Substations	3

Eastern Shore of Virginia National Wildlife Refuge

Northhampton County, VA

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



Visual Simulation: 14-MW Wind Turbine

Eastern Shore of Virginia National Wildlife Refuge

Northhampton County, VA

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

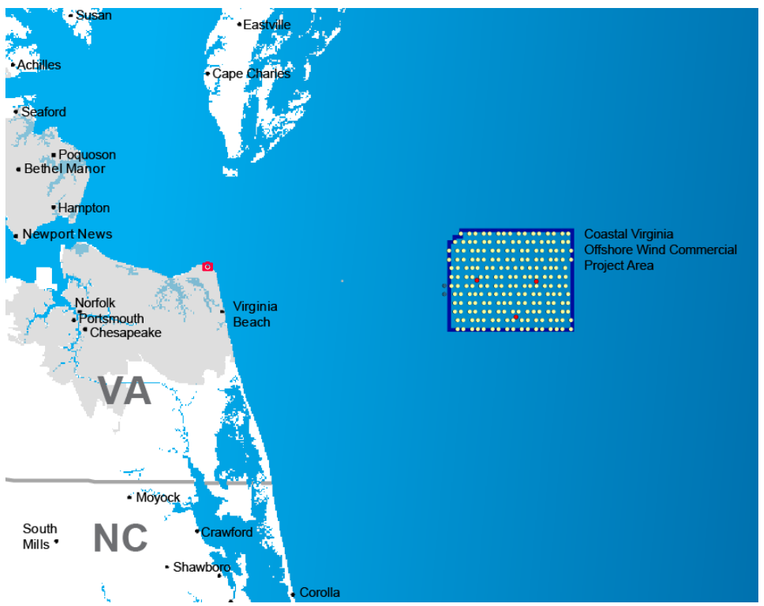


Visual Simulation: 16-MW Wind Turbine

Cape Henry Lighthouse

Virginia Beach, VA

Vicinity Map



Pilot Project Turbine · Turbine Location · Photo Point

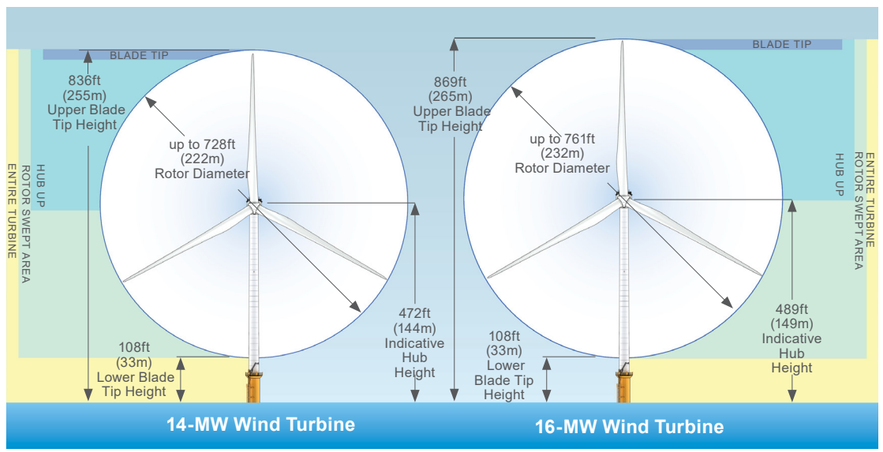
Chesapeake Light Tower · Offshore Substation · Lease Area

Existing Panoramic View

Located inside the Cape Henry Lighthouse



Turbine Dimensions



Turbine Visibility

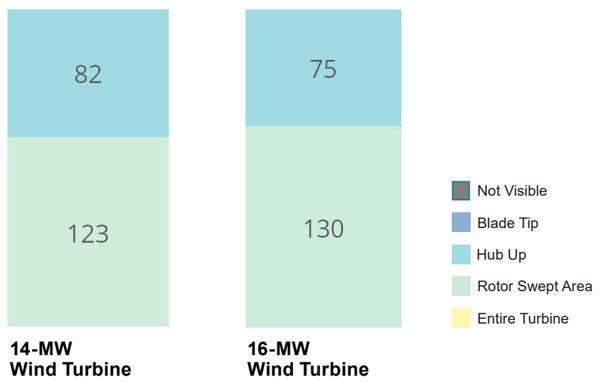


Image Data

PHOTO INFORMATION

Field ID #	13
Date	7/9/2021
Time	9:18 AM
Latitude	36.9279°
Longitude	-76.0039°
Direction of View	ENE
Elevation	90’

ENVIRONMENTAL

Temperature	80° F
Humidity	74%
Wind Direction	WSW
Wind Speed	9 mph
Weather Condition	Fair

PROJECT VIEW

Distance to Nearest Turbine	29.1miles
Horizontal Area Occupied by Visible Turbines	21°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Cape Henry Lighthouse

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Cape Henry Lighthouse

Virginia Beach, VA

Print Guide / Image Notes:
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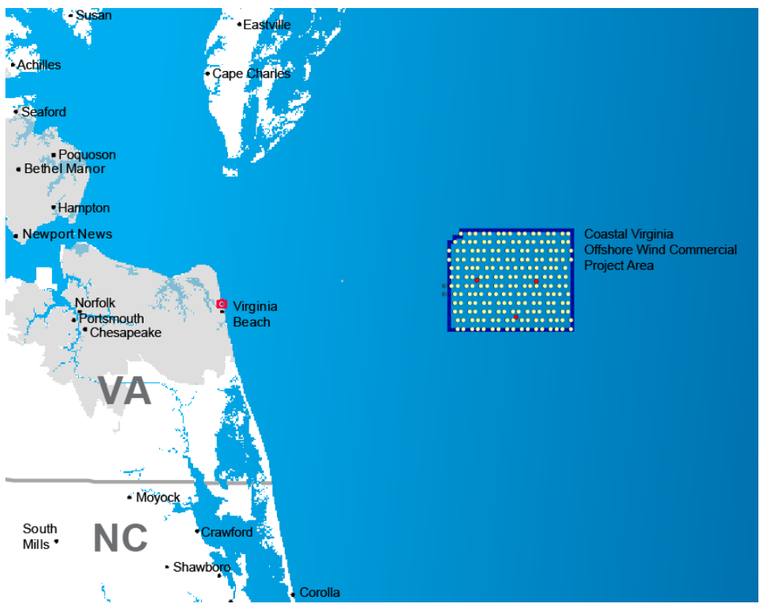
Visual Simulation: 16-MW Wind Turbine

Neptune Statue/Boardwalk

Virginia Beach, VA

Vicinity Map

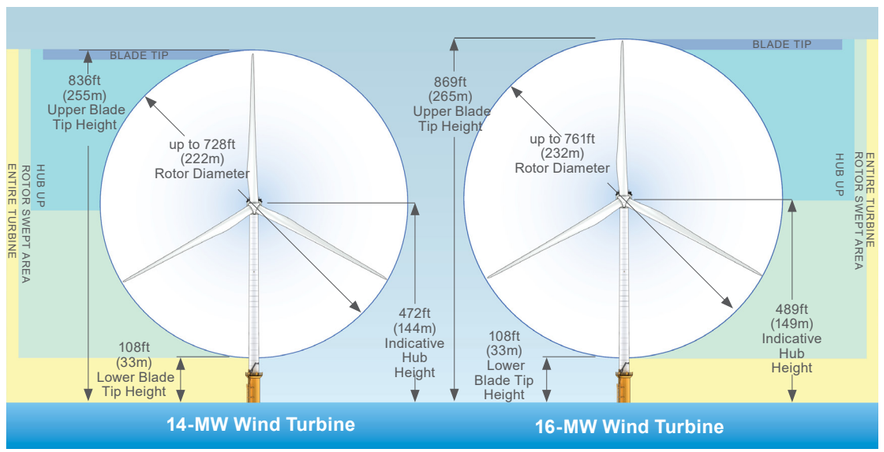




Existing Panoramic View

Located on the Virginia Beach Boardwalk near the Neptune Statue

Turbine Dimensions



Turbine Visibility

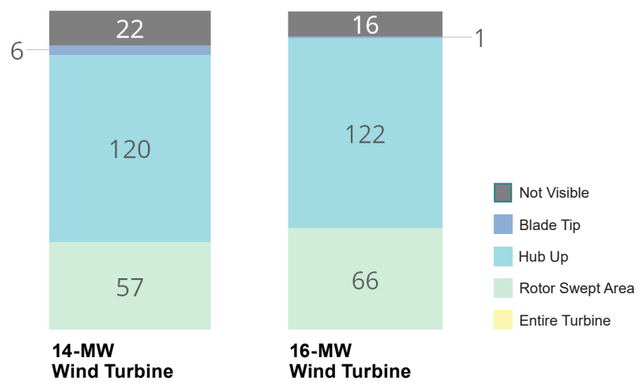


Image Data

PHOTO INFORMATION

Field ID #	22
Date	7/7/2021
Time	2:40 PM
Latitude	36.8522°
Longitude	-75.9697°
Direction of View	E
Elevation	20’

ENVIRONMENTAL

Temperature	88° F
Humidity	59%
Wind Direction	SW
Wind Speed	10 mph
Weather Condition	Fair

PROJECT VIEW

Distance to Nearest Turbine	27.9 miles
Horizontal Area Occupied by Visible Turbines	23°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Neptune Statue/Boardwalk

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Neptune Statue/Boardwalk

Virginia Beach, VA

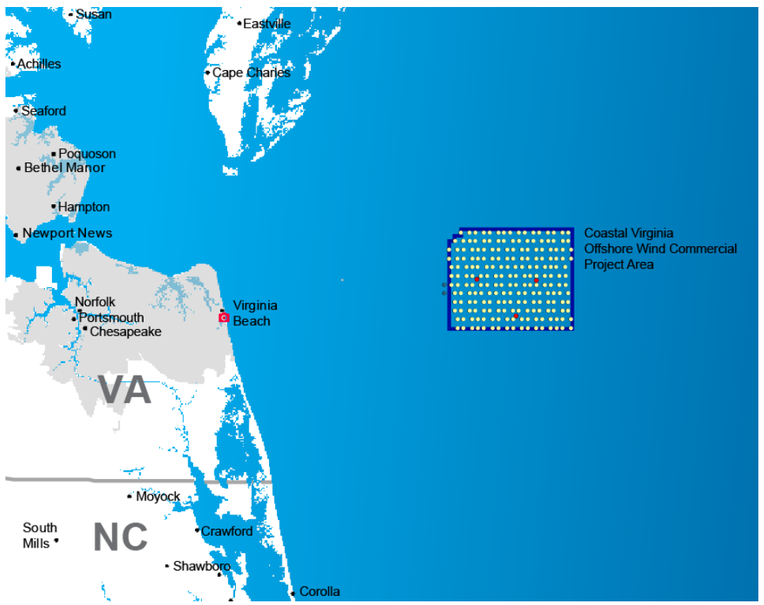
Print Guide / Image Notes:
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



Visual Simulation: 16-MW Wind Turbine

Naval Aviation Monument Park

Virginia Beach, VA



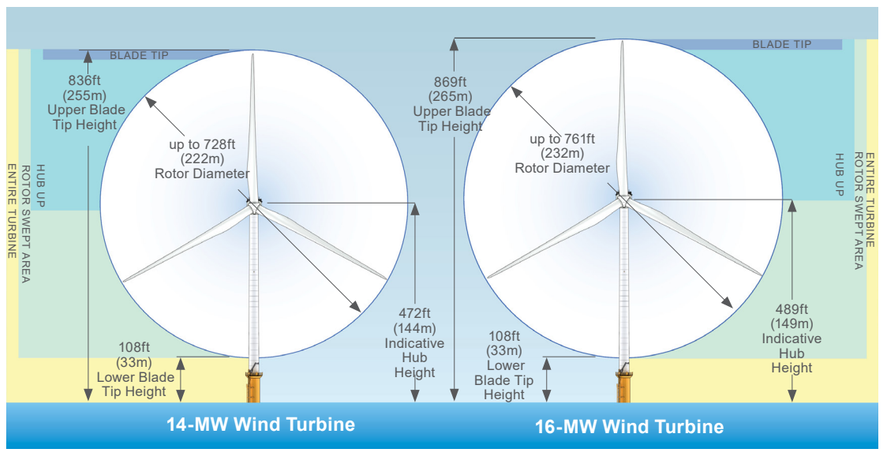
Vicinity Map

Pilot Project Turbine · Turbine Location · Photo Point
Chesapeake Light Tower · Offshore Substation · Lease Area

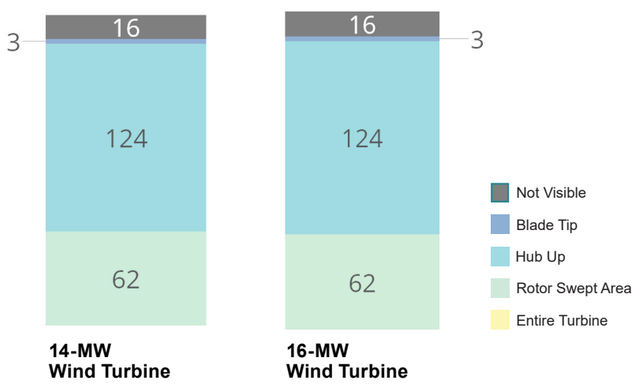


Existing Panoramic View

Located on Virginia Beach Boardwalk, near Naval Aviation Monument - 25th St.



Turbine Dimensions



Turbine Visibility

PHOTO INFORMATION

Field ID #	23
Date	7/9/2021
Time	12:20 PM
Latitude	36.8707°
Longitude	-75.9553°
Direction of View	NE
Elevation	18’

PROJECT VIEW

Distance to Nearest Turbine	27.8 miles
Horizontal Area Occupied by Visible Turbines	23°

ENVIRONMENTAL

Temperature	89° F
Humidity	57%
Wind Direction	SSW
Wind Speed	12 mph
Weather Condition	Fair

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Image Data

Naval Aviation Monument Park

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Naval Aviation Monument Park

Virginia Beach, VA

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

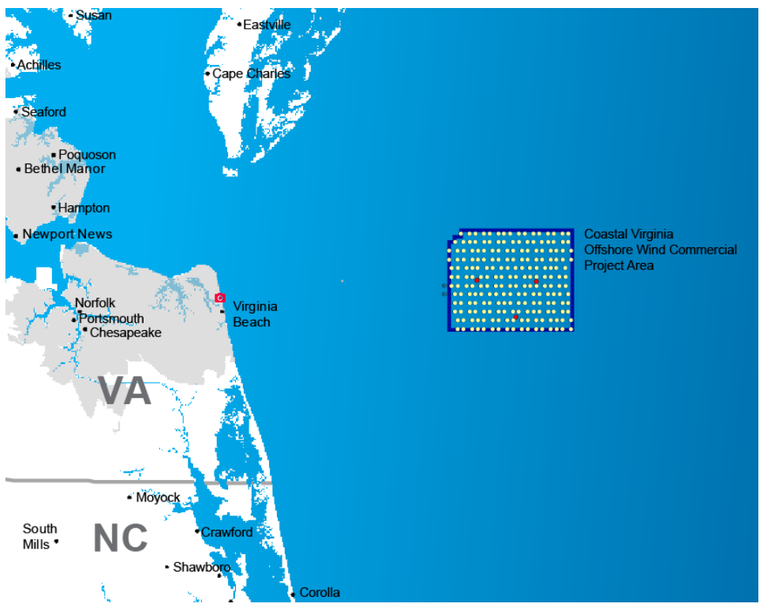


Visual Simulation: 16-MW Wind Turbine

Marriot Oceanfront

Virginia Beach, VA

Vicinity Map

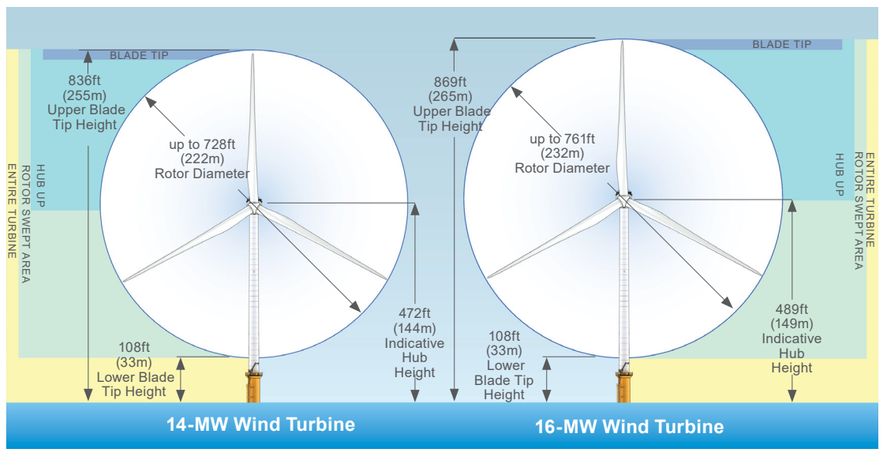


Existing Panoramic View

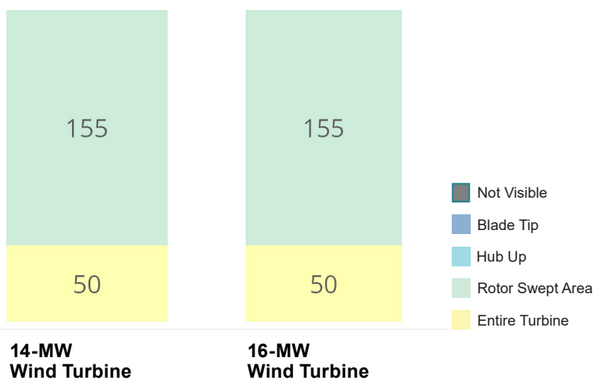
Located on rooftop of Marriot Virginia Beach Oceanfront hotel



Turbine Dimensions



Turbine Visibility



14-MW Wind Turbine

16-MW Wind Turbine

Image Data

PHOTO INFORMATION

Field ID #	26
Date	9/29/2021
Time	10:56am
Latitude	36.8617°
Longitude	-75.9856°
Direction of View	E
Elevation	236'

ENVIRONMENTAL

Temperature	71° F
Humidity	61%
Wind Direction	NNE
Wind Speed	10 mph
Weather Condition	Fair

PROJECT VIEW

Distance to Nearest Turbine	28.0 miles
Horizontal Area Occupied by Visible Turbines	23°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Marriot Oceanfront

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Marriot Oceanfront

Virginia Beach, VA

Print Guide / Image Notes:
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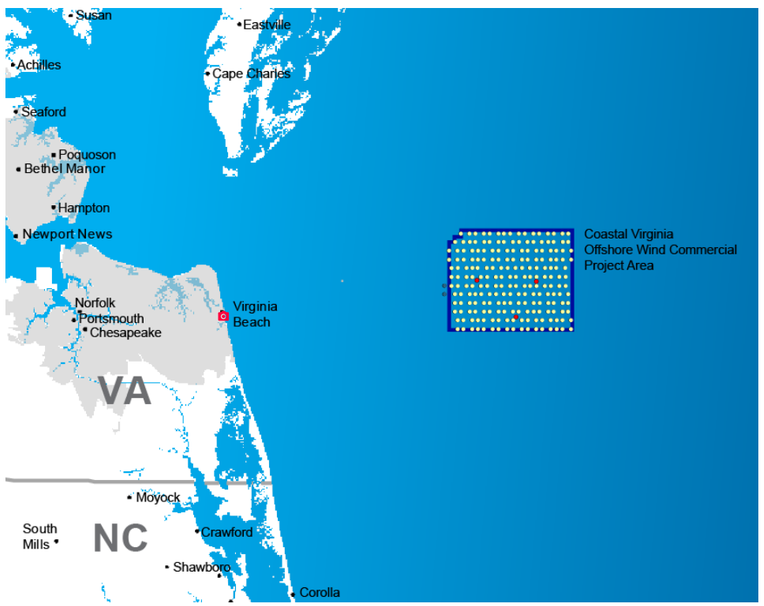
Visual Simulation: 16-MW Wind Turbine

Grommet Island Park

Virginia Beach, VA

Vicinity Map

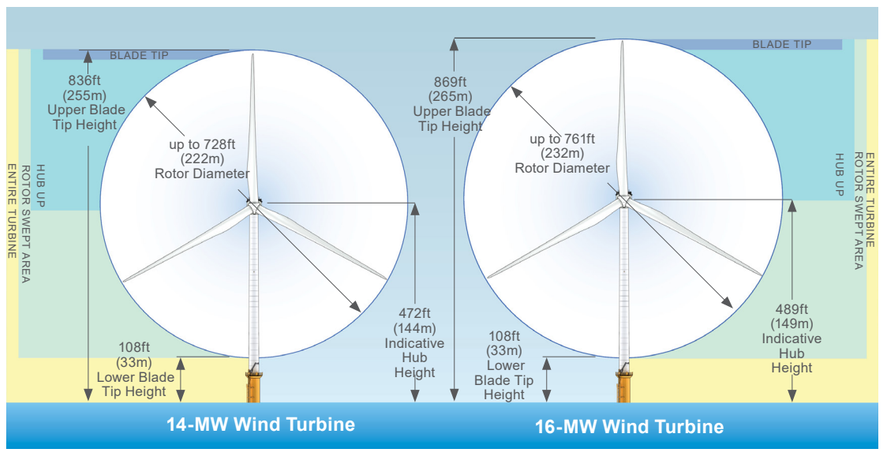


Existing Panoramic View

Located on Virginia Beach Boardwalk, near Grommet Island Park



Turbine Dimensions



Turbine Visibility

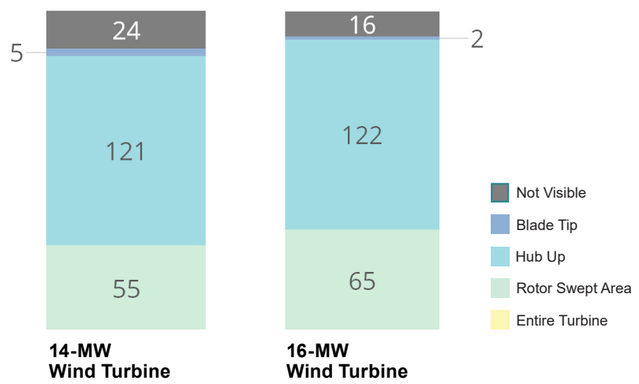


Image Data

PHOTO INFORMATION

Field ID #	29
Date	7/8/2021
Time	12:04pm
Latitude	36.8408°
Longitude	-75.9753°
Direction of View	E
Elevation	18'

ENVIRONMENTAL

Temperature	82° F
Humidity	79%
Wind Direction	S
Wind Speed	18 mph
Weather Condition	Rain

PROJECT VIEW

Distance to Nearest Turbine	27.7 miles
Horizontal Area Occupied by Visible Turbines	23°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Grommet Island Park

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Grommet Island Park

Virginia Beach, VA

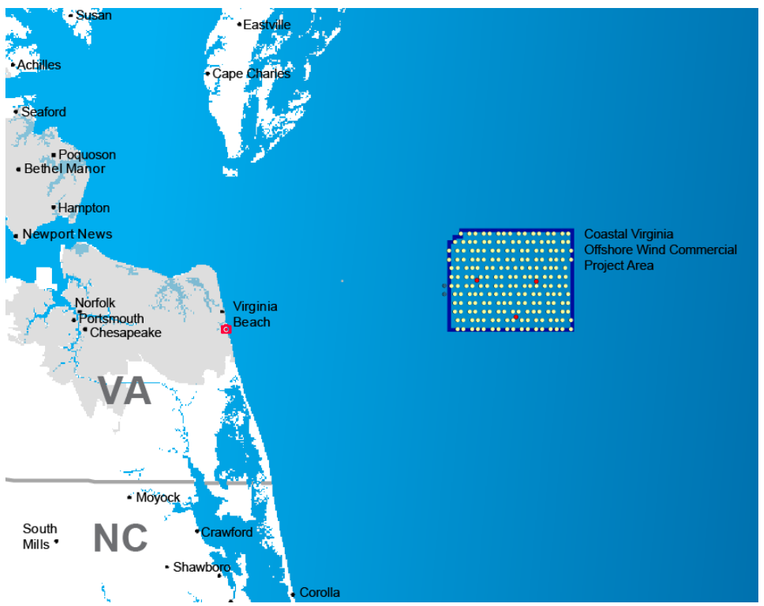
Print Guide / Image Notes:
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



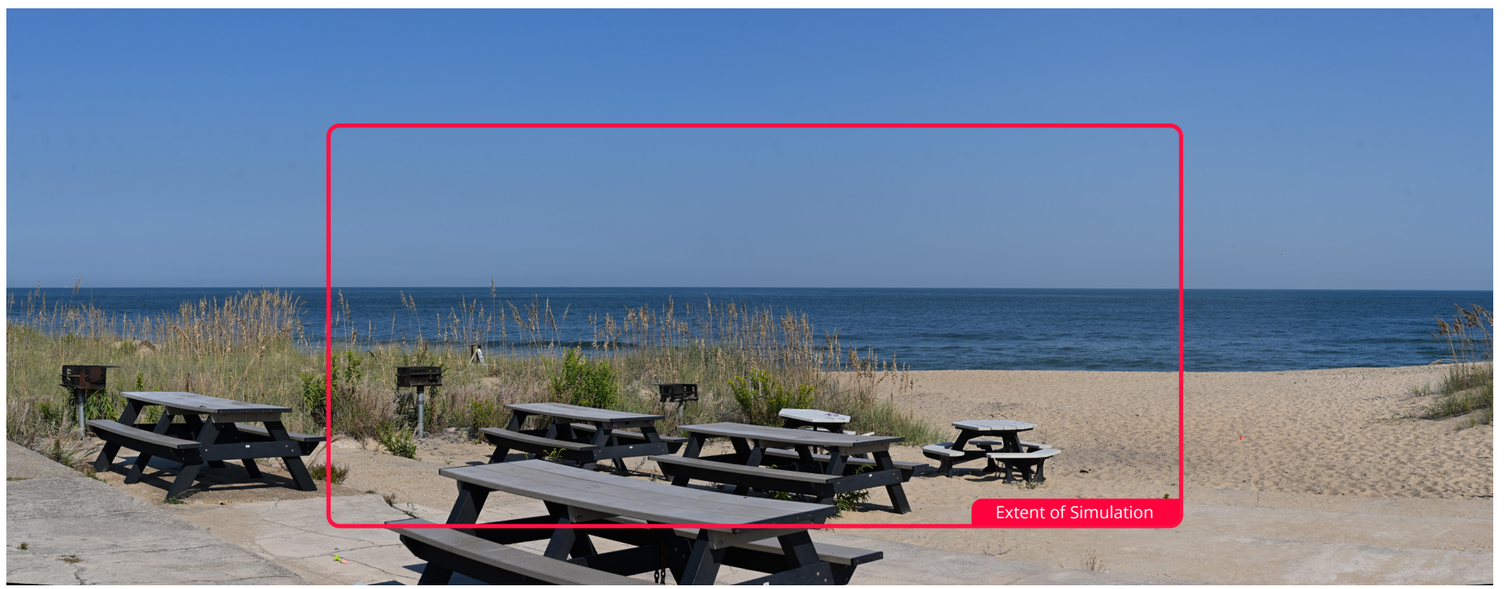
Visual Simulation: 16-MW Wind Turbine

Picnic Views at SMR

Virginia Beach, VA

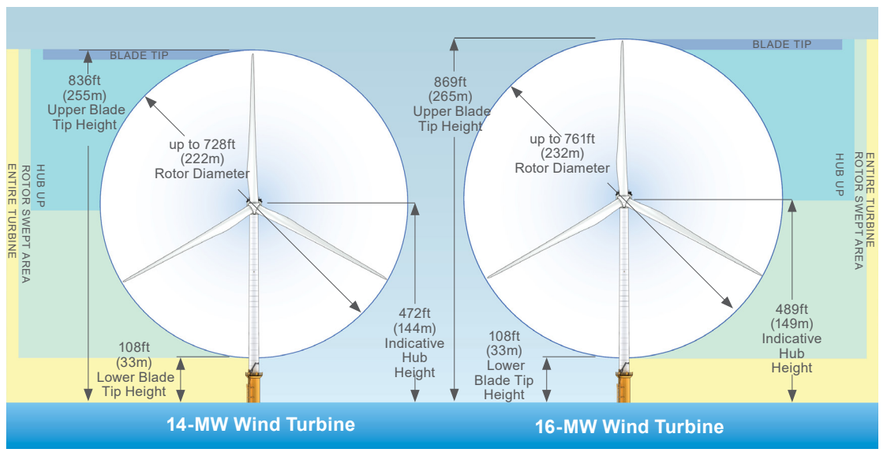


Vicinity Map

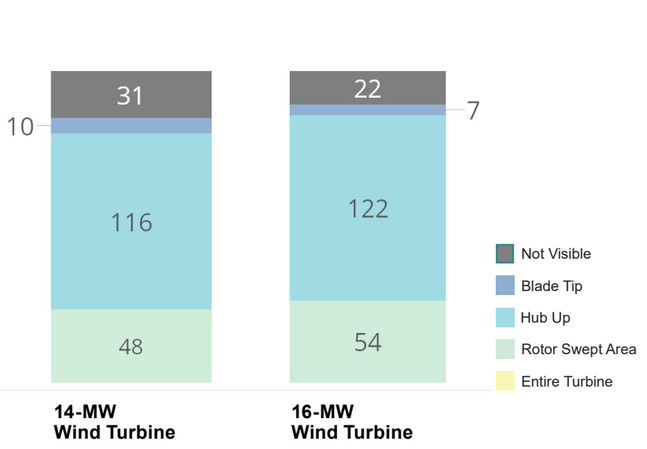


Existing Panoramic View

Located on Picnic Area near SMR



Turbine Dimensions



Turbine Visibility

PHOTO INFORMATION

Field ID #	31
Date	9/28/2021
Time	1:11pm
Latitude	36.8216°
Longitude	-75.9560°
Direction of View	E
Elevation	14'

PROJECT VIEW

Distance to Nearest Turbine	27.6 miles
Horizontal Area Occupied by Visible Turbines	22°

ENVIRONMENTAL

Temperature	82° F
Humidity	51%
Wind Direction	SW
Wind Speed	9 mph
Weather Condition	Fair

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Image Data

Picnic Views at SMR

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Picnic Views at SMR

Virginia Beach, VA

Print Guide / Image Notes:
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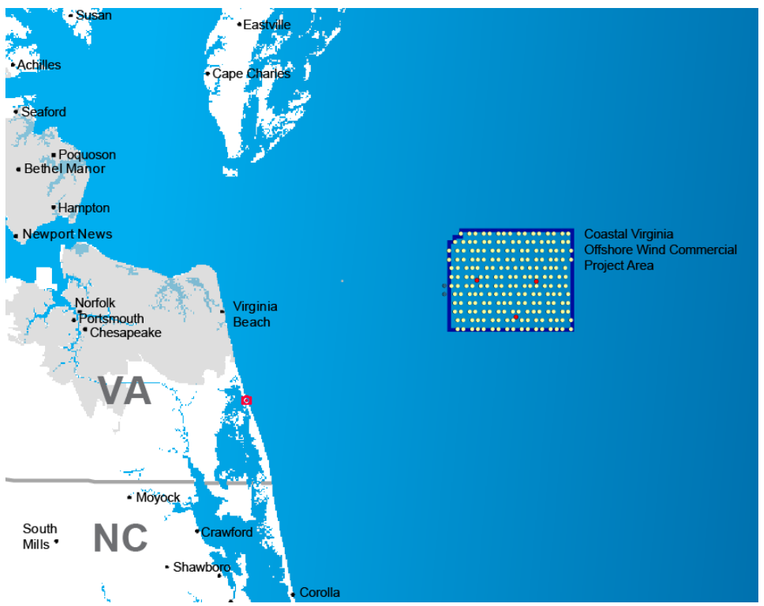
Visual Simulation: 16-MW Wind Turbine

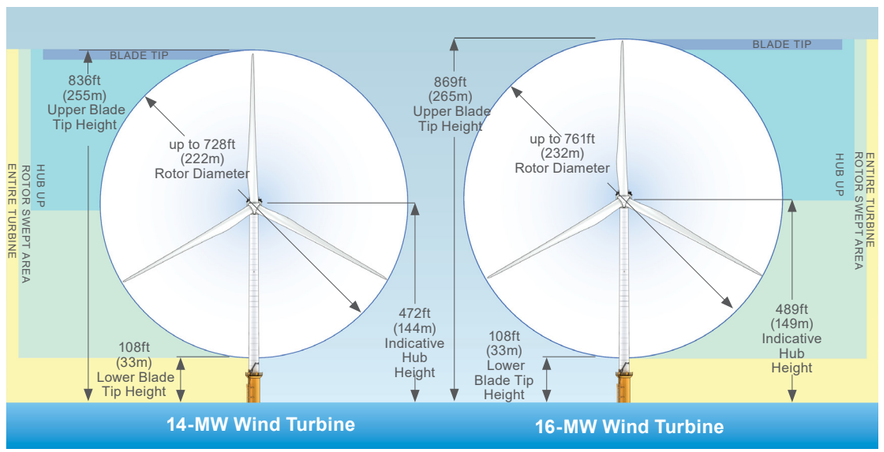
Little Island Park

Virginia Beach, VA

Vicinity Map



Turbine Dimensions



Existing Panoramic View

Located on Little Island Park near Sandpiper Rd.



Turbine Visibility

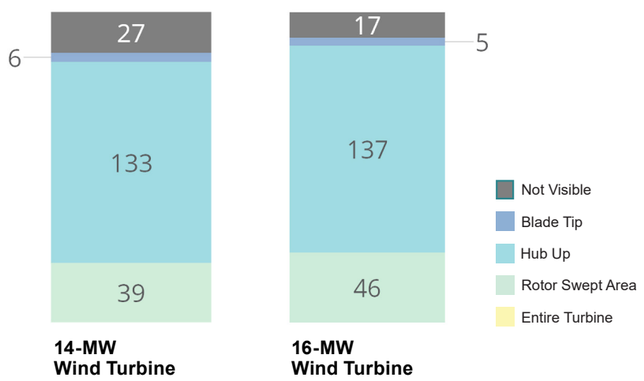


Image Data

PHOTO INFORMATION	
Field ID #	44
Date	7/8/2021
Time	9:15 AM
Latitude	36.6683°
Longitude	-75.9686°
Direction of View	ENE
Elevation	15’

ENVIRONMENTAL	
Temperature	84° F
Humidity	72%
Wind Direction	SSW
Wind Speed	14 mph
Weather Condition	Overcast

PROJECT VIEW	
Distance to Nearest Turbine	26.8 miles
Horizontal Area Occupied by Visible Turbines	26°

PROJECT INFRASTRUCTURE	
Turbines	205
Offshore Substations	3

Little Island Park

Virginia Beach, VA

Print Guide / Image Notes:
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Visual Simulation: 14-MW Wind Turbine

Little Island Park

Virginia Beach, VA

Print Guide / Image Notes:
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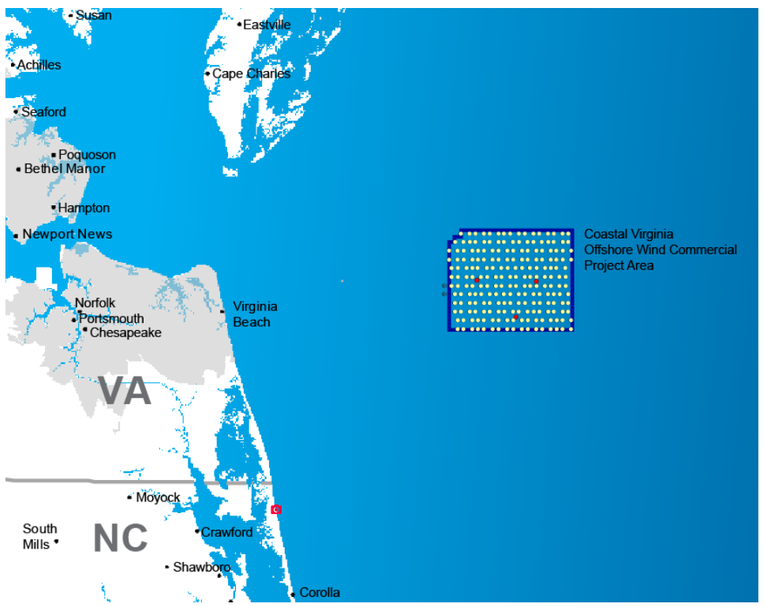
Visual Simulation: 16-MW Wind Turbine

Currituck National Wildlife Refuge

Corolla, NC

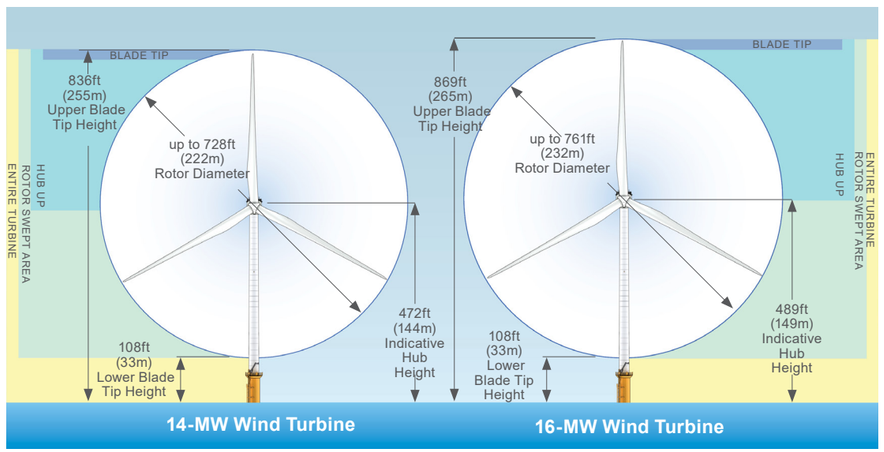
Vicinity Map



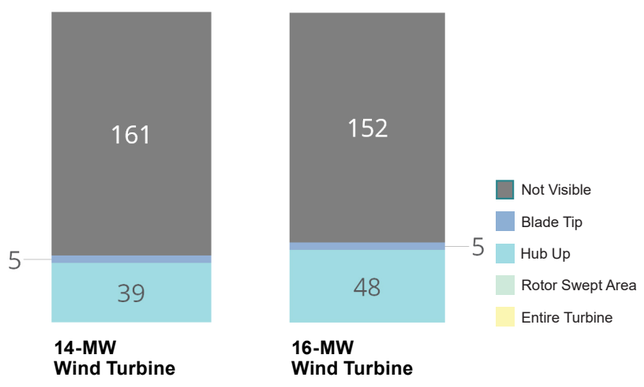


Existing Panoramic View

Located on Currituck National Wildlife Refuge near N Beach Access Rd 12



Turbine Dimensions



Turbine Visibility

PHOTO INFORMATION

Field ID #	47
Date	7/7/2021
Time	10:58am
Latitude	36.4799°
Longitude	-75.7994°
Direction of View	NE
Elevation	15’

PROJECT VIEW

Distance to Nearest Turbine	34.6 miles
Horizontal Area Occupied by Visible Turbines	12.5°

ENVIRONMENTAL

Temperature	88° F
Humidity	57%
Wind Direction	SSW
Wind Speed	9 mph
Weather Condition	Fair

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Image Data

Currituck National Wildlife Refuge

Corolla, NC

Print Guide / Image Notes:
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Visual Simulation: 14-MW Wind Turbine

Currituck National Wildlife Refuge

Corolla, NC

Print Guide / Image Notes:
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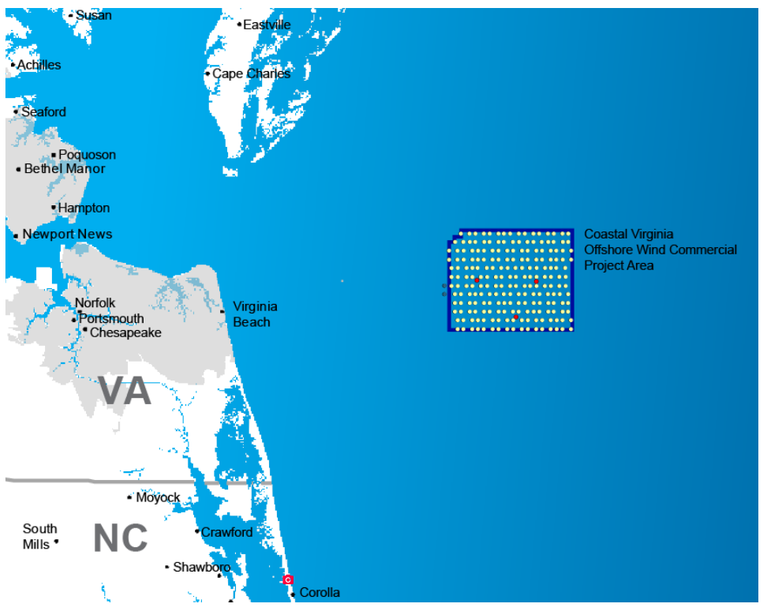
Visual Simulation: 16-MW Wind Turbine

Currituck Beach Lighthouse

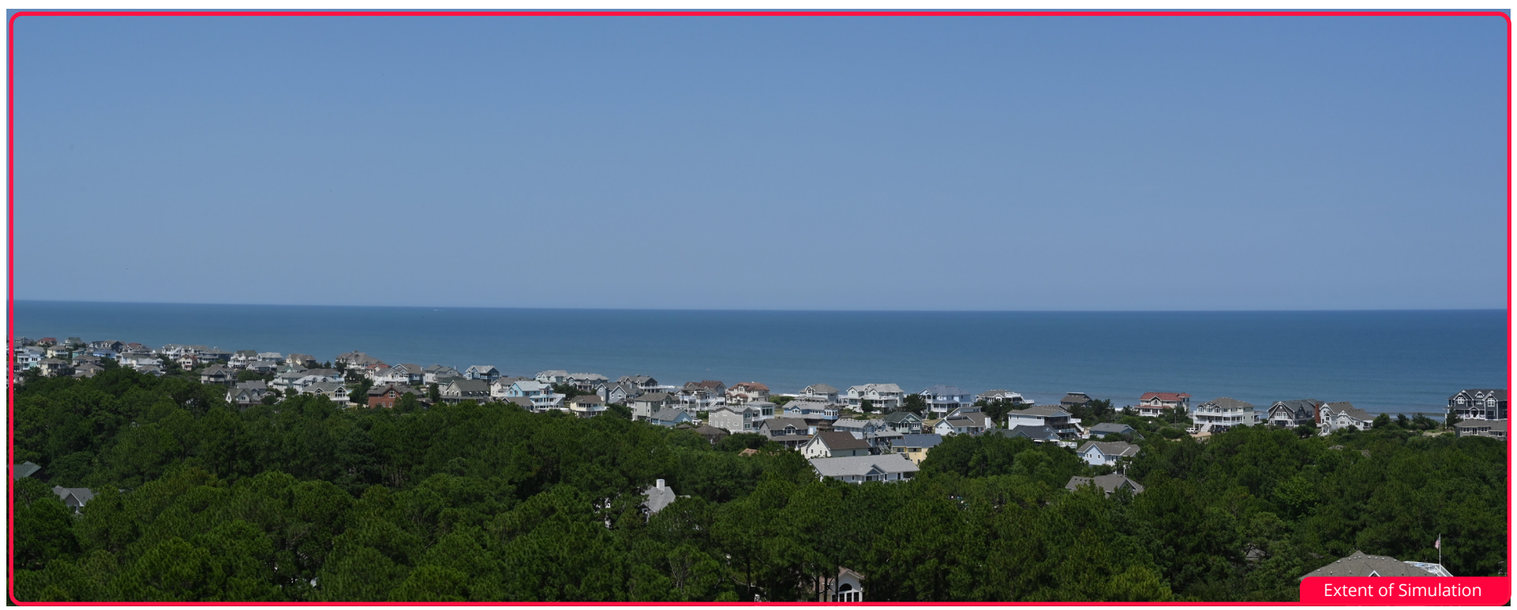
Corolla, NC

Vicinity Map

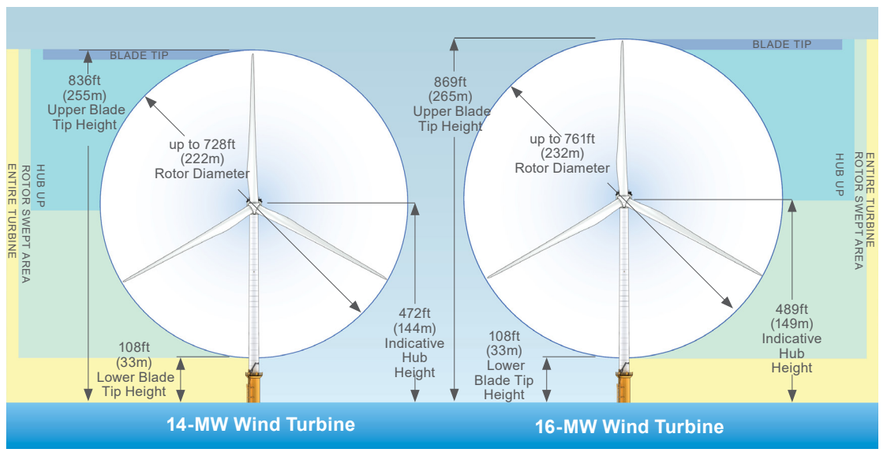


Existing Panoramic View

Located on the Currituck Beach Lighthouse observation deck.



Turbine Dimensions



Turbine Visibility

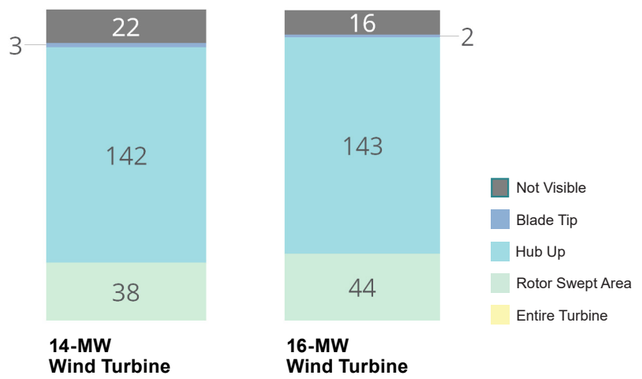


Image Data

PHOTO INFORMATION

Field ID #	48
Date	7/7/2021
Time	2:40 PM
Latitude	36.3767°
Longitude	-75.8307°
Direction of View	NE
Elevation	155’

ENVIRONMENTAL

Temperature	93° F
Humidity	38%
Wind Direction	S
Wind Speed	14 mph
Weather Condition	Clear

PROJECT VIEW

Distance to Nearest Turbine	36.8 miles
Horizontal Area Occupied by Visible Turbines	22°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Currituck Beach Lighthouse

Corolla, NC

Print Guide / Image Notes:
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Visual Simulation: 14-MW Wind Turbine

Currituck Beach Lighthouse

Corolla, NC

Print Guide / Image Notes:
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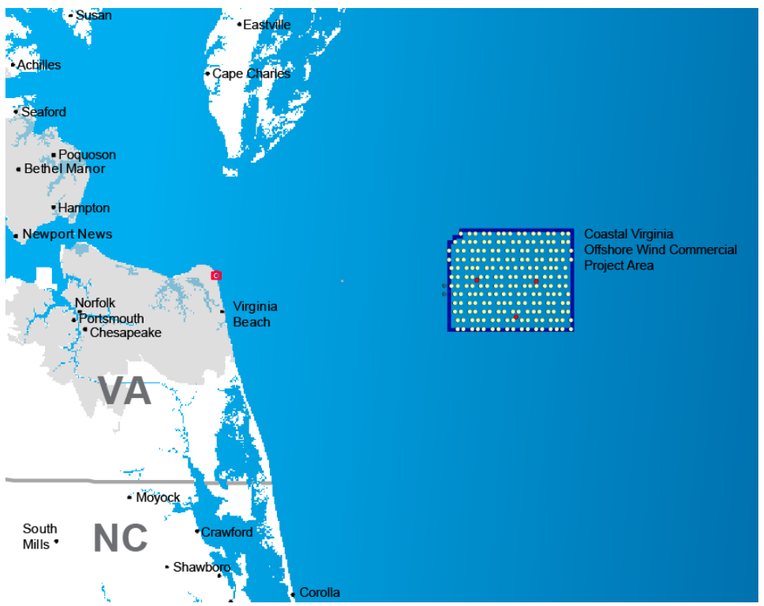
Visual Simulation: 16-MW Wind Turbine

Beach Residential 1

Virginia Beach, VA

Vicinity Map



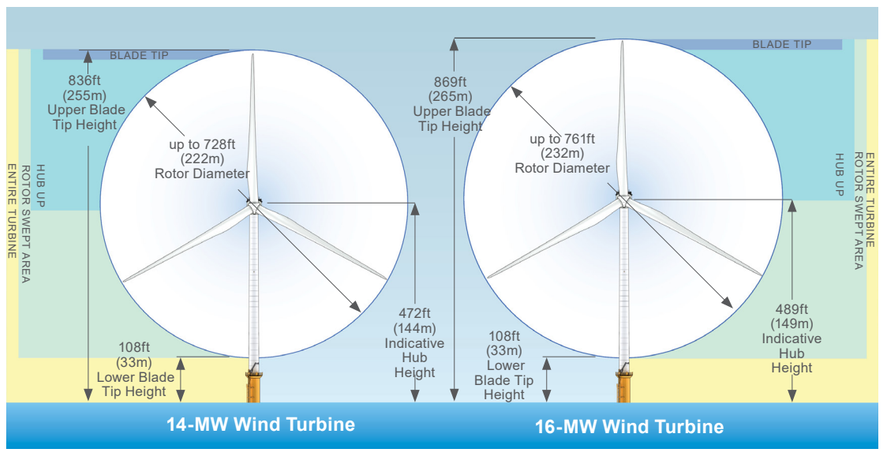
Pilot Project Turbine · Turbine Location · Photo Point
Chesapeake Light Tower · Offshore Substation · Lease Area

Existing Panoramic View

Located on North End Beaches, near 70th St.



Turbine Dimensions



Turbine Visibility

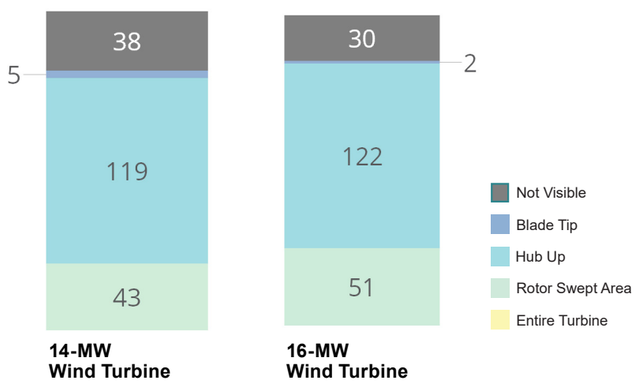


Image Data

PHOTO INFORMATION

Field ID #	15a
Date	7/9/2021
Time	10:00 AM
Latitude	36.8961°
Longitude	-75.9861°
Direction of View	E
Elevation	15’

ENVIRONMENTAL

Temperature	83° F
Humidity	69%
Wind Direction	WSW
Wind Speed	6 mph
Weather Condition	Fair

PROJECT VIEW

Distance to Nearest Turbine	28.1 miles
Horizontal Area Occupied by Visible Turbines	22°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Beach Residential 1

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Beach Residential 1

Virginia Beach, VA

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

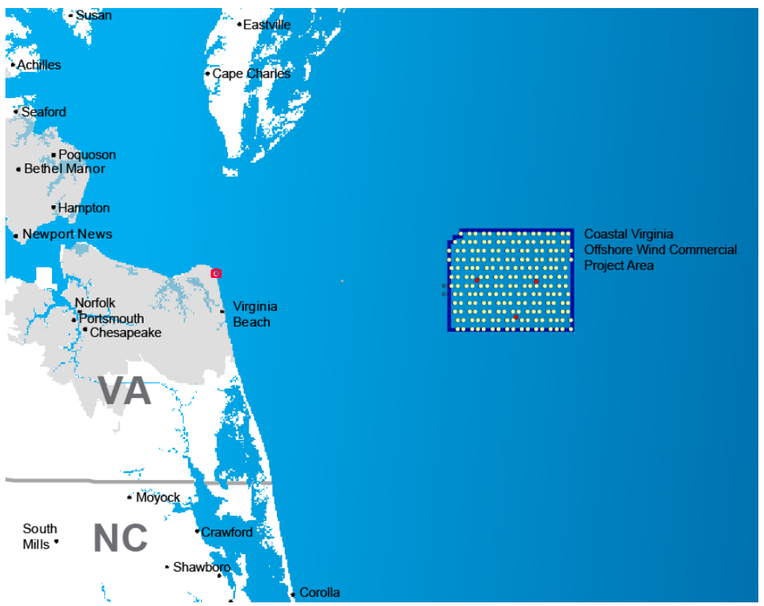


Visual Simulation: 16-MW Wind Turbine

Beach Residential 1 - Nighttime

Virginia Beach, VA

Vicinity Map

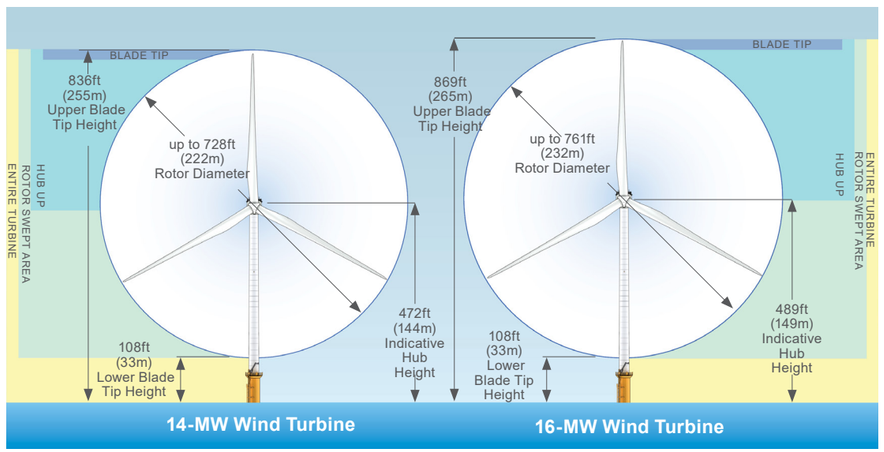


Existing Panoramic View

Located on North End Beaches, near 70th St.



Turbine Dimensions



Turbine Visibility

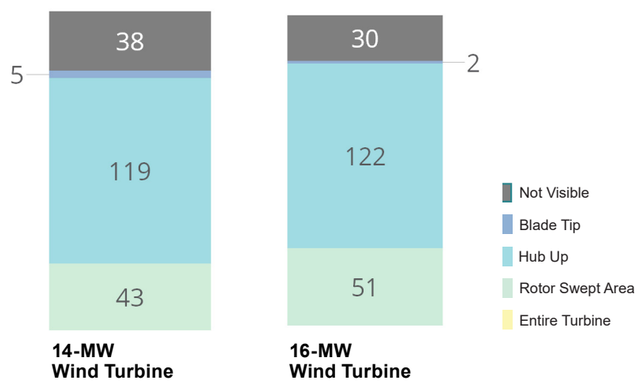


Image Data

PHOTO INFORMATION

Field ID #	15b
Date	7/10/2021
Time	10:27pm
Latitude	36.8966°
Longitude	-75.9762°
Direction of View	E
Elevation	15’

ENVIRONMENTAL

Temperature	78° F
Humidity	64%
Wind Direction	SSE
Wind Speed	6 mph
Weather Condition	Fair

PROJECT VIEW

Distance to Nearest Turbine	28.1 miles
Horizontal Area Occupied by Visible Turbines	23°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Beach Residential 1 - Nighttime

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Beach Residential 1 - Nighttime

Virginia Beach, VA

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

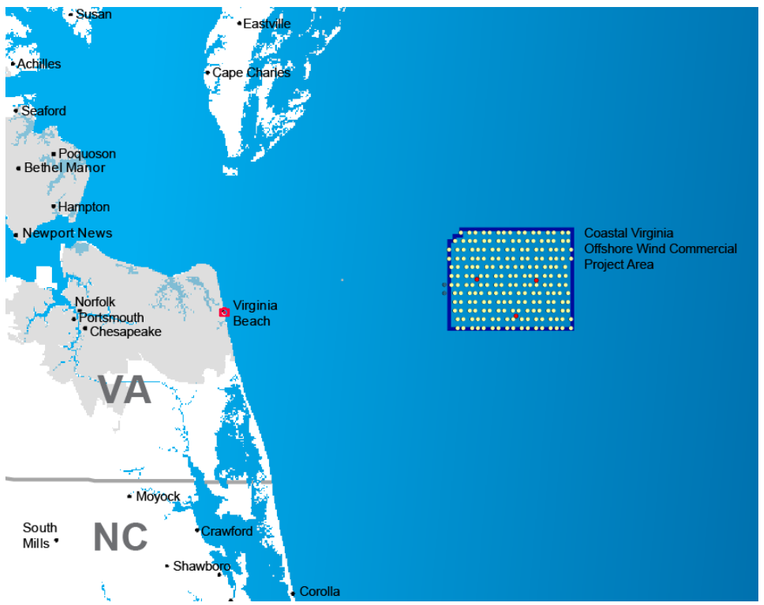


Visual Simulation: 16-MW Wind Turbine

Virginia Beach Boardwalk - 17th St Park

Virginia Beach, VA

Vicinity Map



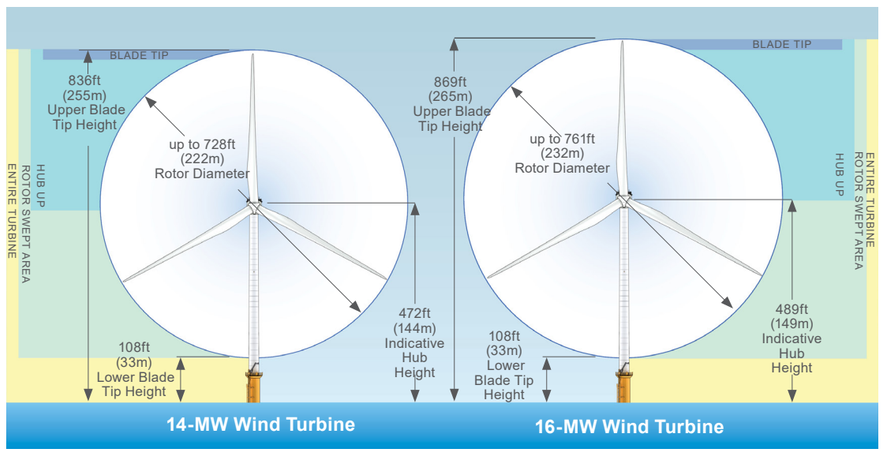
- Pilot Project Turbine
- Chesapeake Light Tower
- Turbine Location
- Offshore Substation
- Photo Point
- Lease Area

Existing Panoramic View

Located on Virginia Beach Boardwalk, near 17th St Park



Turbine Dimensions



Turbine Visibility

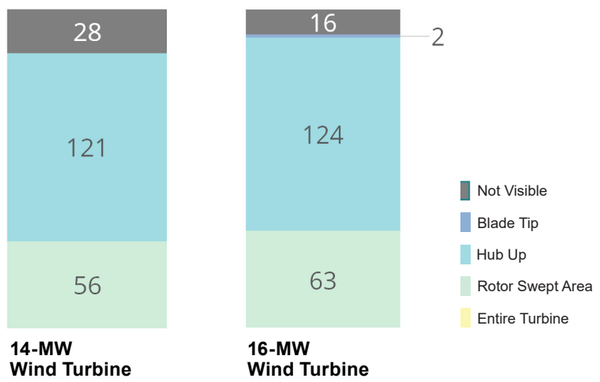


Image Data

PHOTO INFORMATION

Field ID #	24a
Date	7/9/2021
Time	1:33 pm
Latitude	36.8455°
Longitude	-75.9733°
Direction of View	E
Elevation	18’

ENVIRONMENTAL

Temperature	91° F
Humidity	53%
Wind Direction	WSW
Wind Speed	5 mph
Weather Condition	Partly Cloudy

PROJECT VIEW

Distance to Nearest Turbine	27.8 miles
Horizontal Area Occupied by Visible Turbines	23°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Virginia Beach Boardwalk - 17th St Park

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Virginia Beach Boardwalk - 17th St Park

Virginia Beach, VA

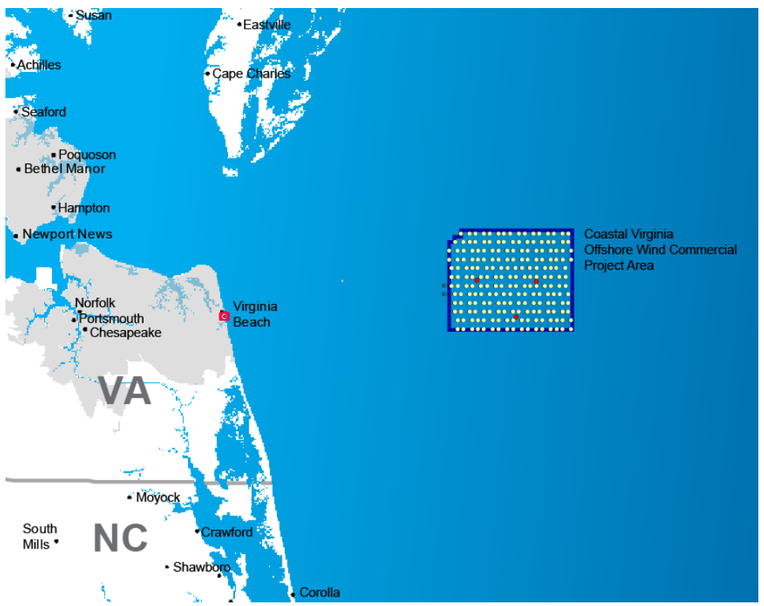
Print Guide / Image Notes:
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



Visual Simulation: 16-MW Wind Turbine

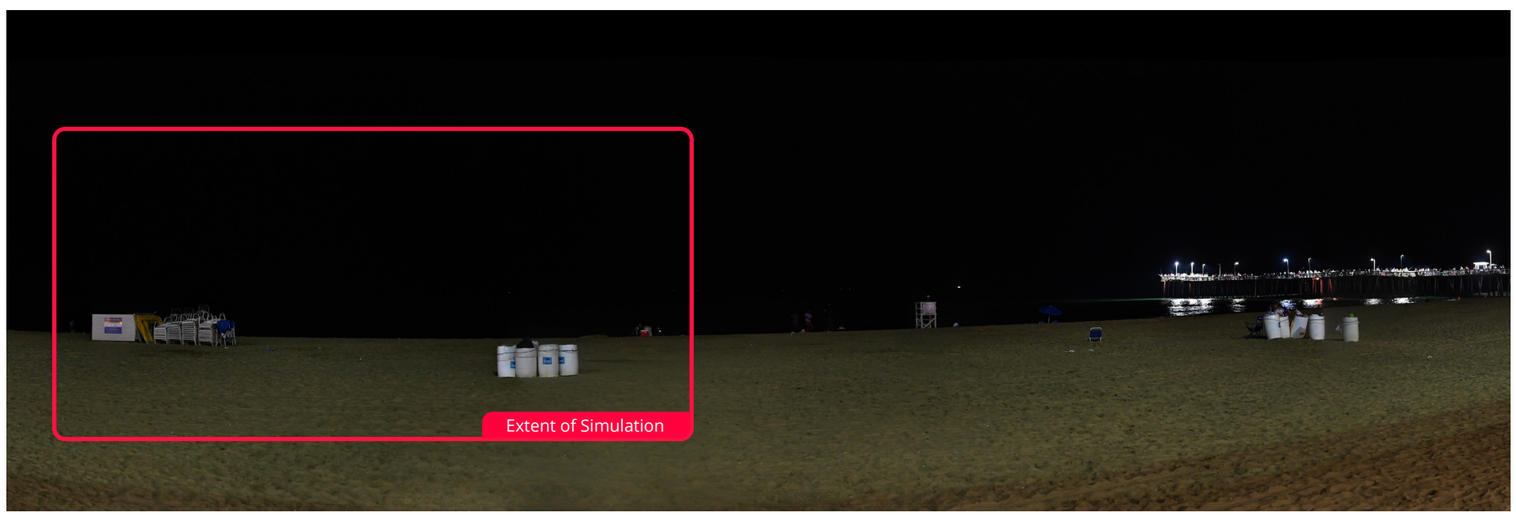
Virginia Beach Boardwalk - 16th St Entrance - Nighttime

Virginia Beach, VA



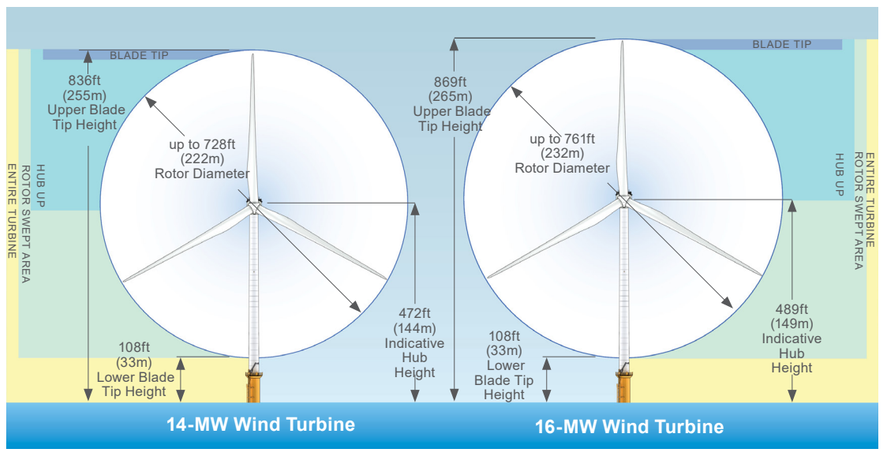
Vicinity Map

- Pilot Project Turbine
- Chesapeake Light Tower
- Turbine Location
- Offshore Substation
- Photo Point
- Lease Area

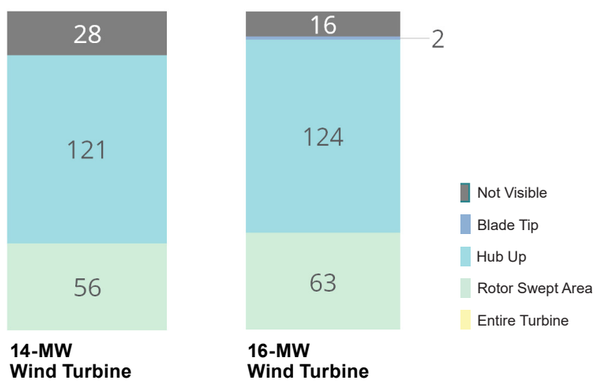


Existing Panoramic View

Located on Virginia Beach Boardwalk, near 16th St Entrance



Turbine Dimensions



Turbine Visibility

PHOTO INFORMATION

Field ID #	24b
Date	7/10/2021
Time	9:54 pm
Latitude	36.8447°
Longitude	-75.9731°
Direction of View	E
Elevation	18’

PROJECT VIEW

Distance to Nearest Turbine	27.7 miles
Horizontal Area Occupied by Visible Turbines	23°

ENVIRONMENTAL

Temperature	78° F
Humidity	68%
Wind Direction	SSE
Wind Speed	6 mph
Weather Condition	Fair

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Image Data

Virginia Beach Boardwalk - 16th St Entrance - Nighttime

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Virginia Beach Boardwalk - 16th St Entrance - Nighttime

Virginia Beach, VA

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

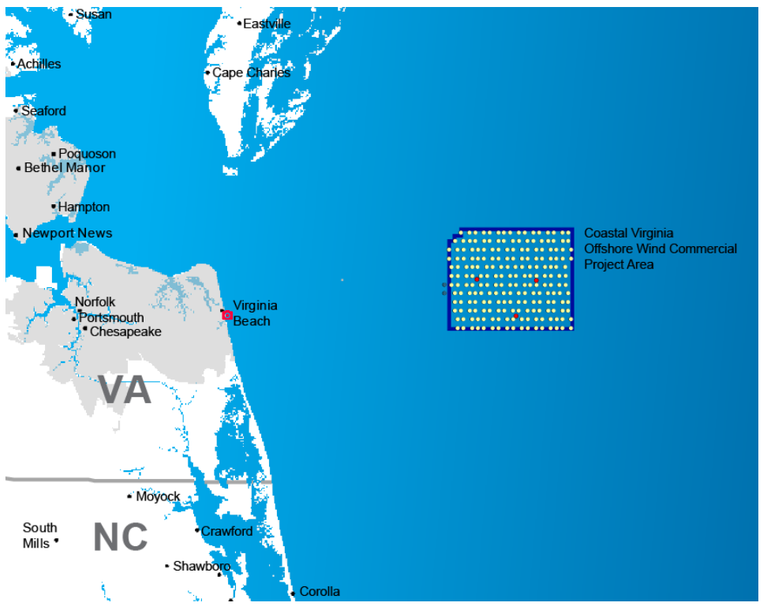


Visual Simulation: 16-MW Wind Turbine

Virginia Beach Boardwalk - Fishing Pier

Virginia Beach, VA

Vicinity Map

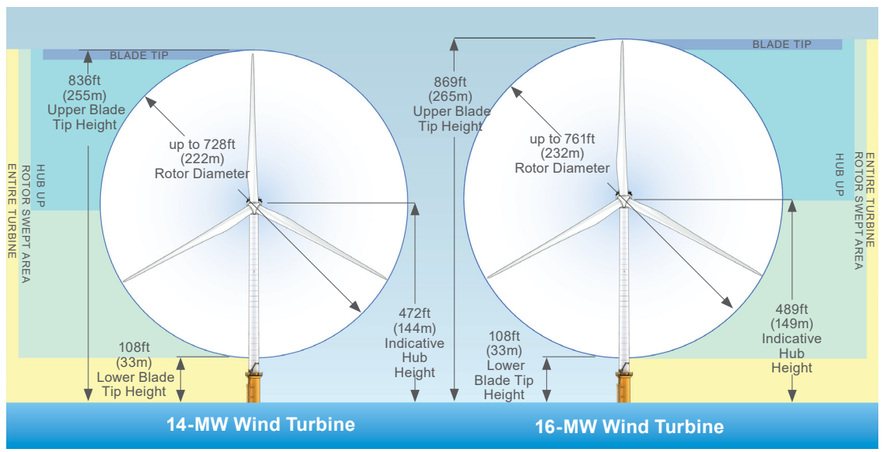


Existing Panoramic View

Located on Virginia Beach Boardwalk Fishing Pier



Turbine Dimensions



Turbine Visibility

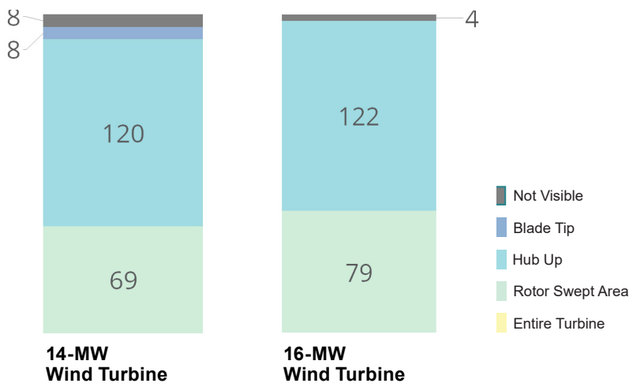


Image Data

PHOTO INFORMATION	
Field ID #	24d
Date	7/9/2021
Time	1:50 pm
Latitude	36.8437°
Longitude	-75.9698°
Direction of View	E
Elevation	25’

ENVIRONMENTAL	
Temperature	91° F
Humidity	53%
Wind Direction	WSW
Wind Speed	5 mph
Weather Condition	Partly Cloudy

PROJECT VIEW	
Distance to Nearest Turbine	27.6 miles
Horizontal Area Occupied by Visible Turbines	23°

PROJECT INFRASTRUCTURE	
Turbines	205
Offshore Substations	3

Virginia Beach Boardwalk - Fishing Pier

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Virginia Beach Boardwalk - Fishing Pier

Virginia Beach, VA

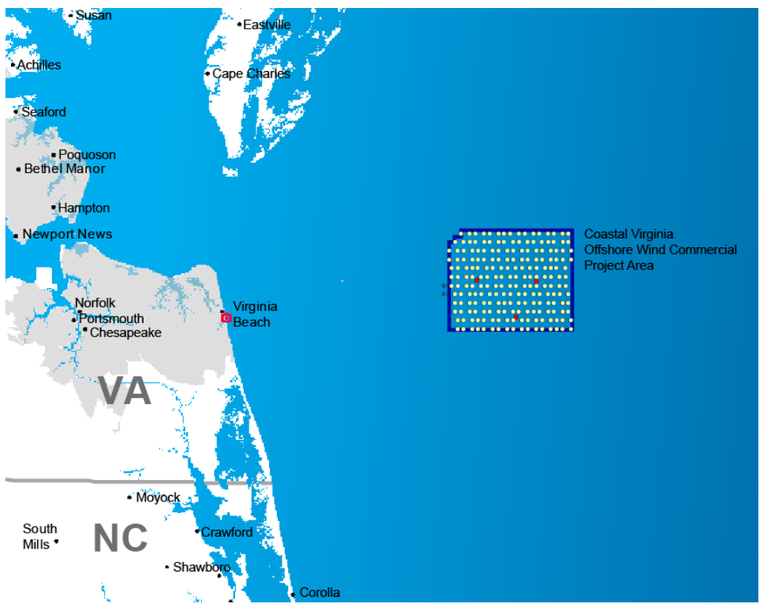
Print Guide / Image Notes:
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



Visual Simulation: 16-MW Wind Turbine

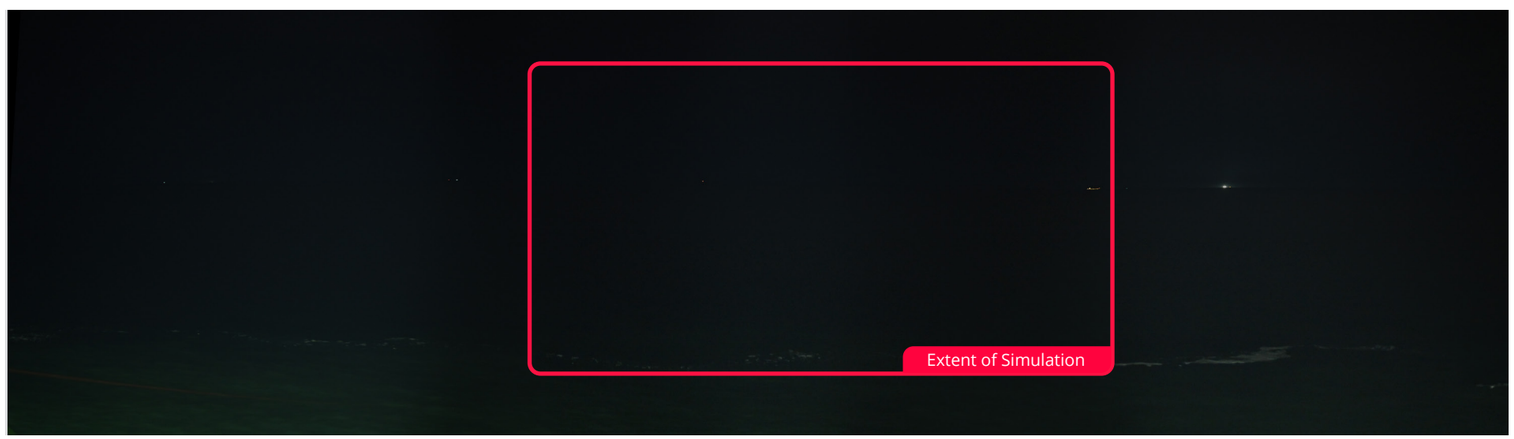
Virginia Beach Boardwalk - Fishing Pier Nighttime

Virginia Beach, VA



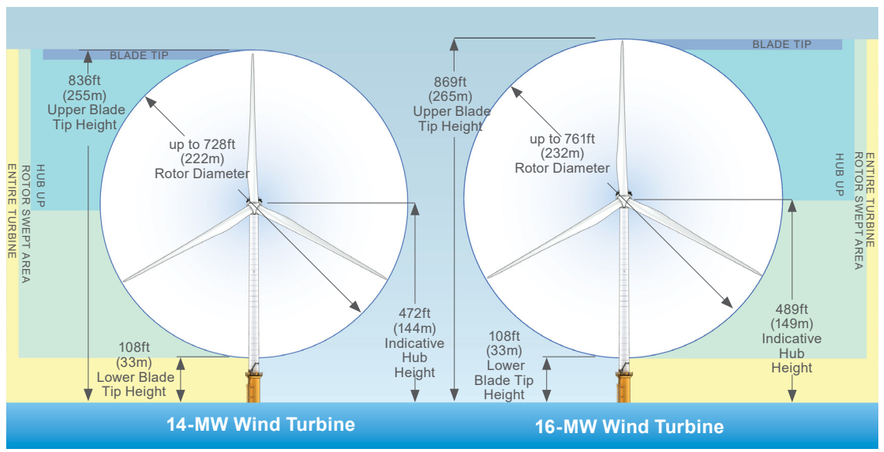
Vicinity Map

Pilot Project Turbine · Turbine Location · Photo Point
Chesapeake Light Tower · Offshore Substation · Lease Area

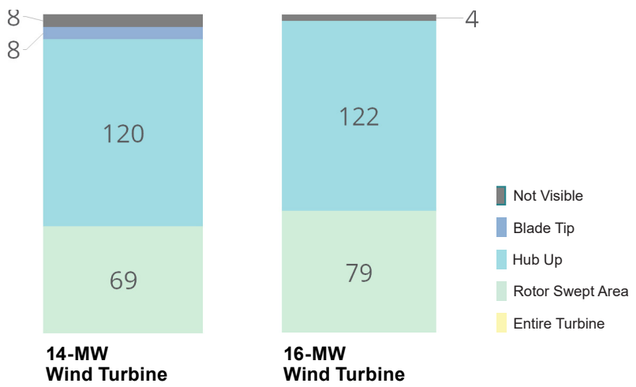


Existing Panoramic View

Located on Virginia Beach Boardwalk Fishing Pier



Turbine Dimensions



Turbine Visibility

PHOTO INFORMATION

Field ID #	24d
Date	7/10/2021
Time	9:37 pm
Latitude	36.8437°
Longitude	-75.9698°
Direction of View	E
Elevation	25’

PROJECT VIEW

Distance to Nearest Turbine	27.6 miles
Horizontal Area Occupied by Visible Turbines	23°

ENVIRONMENTAL

Temperature	78° F
Humidity	6%
Wind Direction	SSE
Wind Speed	6 mph
Weather Condition	Fair

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Image Data

Virginia Beach Boardwalk - Fishing Pier Nighttime

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Virginia Beach Boardwalk - Fishing Pier Nighttime

Virginia Beach, VA

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

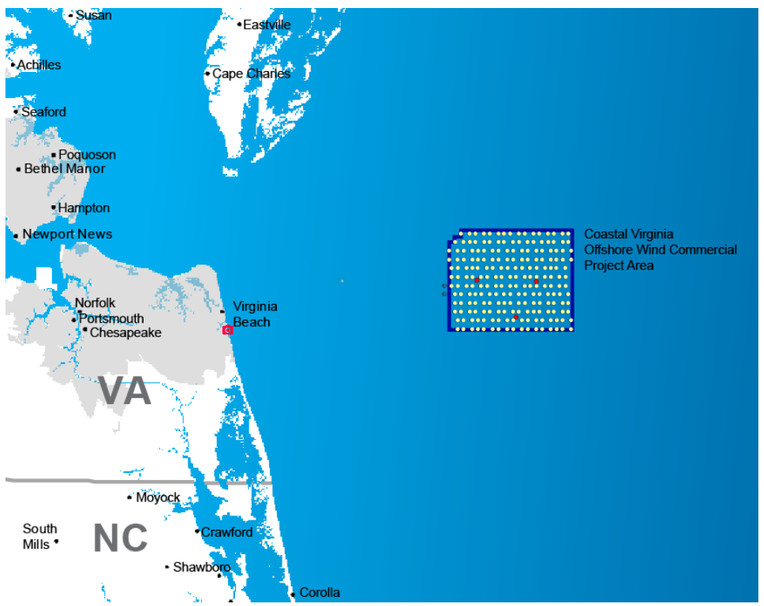


Visual Simulation: 16-MW Wind Turbine

Croatan Beach A - North

Virginia Beach, VA

Vicinity Map



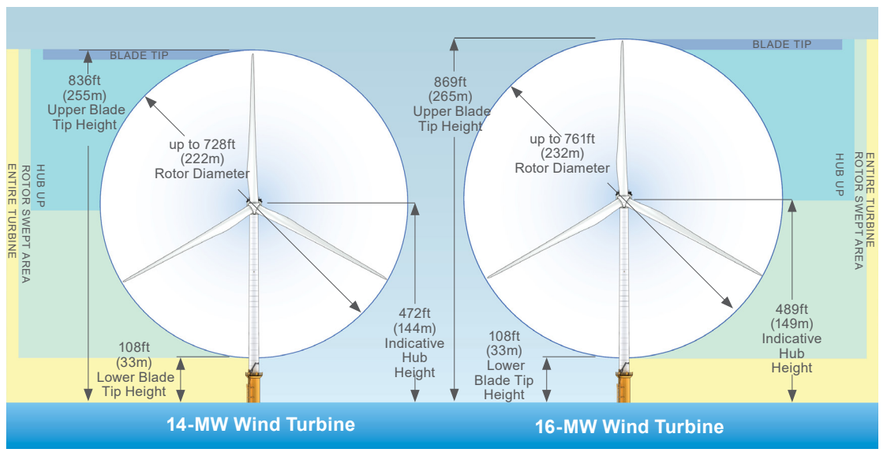
Pilot Project Turbine · Turbine Location · Photo Point
Chesapeake Light Tower · Offshore Substation · Lease Area

Existing Panoramic View

Located on Croatan Beach



Turbine Dimensions



Turbine Visibility

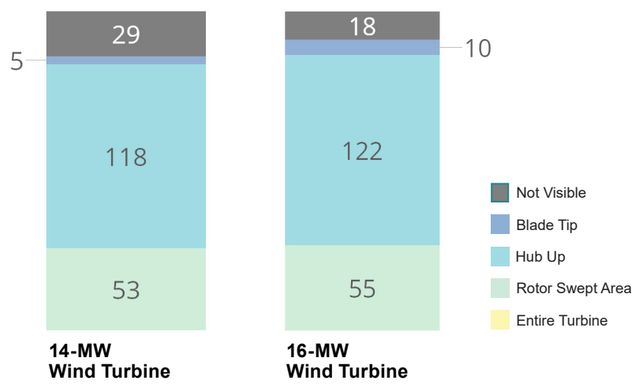


Image Data

PHOTO INFORMATION	
Field ID #	30a
Date	7/8/2021
Time	11:00 AM
Latitude	36.8275°
Longitude	-75.9861°
Direction of View	ENE
Elevation	15’

ENVIRONMENTAL	
Temperature	84° F
Humidity	72%
Wind Direction	SSW
Wind Speed	15 mph
Weather Condition	Overcast

PROJECT VIEW	
Distance to Nearest Turbine	27.6 miles
Horizontal Area Occupied by Visible Turbines	22.5°

PROJECT INFRASTRUCTURE	
Turbines	205
Offshore Substations	3

Croatan Beach A - North

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Croatan Beach A - North

Virginia Beach, VA

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

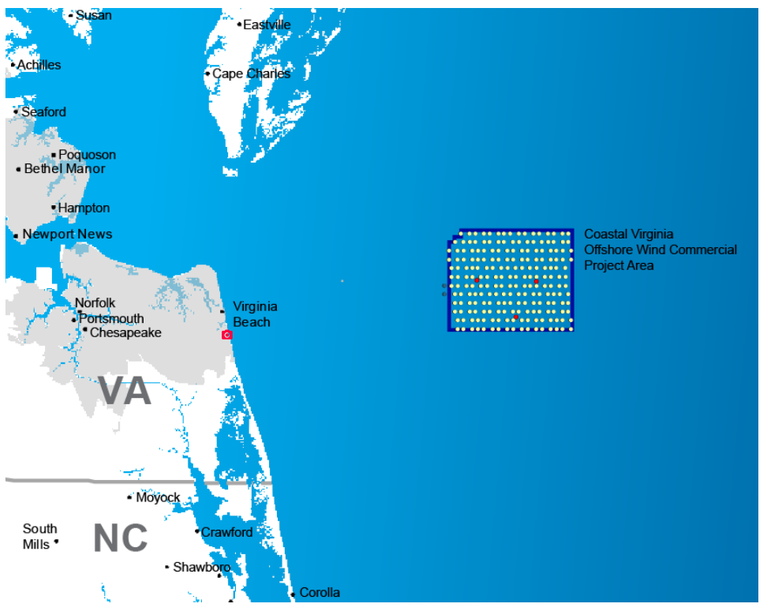


Visual Simulation: 16-MW Wind Turbine

Croatan Beach C - South

Virginia Beach, VA

Vicinity Map

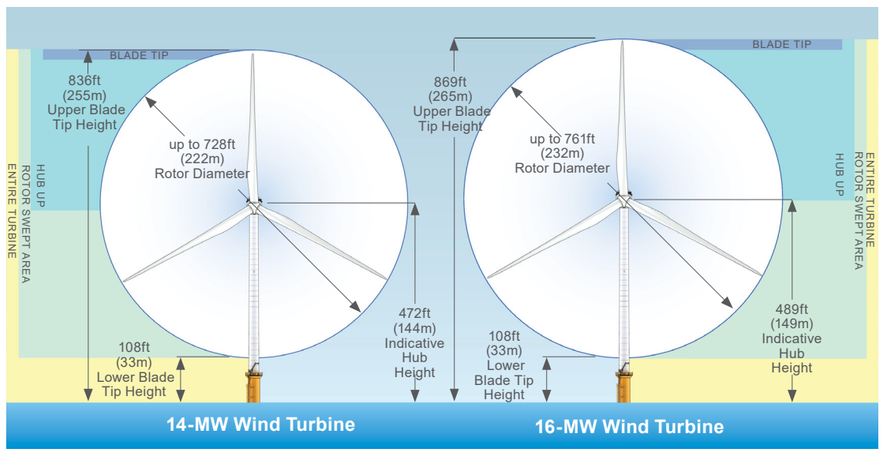


Existing Panoramic View

Located on Croatan Beach



Turbine Dimensions



Turbine Visibility

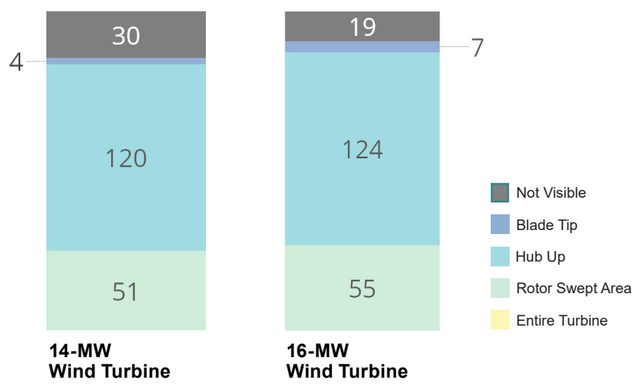


Image Data

PHOTO INFORMATION	
Field ID #	30c
Date	7/8/2021
Time	11:18 am
Latitude	36.8180
Longitude	-75.9668°
Direction of View	ENE
Elevation	15’

ENVIRONMENTAL	
Temperature	84° F
Humidity	72%
Wind Direction	SSW
Wind Speed	15 mph
Weather Condition	Mostly Cloudy

PROJECT VIEW	
Distance to Nearest Turbine	27.6 miles
Horizontal Area Occupied by Visible Turbines	22.5°

PROJECT INFRASTRUCTURE	
Turbines	205
Offshore Substations	3

Croatan Beach C - South

Virginia Beach, VA

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



Visual Simulation: 14-MW Wind Turbine

Croatan Beach C - South

Virginia Beach, VA

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

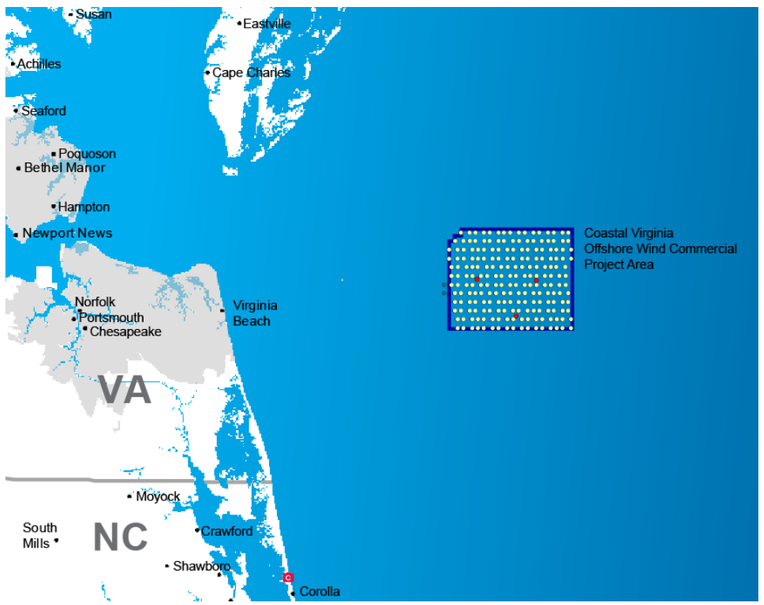


Visual Simulation: 16-MW Wind Turbine

Whale Head Bay - Residential

Corolla, NC

Vicinity Map

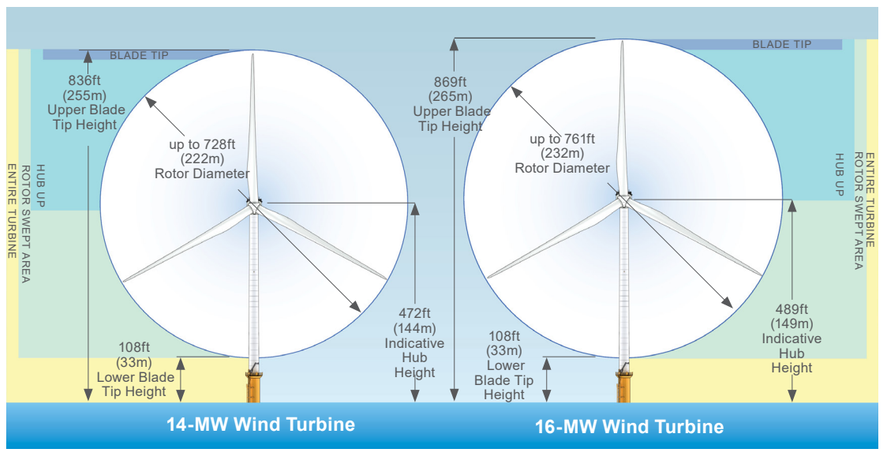


Existing Panoramic View

Located on Corolla Beach, near Corolla Beach Rd.



Turbine Dimensions



Turbine Visibility

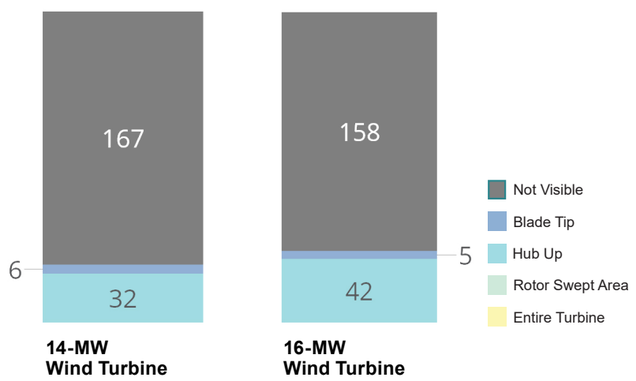


Image Data

PHOTO INFORMATION

Field ID #	49a
Date	7/7/2021
Time	12:20 PM
Latitude	36.3776°
Longitude	-75.8242°
Direction of View	NE
Elevation	25’

ENVIRONMENTAL

Temperature	91° F
Humidity	48%
Wind Direction	SW
Wind Speed	13 mph
Weather Condition	Fair

PROJECT VIEW

Distance to Nearest Turbine	36.6 miles
Horizontal Area Occupied by Visible Turbines	14.5°

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Whale Head Bay - Residential

Corolla, NC

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



Visual Simulation: 14-MW Wind Turbine

Whale Head Bay - Residential

Corolla, NC

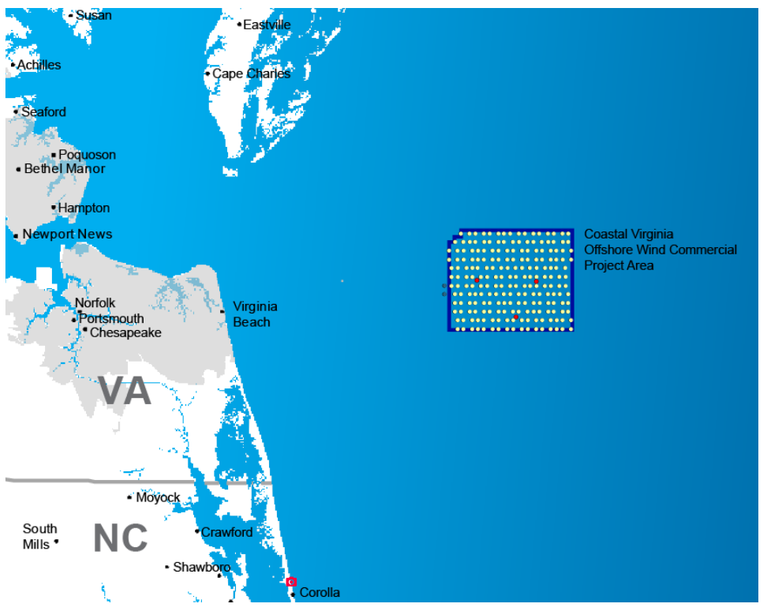
Print Guide / Image Notes:
This sheet should be printed at 11 by 17 inches; full size with no scaling; and viewed at arm's length (24 inches). If viewed on a computer monitor, the document should be scaled to 100 percent and viewed at arm's length (24 inches).



Visual Simulation: 16-MW Wind Turbine

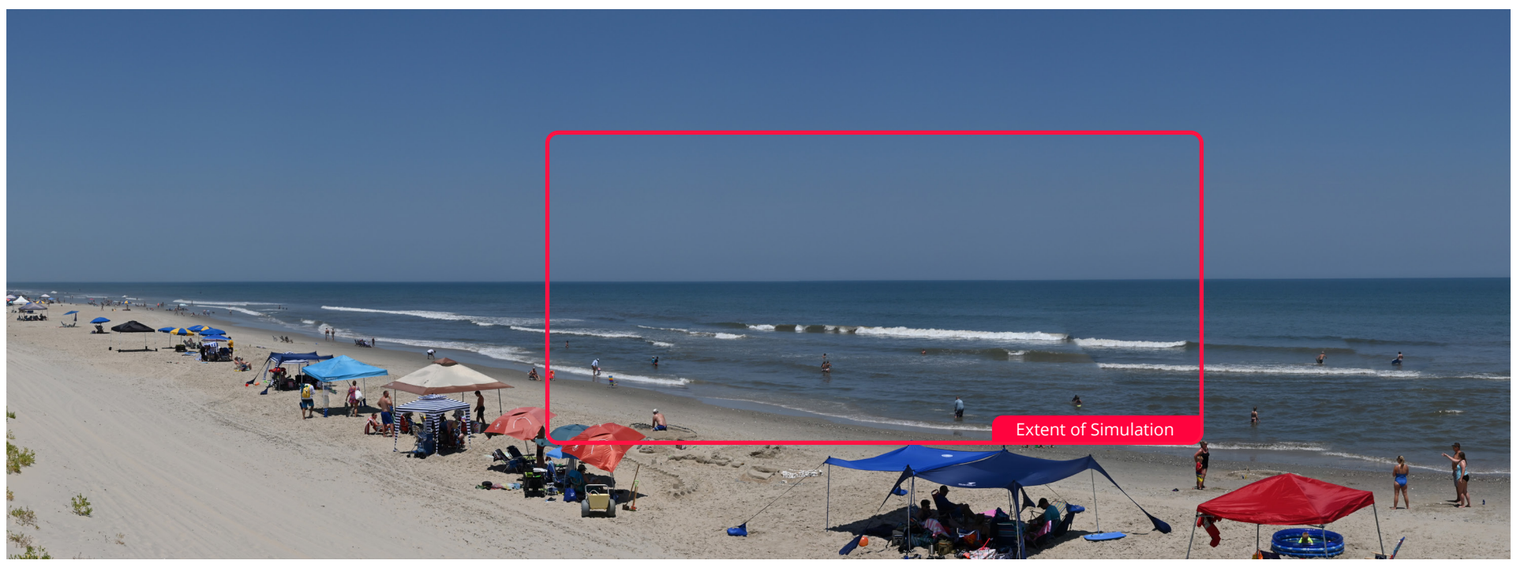
Whale Head Bay - Albacore St Entrance

Corolla, NC



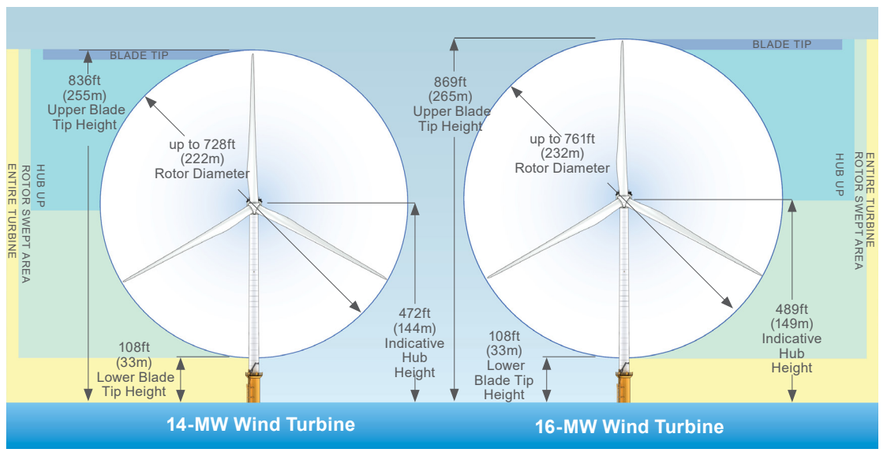
Vicinity Map

- Pilot Project Turbine
- Chesapeake Light Tower
- Turbine Location
- Offshore Substation
- Photo Point
- Lease Area

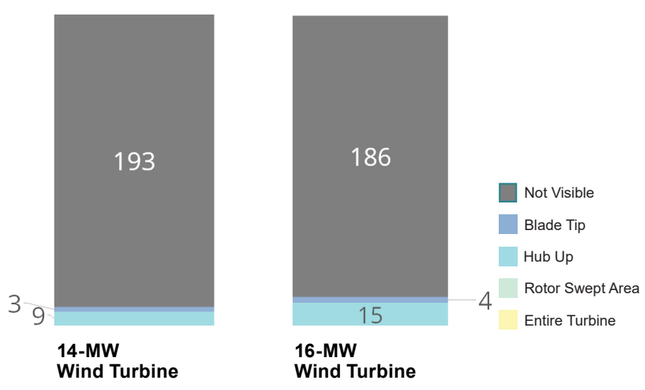


Existing Panoramic View

Located on Corolla Beach, near Corolla Beach Rd.



Turbine Dimensions



Turbine Visibility

PHOTO INFORMATION

Field ID #	49g
Date	7/7/2021
Time	12:20 PM
Latitude	36.3283°
Longitude	-75.8104°
Direction of View	NE
Elevation	25’

PROJECT VIEW

Distance to Nearest Turbine	39.1 miles
Horizontal Area Occupied by Visible Turbines	9°

ENVIRONMENTAL

Temperature	93° F
Humidity	42%
Wind Direction	S
Wind Speed	12 mph
Weather Condition	Fair

PROJECT INFRASTRUCTURE

Turbines	205
Offshore Substations	3

Image Data

Whale Head Bay - Albacore St Entrance

Corolla, NC

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



Visual Simulation: 14-MW Wind Turbine

Whale Head Bay - Albacore St Entrance

Corolla, NC

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



Visual Simulation: 16-MW Wind Turbine

Attachment I-1-6 24-Hour Time-Lapse Video Simulations

24-Hour Time Lapse Video for Offshore Project Components:

- Croatan Beach C, Virginia
- North End Beach – Residential View 1 (Nighttime), Virginia
- Currituck Beach Lighthouse, North Carolina

Attachment I-1-7 Visual Impact Assessment by Key Observation Point

Virginia

Table 1 provides a summary of the level of contrast (i.e., strong, moderate, weak, none) and visibility rating for each of the 15 KOPs in the Virginia portion of the Offshore Study Area. Visual simulations prepared for each KOP are presented in Attachment I-1-5. Contrast Rating Worksheets for each KOP are located in Attachment I-1-4. The assessment results describing views with the Project implemented for each KOP are presented below.

Table 1. Summary of Contrast Rating of Key Observation Points in Virginia for Offshore Project Components

Field ID	KOP Name	Location	Distance to Nearest Offshore Project Component (mi [km])	Contrast Rating a/		Daytime/Nighttime Simulation Created for KOP b/
			14 MW and 16 MW WTG	14 MW WTG	16 MW WTG	
5	Oyster Village Horse Island Trail	Northampton	32.6 (52.5)	Weak	Weak	Daytime
8	Eastern Shore of Virginia National Wildlife Refuge	Northampton	28.2 (45.4)	None	None	Daytime
13	Cape Henry Lighthouse/Fort Story Military Base	Virginia Beach	29.1 (46.8)	Moderate	Moderate	Daytime
22	King Neptune Statue/Boardwalk	Virginia Beach	27.9 (45)	Moderate	Moderate	Daytime
23	Naval Aviation Monument Park	Virginia Beach	27.9 (45)	Weak	Weak	Daytime
26	Marriott Virginia Beach Oceanfront Hotel	Virginia Beach	28 (45)	Moderate	Moderate	Daytime
29	Grommet Island Park/Boardwalk	Virginia Beach	27.7 (44.6)	Weal	Weal	Daytime
31	Picnic Views on Beach	Virginia Beach	27.7 (44.6)	Weak	Weak	Daytime
44	Back Bay National Wildlife Refuge/Little Island Park	Virginia Beach	26.8 (43.1)	Weak	Weak	Daytime
15	North End Beach – Residential View 1	Virginia Beach	28.1 (45.2)	Weak	Weak	Daytime
15	North End Beach – Residential View 1 (Nighttime)	Virginia Beach	28.1 (45.2)	Moderate	Moderate	Nighttime
24a	Virginia Beach Boardwalk – 17th Street Park	Virginia Beach	27.8 (44.7)	Moderate	Moderate	Daytime
24b	Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime)	Virginia Beach	27.8 (44.7)	Moderate	Moderate	Nighttime
24d	Virginia Beach Boardwalk – Fishing Pier	Virginia Beach	27.6 (44.4)	Weak	Weak	Daytime
24d	Virginia Beach Boardwalk – Fishing Pier (Nighttime)	Virginia Beach	27.6 (44.4)	Moderate	Moderate	Nighttime
30a	Croatan Beach A	Virginia Beach	27.7 (44.6)	Weak	Weak	Daytime

Field ID	KOP Name	Location	Distance to Nearest Offshore Project Component (mi [km])	Contrast Rating a/		Daytime/Nighttime Simulation Created for KOP b/
			14 MW and 16 MW WTG	14 MW WTG	16 MW WTG	
30c	Croatan Beach C	Virginia Beach	27.7 (44.6)	Weak	Weak	Daytime

Notes:
a/ Visual Contrast Rating Worksheets for each KOP is included in Attachment I-1-4. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in this table.
b/ Visual simulations are included in Attachment I-1-5.

Oyster Village Horse Island Trail

Oyster Village / Horse Island Trail is located east of the village of Cheriton, on the large peninsula known as Delmarva, east of Chesapeake Bay. The trail site is situated on a tiny peninsula oriented to the east, adjacent to Oyster Slip and a small boat ramp. The trail site is managed by the Nature Conservancy. Beginning at the eastern terminus of County Road 638, this 0.35 mile out-and-back trail is memorable for the trail material: crushed white oyster shells. The short trail runs east and then south along the edge of a scrubby forested marsh, which screens views to the west and south. Views north and east are composed of the fine textured marsh and Atlantic Ocean beyond. The low landforms of the barrier islands can be seen along the horizon from some easterly views. The surrounding landscape is flat, offering broad views to the north and east across the salt marshes and ocean. The adjoining landscape of the peninsula to the west is a mosaic of crop lands, swaths of mixed forest, and clusters of rural residential properties connected by rural roadways. Trail users would include local residents and visitors looking for an easy scenic hike, and birdwatchers.

Existing View

This view, facing southeast, is located along Horse Island Trail, where the trail turns slightly to the south. The unique color and texture of the trail can be seen to the right. The saltmarsh landscape is flat as it meets the Atlantic Ocean, which continues into the middleground and distant horizon. Existing mature trees and shrubs in the middleground block views to the south. Although present in the view, the barrier islands are so low and distant in this view they are seen only as a thin dark line at the horizon.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that are accessing the trail from this location. Views towards the WTGs will be partially unobstructed, as the low landforms of the barrier islands can be seen creating a dark line along the horizon. The portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the max tip. WTGs located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 32.6 mi (52.5 km) or greater from the viewer. From this location, under clear conditions, the WTGs appear as faint thin white lines in rows just over the horizon in the distance. The white color of the WTGs creates some contrast as the thin lines of the blades appear to be floating out on the ocean, however, the blades are very small and faint from this location. When the blades are in motion, this may draw attention to the turbines after extended viewing

toward the Project. When weather conditions are less than sunny and clear (e.g., haze, clouds), the WTGs will be less visible. At a distance of approximately 32.6 mi (52.5 km) the thin form of the tips of the blades will blend with the light color of the sky, further diminishing contrast to no contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 1. Under atmospheric conditions such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would result in no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 1.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Eastern Shore of Virginia National Wildlife Refuge

This site, at the Wise Point boat ramp, is located at the far southern tip of the Delmarva peninsula, between the Atlantic Ocean and Chesapeake Bay. Interstate 13 is located one mile to the west, with the Chesapeake Bay Bridge located about 1.5 miles to the southwest. Eastern Shore of Virginia National Wildlife Refuge contains some 1,123 acres of saltmarsh mosaic, grasslands, narrow channels, and mixed woodlands managed by the USFWS. The varied habitats of the refuge are critical habitat for migrating birds and monarch butterflies, among other TES. The refuge also contains former military installments used during WWII, including Battery Winslow. Visitors to the refuge can enjoy walking trails, hand boat launches, a visitor's center, and this KOP site, Wise Point boat ramp, which provides access to the Virginia Inside Passage. Views at the boat ramp are dominated by the waters of the Passage and marsh lands to the southeast, but also include a small parking area and a short dock (USFWS 2021a).

Although located within the refuge, this KOP site is likely not frequented by NWR visitors, but rather used predominantly by locals intending to utilize the boat ramp. Information from the USFWS indicate the boat ramp site is often at capacity during weekends (USFWS 2015).

Existing View

This view faces east overlooking Virginia Inside Passage, the 350-foot-wide channel-oriented northeast to southwest between the southern terminus of Delmarva peninsula and Raccoon Island. The end of a weathered wooden dock and its wooden vertical piers is visible in the foreground to the north. The flat, fine texture and green color of the salt marsh grasses, and mixed woodlands of raccoon Island can be seen in the middleground, with pine tree silhouettes rising up into the skyline. Distant views include the long, low landforms and existing vegetation of the barrier island chain.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that are accessing the boat ramp from this location. Views towards the WTGs will be mostly obstructed by the Virginia Inside Passage which blocks

most views towards the Atlantic Ocean. A small portion of the maximum representative WTG blades that are closest to the viewer and visible above the landform will be viewed from this location. At a distance of approximately 28.2 mi (45.4 km) or more, the majority of the WTGs will fall below the passage landform. The thin lines created by the blades will likely not be noticeable or perceived by users at the boat dock. As such, the Project will create no visual contrast and would not have a visibility rating.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs are thin and faint and will likely not be noticeable or perceived. As such, the Project will create no visual contrast.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Cape Henry Lighthouse/Fort Story Military Base

There are two lighthouses located at Cape Henry within Fort Story military base near the northern end of Virginia Beach. The original National Historic Landmark Cape Henry Lighthouse was completed in 1792 atop a large constructed hill. It was acquired in 1930 by Preservation Virginia. The original lighthouse is typically open to the public, but entry was temporarily limited to military personnel and their families in August 2021 due to the COVID-19 pandemic (virginiabeach.com 2021a).

From the top of the 90-foot tower, visitors have 360-degree views from the lantern room of the Atlantic Ocean, Chesapeake Bay, and the city (Virginia Pilot 2020). The distinctively black and white painted New Cape Henry lighthouse nearby does not permit public access. The landscape surrounding the original lighthouse is dominated by development of Fort Story: generally flat terrain, with broad areas of lawn divided up by 1 to 3 story buildings and roadways. Dense mature vegetation outside the developed base area screens views to the south and west.

Existing View

From the top of the 90-foot lighthouse, the lantern room is encased by large windows divided by metal mullions. Views toward the WTGs to the east overlook foreground views of Fort Story: open lawns areas, the narrow line of Cape Henry Road, and a cluster of small buildings (1 and 2 stories) and overhead utility poles. The view toward the WTGs does not include New Cape Henry Lighthouse, which is a popular photo subject from this location. Dense vegetation grows between the development and the shoreline, where the terrain gently lowers toward the ocean. Very little beach is visible from this view. A large ship can be seen passing in the distance.

View with the Project (Maximum Representative Wind Turbines)

This KOP represents views of residents and tourists associated with military families that are accessing the lighthouse from this location during operating hours (weekly from 10 am to 4 pm). This lighthouse is not currently open to the general public without military identification (see above). From this elevated viewpoint, views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the hub up. WTGs located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTG

blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 29.1 mi (46.8 km) or greater from the viewer. From this location, under clear conditions, the WTGs appear as grayish white lines in rows in the distance. The arrangement of the WTGs appears more ordered in the middle portion of the Lease Area, creating more contrast against the sky. The white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. When weather conditions are less than sunny and clear (e.g., fog, clouds), the WTGs likely will not be visible. At a distance of approximately 29.1 mi (46.8 km) the thin form of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will be visible after a brief glance in the direction of the Project. As such, the WTGs will create moderate visual contrast which corresponds to a visibility rating of 3. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location. No views are anticipated from the lighthouse grounds due to the dense vegetation in the foreground.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears after a brief glance in the direction of the Project. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 3.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

King Neptune Statue/Boardwalk

The King Neptune Statue is a 24-ft, 12-ton bronze statue that stands at the gateway to Neptune's Park on 31st Street along the Virginia Beach Boardwalk which extends parallel to the Atlantic Ocean (Virginiabeach.com 2021b). The statue is surrounded by urban development, including high-rise hotels, restaurants, and tourism-oriented shops. Neptune's Park offers an outdoor stage for concerts, shows, plays, and movies. Neptune's Park is a hub site for the annual Neptune's Festival, which lasts three days each September to celebrate "beach life" in the city, drawing hundreds of thousands of attendants (Neptune Festival 2021).

Existing View

This east-facing KOP is located south of the King Neptune statue along the Virginia Beach Boardwalk near 31st Street. The landscape surrounding this location is characterized by the open waters of the Atlantic Ocean, dense urban development along the coastline, multi-story hotels and apartment complexes, and multiple parks. Views from this location consist of flat, tan-colored beaches which, during the summer months, are packed with tourists and residents. The horizon line remains the main focal point, however, it is broken by umbrellas and beachgoers in the foreground. No vegetation is present from this location. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are recreational/commercial vessels playing/traveling through the area. This KOP provides unobstructed views

towards the WTGs, however, during off-peak times of the year the umbrellas and crowds will be absent from the foreground. Because the boardwalk is parallel to the beach, strolling boardwalk viewers would see the ocean in the periphery whereas beachgoers on the beach would view the ocean directly. Boardwalk viewers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents recreational users, residents, tourists, beachgoers, and people walking along the Boardwalk. Views towards the WTGs will be partially unobstructed by beachgoer activity during the peak season and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. Several elements compete for the viewer's attention at this location, including the boardwalk and activities of beachgoers. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.9 mi (45 km) or greater from the viewer. From this location the WTGs appear as thin white lines in rows in the distance. The bright white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 27.9 mi (45 km) the thin form of the tips of the WTGs contrast with the blue sky but under cloudy conditions, would blend more with the sky, further diminishing contrast. It is anticipated that the WTGs will be visible after a brief glance in the direction of the Project. As such, the WTGs will create moderate visual contrast which corresponds to a Visibility Rating of 3. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears after a brief glance in the direction of the Project. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 3.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Naval Aviation Monument Park

The Naval Aviation Monument in Virginia Beach is located inside the Naval Aviation Monument Park near the Virginia Beach Boardwalk at the eastern terminus of 25th Street. The park is situated west of the Boardwalk, between two large hotel towers, and includes 9 bronze statues depicting early local naval history, World War II, and the modern day. It is surrounded by an assortment of shops and restaurants and is adjacent to the Marriott Hotel. This monument was officially dedicated in 2006, by the Hampton Roads Squadron of the Naval Aviation Foundation Association (viriginiabeach.com 2021c).

Existing View

This east-facing KOP view is located along the Virginia Beach Boardwalk, just north of Aviation Monument Park. Views from this location consist of flat, tan-colored beaches which, during the summer months, are packed with tourists and residents. From the elevated position of this KOP on the Boardwalk, the horizon remains nearly unbroken by beach umbrellas. No vegetation is present from this location. The Atlantic Ocean is visible from the middleground through the seldom seen distance zones, as are recreational/commercial vessels playing/traveling through the area. This KOP provides unobstructed views towards the WTGs, however, during off-peak times of the year the umbrellas and crowds will be absent from the foreground. Because the boardwalk is parallel to the beach, strolling boardwalk viewers would see the ocean in the periphery whereas beachgoers on the beach would view the ocean directly. Boardwalk viewers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents recreational users, residents, tourists, beachgoers, and people walking along the Boardwalk. Views towards the WTGs will be partially unobstructed by beachgoer activity during the peak season and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. Several elements compete for the viewer's attention at this location, including the boardwalk and activities of beachgoers. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.9 mi (45 km) or greater from the viewer. From this location the WTGs appear as thin grayish white lines in rows in the distance. The grayish white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 27.9 mi (45 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 2).

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Marriott Virginia Beach Oceanfront

The Marriott Virginia Beach Oceanfront Hotel is located just off the north end of the Virginia Beach Boardwalk between 40th and 42nd Streets, and is a part of The Cavalier Resort, with The Historic Cavalier Hotel across the street. The hotel has 305 guest rooms and suites, all with ocean views, as well as over 25,000 square feet of event space. The hotel includes a rooftop restaurant with hours generally from 11 am to 3:30 pm for lunch and 5 to 10 pm, except on Fridays and Saturdays when it is open until 11 pm for dinner (Marriott International 2021). Other local restaurants and bars, some with rooftop access, are within walking distance of this hotel.

Existing View

This hotel view is located just north of the north end of the Boardwalk. The landscape surrounding this location is characterized by dense urban development along the coastline with an assortment of restaurants, shops, and activities for tourists. Views from the oceanfront hotel rooms and rooftop are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are recreational/commercial vessels traveling through the area. This KOP provides unobstructed views toward the Lease Area. Because tourists are likely to look towards the ocean from hotel rooms and the rooftop, they would see towards the Lease Area. Tourists staying at the hotel are anticipated year-round to visit Virginia Beach, attend events, or for business.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of tourists staying at the hotel. Views towards the WTGs will be unobstructed and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTGs of the maximum representative WTGs will appear above the horizon, including the hub and a portion of the rotor swept diameter. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 28 mi (45 km) or greater from the viewer. From this location, under mostly clear conditions, the WTGs appear as thin white lines in rows in the distance, with overlapping turbines in rows causing more contrast. The white/gray color of the WTGs creates some contrast as the lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. When weather conditions are less than sunny and clear (e.g., fog, clouds), the WTGs will be less visible. At a distance of approximately 28 mi (45 km) the thin form of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will be plainly visible to casual observers, however, given the significant distance, their size will not dominate the landscape. As such, the WTGs will create moderate visual contrast which corresponds to a visibility rating of 4. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs appears similar to the maximum representative wind turbines in the landscape. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Grommet Island Park/Boardwalk

Grommet Island Park is a 15,000-square foot beach park and playground at the far southern terminus of the Virginia Beach Boardwalk, where the city center urban development transitions to primarily residential land uses to the south, across Owl Creek, which divides the beach. The playground highlights universally accessible playspaces: wheelchair-accessible entrances, poured-in-place surfacing, raised sand tables for sandcastle building at an accessible height, a sensory board for children who are autistic and visually impaired, and a sway boat. The playground also includes sculptural features such as dolphins, a surfboard, and a wave that are all fully accessible for children to pretend to ride the waves and swim with the dolphins. Wood polymer decking extends from the playground to accessible seating areas with an umbrella and hand-operated sand scoop designed to be used by a person in a wheelchair, allowing everyone access to play in the sand (City of Virginia Beach 2021a). The park is adjacent to public parking and restrooms along the boardwalk.

Existing View

This beach park view is located adjacent to the southern end of the Boardwalk near Rudee Inlet. The landscape surrounding this location is characterized by dense urban development including shops and restaurants. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point, however; views from the boardwalk are partially obscured by the play structure. Vegetation lines the parking lot and other linear features. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are recreational/commercial vessels traveling through the area. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to play on the structure or stroll along the boardwalk, they would see the ocean in the periphery whereas beachgoers would see the ocean directly. Residents are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that are accessing the park and beach from this location. Views towards the WTGs will be unobstructed and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. Several elements compete for the viewer's attention at this location, including the rock jutty at the start of Rudee Inlet. From this KOP only a portion of the WTGs of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of

approximately 27.7 mi (44.6 km) or greater from the viewer. From this location, under cloudy (raining) conditions, the WTGs appear as thin gray lines in rows in the distance. The gray-white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 27.7 mi (44.6 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the hub and blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 2.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Picnic Views on Beach

This viewpoint is along a picnic area near the beach near military residential areas within the State Military Reservation's 400-acre State Rifle Range which is on the Atlantic Ocean beach just south of Rudee Inlet. The residential neighborhood is a mixture of single-story, two-story, and multiple story residential housing and residential complexes. The military reservation and residential neighborhood includes mature trees surrounding residential homes and buildings with limited views towards the ocean. The landscape surrounding this location includes long sandy beaches along the coastline and the Atlantic Ocean.

Existing View

The landscape surrounding this location is characterized by moderately dense urban development along the coastline with wooded areas beyond the residential area which include the State Military Reservation. Views from the beach are unobstructed, however; views from nearby residential neighborhoods not directly in front of the beach are mostly obscured by existing development and mature trees. Some homes may have elevated views towards the ocean. Vegetation is scattered throughout the area surrounding individual homes. From this picnic area beach location, unobstructed views of the Atlantic Ocean can be seen. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones. This KOP provides unobstructed views toward the Lease Area. Residents are anticipated year-round whereas beachgoers (sunbathing, water sports) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents views of military personnel and military families that are accessing the beach from this location. Views towards the WTGs will be unobstructed and the portion of the maximum

representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. Several elements compete for the viewer's attention at this location, including the beach grasses surrounding the picnic benches. From this KOP only a portion of the turbines of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.7 mi (44.6 km) or greater from the viewer. From this location the WTGs are limited in visibility due to the gray color of the turbine blades which creates minimal contrast. When the blades are in motion, this may draw attention to the turbines. At a distance of approximately 27.7 mi (44.6 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 2. As seen in this simulation, under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will likely not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast and have a visibility rating of 2.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Back Bay National Wildlife Refuge/Little Island Park

Approximately 13 miles south of Virginia Beach, Back Bay National Wildlife Refuge provides fishing and crabbing. Little Island Park, just north of the refuge on the western border, is a 122-acre beach park in Sandbridge. The park has a 775-foot beach north of the 400-foot fishing pier for surfing and a 2,000-foot beach for swimming and fishing south of the pier (City of Virginia Beach 2021b, USFWS 2021b). The refuge is located adjacent to the Atlantic Ocean which a beach area, while the sand dunes lead to the road and the inland areas of the refuge.

Existing View

The landscape surrounding this location is characterized by sandy beaches and minimal development including hotels, apartment complexes, and parking areas along the coastline. Beyond the beach lies a marshy area that makes up the Back Bay National Wildlife Refuge. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point, however; views not directly on the beach are mostly obscured by roads and low-lying scrub/shrub. Vegetation is scattered throughout the area used as habitat for the protected areas. From this beach location, unobstructed views of the Atlantic Ocean can be seen, however, inland views will have partially obscured views towards the Lease Area. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones. This KOP provides unobstructed views toward the Lease Area. Because tourists and residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers

would see the ocean directly. Residents and hikers are anticipated year-round whereas beachgoers (sunbathing on the beach) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents, recreationalists, and tourists that are accessing the beach or refuge from this location. Views towards the WTGs will be unobstructed and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 26.8 mi (43.1 km) or greater from the viewer. From this location, under cloudy conditions, the WTGs appear as small white lines in the distance with brighter colored hubs. The white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 26.8 mi (43.1 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast and will be more difficult to view from the refuge when not located on the beach. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 2.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

North End Beach – Residential View 1

This residential beach view is taken from the beach adjacent to a strip of residential properties that are located between the Atlantic Ocean, beach, and First Landing State Park. The neighborhood is a mixture of single-story, two-story, and multiple story residential housing and residential complexes. Some residences have viewing decks on the roofs. The residential neighborhood includes mature trees surrounding residential homes. Each street dead-ends to a walkway allowing pedestrian beach access and views of the Atlantic Ocean. The landscape surrounding this location includes long sandy beaches along the coastline, the Atlantic Ocean, and the wooded First Landing State Park.

Existing View

The landscape surrounding this location is characterized by dense residential development along the coastline with a heavily wooded area beyond the residential area. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point,

however; views from residences not directly in front of the beach are mostly obscured by existing development and mature trees. Vegetation is scattered throughout the area surrounding individual homes. From this beach location, unobstructed views of the Atlantic Ocean can be seen. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are recreational/commercial vessels traveling through the area. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers would see the ocean. Residents are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that are accessing the beach from this location. Views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the hub up. WTGs located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 28.1 mi (45.2 km) or greater from the viewer. From this location, under clear conditions, the WTGs appear as thin white lines in rows in the distance. The bright white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. When weather conditions are less than sunny and clear (e.g., fog, clouds), the WTGs will be less visible. At a distance of approximately 28.1 mi (45.2 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 2.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

North End Beach – Residential View 1 (Nighttime)

See Beach Residential View 1, above, for a description of the general area.

Existing View

See North End Beach – Residential View 1 for a description of the general existing view during daylight.

View with the Project (Maximum Representative Wind Turbines)

A nighttime photographic simulation depicting the maximum representative WTG was prepared and is included in Attachment I-1-5. FAA lights on wind turbines where the nacelles are visible during the day would be visible during nighttime hours and would appear as a linear row of small red dots. The synchronized flashing of the FAA lights would attract viewers attention. However, FAA lights would only be visible for a portion of the wind turbines as WTGs located farther from the viewer begin to fall below the horizon. The FAA lights would be seen in the context of a dark night for approximately 28.1 mi (45.2 km). The FAA lights would add a new source of nighttime lighting, however, at this distance it is not likely to dominate the view. The maximum representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

View with the Project (Preferred Representative Wind Turbines)

From this location, the hub of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Virginia Beach Boardwalk – 17th Street Park

The Virginia Beach Boardwalk – 17th Street Park is along the Virginia Beach Boardwalk that extends parallel to the Atlantic Ocean. It is surrounded by urban development, including hotels and shops. The Virginia Beach Boardwalk is a 28-foot-wide boardwalk that runs parallel to the Atlantic Ocean and stretches 3 miles from 2nd to 40th Streets and features a separate bike path, ideal for strolling, rollerblading, and biking. Entertainment is offered nightly during the summer months and four oceanfront stages at this viewpoint and provides live musical acts. Along the boardwalk, there is a variety of outdoor restaurants and vendors offering bike and surrey rentals.

Existing View

The Virginia Beach Boardwalk – 17th Street Park is located along the boardwalk. The landscape surrounding this location is characterized by the open waters of the Atlantic Ocean, dense urban development along the coastline, multi-story hotels and apartment complexes, and multiple parks. Views from this location consist of flat, sandy beaches which, during the summer months, are packed with tourists and residents. During peak season, views from the entrance to the 17th Street Park location are partially unobstructed and dominated by rare open views of the Atlantic Ocean and large expansive beach areas lined with umbrellas. The horizon line remains the main focal point, however, it is broken by umbrellas in the foreground. No vegetation is present from this location. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are recreational/commercial vessels playing/traveling through the area. This KOP provides partially unobstructed views toward the Lease Area, however, during other times of the year the umbrellas and crowds will not be in the foreground. Because the boardwalk is parallel to the beach,

boardwalk viewers would see the ocean in the periphery whereas beachgoers on the beach would see the ocean. Boardwalk viewers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents recreational users, residents, and tourists, beachgoers, and people walking along the Boardwalk. Views towards the WTGs will be partially unobstructed during the peak season and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the hub up. Wind turbines located farther from the viewer begin to fall below the horizon. Several elements compete for the viewer's attention at this location, including the boardwalk and activities of beachgoers. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.8 mi (44.7 km) or greater from the viewer. From this location the WTGs appear as thin white pointed lines in rows in the distance. The bright white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 27.8 mi (44.7 km) the thin pointed form of the tips of the WTGs contrast with the blue sky but under cloudy conditions, would blend more with the sky, further diminishing contrast. It is anticipated that the WTGs will be plainly visible but does not strongly attract attention or dominate the view in the landscape. As such, the WTGs will create moderate visual contrast which corresponds to a Visibility Rating of 4. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbine Generators)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also plainly appears but does not dominate the view. As such, the Project will create moderate visual contrast and have a visibility rating of 4.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Virginia Beach Boardwalk – 16th Street Entrance (Nighttime)

The 16th Street Entrance to the Virginia Beach Boardwalk is a prominent access point, having a decorative pedestrian plaza leading from the city center to the boardwalk and offering a pedestrian connection to the beach. The Virginia Beach Boardwalk is a 28-foot-wide paved boardwalk that runs parallel to the Atlantic Ocean, stretching for 3 miles from 2nd to 40th Streets and features a separate bike path, ideal for strolling, rollerblading, and biking. It is surrounded by urban development, including hotels, restaurants, and shops. Entertainment is offered nightly during the summer months and four oceanfront stages at this viewpoint provide live musical acts. Along the boardwalk, there is a variety of outdoor restaurants and vendors offering bike and surrey rentals. This is a popular location at night and often has music events and other nighttime activities for tourists and residents.

Existing View

See for a representative location. See the 17th Street Park existing view for a description of the general existing view during daylight. During nighttime, there is still quite a bit of activity, people strolling along the beach and boardwalk, and existing light sources from the nearby boardwalk shops and hotels.

View with the Project (Maximum Representative Wind Turbines)

A nighttime photographic simulation depicting the maximum representative WTG was prepared and is included in Attachment I-1-5. FAA lights on wind turbines where the nacelles are visible during the day would be visible during nighttime hours and would appear as a linear row of small red dots. The synchronized flashing of the FAA lights would attract viewers attention. However, FAA lights would only be visible for a portion of the wind turbines as WTGs located farther from the viewer begin to fall below the horizon. The FAA lights would be seen in the context of a dark night for approximately 27.8 mi (44.7 km). The FAA lights would add a new source of nighttime lighting, however, at this distance it is not likely to dominate the view particularly with the existing light sources near the viewer. The maximum representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

View with the Project (Preferred Representative Wind Turbine Generators)

From this location, the hub of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Virginia Beach Boardwalk – Fishing Pier

The Virginia Beach Boardwalk – Fishing Pier is a fishing pier that extends perpendicular from the Virginia Beach Boardwalk into the Atlantic Ocean. It is surrounded by water and primarily used for fishing. The Virginia Beach Boardwalk is a 28-foot-wide boardwalk that runs parallel to the Atlantic Ocean and stretches 3 miles from 2nd to 40th Streets and features a separate bike path, ideal for strolling, rollerblading, and biking. Entertainment is offered nightly during the summer months and four oceanfront stages at 7th, 17th, and 24th, and 31st Streets provide live musical acts. Along the boardwalk, there is a variety of outdoor restaurants and vendors offering bike and surrey rentals.

Existing View

The fishing pier is located along the boardwalk. The landscape surrounding this location is characterized by open waters, dense urban development along the coastline, multi-story hotels and apartment complexes, and multiple parks. Views from this location consist of flat, sandy beaches along the coastline. Views from the fishing pier are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point. No vegetation is present from this location. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are recreational/commercial vessels traveling

through the area. This KOP provides unobstructed views toward the Lease Area. Because the boardwalk is parallel to the beach, boardwalk viewers would see the ocean in the periphery whereas beachgoers would see the ocean. Anglers on the pier likely would be more focused on the water. Boardwalk viewers and anglers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents recreational users, residents, and tourists, including anglers, beachgoers, and people walking along the Boardwalk. Views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the hub up. WTGs located farther from the viewer begin to fall below the horizon. Several elements compete for the viewer's attention at this location, including the boardwalk and activities of beachgoers. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.6 mi (44.4 km) or greater from the viewer. From this location the WTGs appear as thin white lines in rows in the distance. The bright white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 27.6 mi (44.4 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a Visibility Rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbine Generators)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast and have a visibility rating of 2.

Nighttime View with the Project (Maximum Representative Wind Turbines)

A nighttime photographic simulation depicting the maximum representative WTG was prepared and is included in Attachment I-1-5. FAA lights on wind turbines where the nacelles are visible during the day would be visible during nighttime hours and would appear as a linear row of small red dots. The synchronized flashing of the FAA lights would attract viewers attention. However, FAA lights would only be visible for a portion of the wind turbines as WTGs located farther from the viewer begin to fall below the horizon. The FAA lights would be seen in the context of a dark night for approximately 27.6 mi (44.4 km). The FAA lights would add a new source of nighttime lighting, however, at this distance it is not likely to dominate the view. The maximum representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

Nighttime View with the Project (Preferred Representative Wind Turbines)

From this location, the hub of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs will be plainly visible but is not likely to strongly attract visual attention. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 4.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Croatan Beach A

Croatan Beach is three quarters of a mile long and stretches from Rudee Inlet to Camp Pendleton in Virginia Beach. The Croatan Beach A viewpoint is a sandy beach located along the northern portion of the beach adjacent to residential development and Beach Park. This area is located near the northern surfing area beginning at Rudee Inlet. Lifeguard services are available for swimmers and surfers alike, and are situated along the entire beach front.

Existing View

The landscape surrounding this location is characterized by open waters, residential development, and Beach Park near Rudee Inlet. Views from this location consist of flat, sandy beaches along the coastline. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point. No vegetation is present from this location looking towards the ocean; however, scattered vegetation surrounds the nearby residential areas and beach park. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, and commercial vessels and surfing can also be seen at certain times. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers would see the ocean. Residents and surfers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents recreational users, residents, and tourists, including surfers, beachgoers, and people walking along the beach. Views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the hub up. WTGs located farther from the viewer begin to fall below the horizon. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.7 mi (44.6 km) or greater from the viewer. From this location, the WTGs closest to the viewer appear as thin grayish white lines in rows in the distance. The arrangement of the WTGs appears more ordered in a portion of the Lease Area, creating more contrast against the sky. At a distance of approximately 27.7 mi (44.6 km) the thin form of the tips of the WTGs will blend with the gray color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a Visibility Rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs

will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbine Generators)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast and have a visibility rating of 2.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Croatan Beach C

Croatan Beach is three quarters of a mile long and stretches from Rudee Inlet to Camp Pendleton in Virginia Beach. The Croatan Beach C viewpoint is located along the southern portion of the beach adjacent to the Croatan parking lot which can accommodate up to 505 parking spaces (City of Virginia Beach 2021c). One of two designated surfing areas is available along this beach, and this viewpoint is located near the southern surfing area near Camp Pendleton. Lifeguard services are available for swimmers and surfers alike, and are situated along the entire beach front.

Existing View

The landscape surrounding this location is characterized by open waters, residential development, and Camp Pendleton. Views from this location consist of flat, sandy beaches along the coastline. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point. No vegetation is present from this location looking towards the ocean; however, scattered vegetation surrounds the nearby residential areas and parking area. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are commercial vessels traveling through the area. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers would see the ocean. Residents and surfers are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This viewpoint primarily represents recreational users, residents, and tourists, including surfers, beachgoers, and people walking along the beach. Views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the hub up. WTGs located farther from the viewer begin to fall below the horizon. The Project will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 27.7 mi (44.6 km) or greater from the viewer. From this location, the WTGs closest to the viewer appear as thin white lines in rows in the distance. The arrangement of the WTGs appears more ordered in a portion of the Lease Area, creating more contrast against the sky. At a distance of approximately 27.7 mi (44.6 km) the thin form of the tips of the WTGs will blend with the gray color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate

feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a Visibility Rating of 2. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbine Generators)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast and have a visibility rating of 2.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

North Carolina

Table 2 provides a summary of the level of contrast (i.e., strong, moderate, weak, none) and visibility rating for each KOP in the North Carolina portion of the Offshore Study Area. Contrast Rating Worksheets for each KOP are located in Attachment I-1-4. The assessment results describing views with the Project implemented for each KOP are presented below.

Table 2. Summary of Contrast Rating of Key Observation Points in North Carolina for Offshore Project Components

KOP Name	Location	Distance to Nearest Project Component (mi [km])	Contrast Rating a/		Daytime/Nighttime Simulation Created for KOP b/
		14 MW and 16 MW WTG	14 MW WTG	16 MW WTG	
Currituck Beach Lighthouse	Currituck	36.8 (59.2)	Moderate	Moderate	Daytime
Currituck National Wildlife Refuge	Currituck	34.7 (55.8)	Weak	Weak	Daytime
Whale Head Bay Residential View 4	Currituck	36.6 (58.9)	Weak	Weak	Daytime
Whale Head Bay Albacore Street Entrance – Elevated	Currituck	39.1 (62.9)	Weak	Weak	Daytime

Notes:
a/ Visual Contrast Rating Worksheets for each KOP is included in Attachment I-1-4. Contrast Rating Worksheets for each KOP appear in the same order as they are listed in this table.
b/ Visual simulations are included in Attachment I-1-5.

Currituck Beach Lighthouse

The Currituck Beach Lighthouse is a 162-foot-tall lighthouse located in Corolla in the northern Outer Banks. The lighthouse's First Order Fresnel light, (the largest size available for American lighthouses), can be seen for 18 nautical miles as the light rotates in 20 second increments. The lighthouse stands out for its distinctive red exterior which was intentional allowing it to stand out from its Outer Banks neighbors. Adjacent to the lighthouse, a Victorian style lighthouse keepers' home was built in 1876, providing housing for the principal keeper's family and two assistants; families, however, the buildings are in disrepair. The grounds are open year-round the lighthouse is open seasonally, generally from early spring to late

November. The lighthouse still functions as a guide for passing mariners (Outerbanks.com 2021). The landscape surrounding the lighthouse consists of vegetated areas with the Atlantic Ocean in the distance.

Existing View

The landscape surrounding this location is characterized by vegetated areas and beaches lined with residential development. The lighthouse provides 360-degree unobstructed views. Views consist of level beaches with paved roads and patches of trees approximately 30 to 40 feet tall extending in the foreground to the Atlantic Ocean in the middleground, background, and seldom seen distance zones. Vegetation consists of thick dense patches of trees. Human-made modifications include residential development scattered throughout the area within the historic town of Corolla. Views towards the Lease Area are from an elevated location, are unobstructed and are dominated by the open expanse of the Atlantic Ocean, with the horizon line as a main focal point.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that are accessing the lighthouse from this location during early spring to late November. From this elevated viewpoint, views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the hub up. WTGs located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 36.8 mi (59.2 km) or greater from the viewer. From this location, under clear conditions, the WTGs appear as thin white lines in rows in the distance. The arrangement of the WTGs appears more ordered in the middle portion of the Lease Area, creating more contrast against the sky. The bright white color of the WTGs creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. When weather conditions are less than sunny and clear (e.g., fog, clouds), the WTGs likely will not be visible. At a distance of approximately 36.8 mi (59.2 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will be visible after a brief glance in the direction of the Project. As such, the WTGs will create moderate visual contrast which corresponds to a visibility rating of 3. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location. No views are anticipated from the lighthouse grounds due to the dense vegetation in the foreground.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears visible after a brief glance at the Project. As such, the Project will create moderate visual contrast which corresponds to a visibility rating of 3.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Currituck National Wildlife Refuge

Currituck National Wildlife Refuge is one of ten national wildlife refuges in eastern North Carolina. Those ten national wildlife refuges are all located in the watersheds of the Roanoke, Tar, Neuse, and Cape Fear rivers. Currituck National Wildlife Refuge provides opportunities for wildlife-oriented interpretation, outdoor recreation and environmental education focusing on the wildlife and habitats of the refuge. The refuge is open from sunrise to sunset. Beach refuge roads are the only roads open to four-wheel drive vehicles. Parking is allowed in designated parking areas only and no overnight parking is allowed USFWS 2021c). It serves as protected habitat for shorebirds and sea turtles across 4,570 acres of wetlands, beaches, and forests.

Existing View

The landscape surrounding this location is characterized by sandy beaches adjacent to the Atlantic Ocean and inland, the area becomes marshy with more scrub shrub type vegetation which makes it an ideal location of protected habitat. Minimal development occurs within this area, nearby includes some residential homes with sand roads (not paved). Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point, however; views not directly on the beach are mostly obscured by low-lying scrub/shrub and existing development outside of the refuge. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers would see the ocean directly. Nearby residents are anticipated year-round whereas beachgoers (sunbathing) with four-wheel drive are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that have access to four-wheel drive vehicles. Views towards the WTGs will be unobstructed and the portion of the maximum representative wind turbines that are closest to the viewer and visible above the horizon include view from the max tip. Wind turbines located farther from the viewer begin to fall below the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 34.7 mi (55.8 km) or greater from the viewer. From this location, under clear sky conditions, the WTGs appear as small faint white lines in the distance. The white color of the WTG blades creates some contrast as the thin lines of the WTGs appear to be floating out on the ocean, thereby drawing the viewers' attention. When the blades are in motion, this will further draw attention to the turbines. At a distance of approximately 34.7 mi (55.8 km) the thin form of the tips of the WTGs will blend with the light color of the sky, further diminishing contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 1. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 1.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Whale Head Bay Residential View 4

This residential beach view is taken from the beach adjacent to a strip of residential properties that are located between the Atlantic Ocean and the beach. The neighborhood is a mixture of single-story, two-story, and multiple story residential housing. Beyond the first row of residential houses which have direct views towards the Atlantic Ocean, are other houses scattered through the area along lines of mature patches of trees. Beach access is directly from the houses lined along the beach, and access is along several public roads for houses that are not directly adjacent to the beach allowing pedestrian beach access and views of the Atlantic Ocean. The landscape surrounding this location includes long sandy beaches along the coastline and the Atlantic Ocean.

Existing View

The landscape surrounding this location is characterized by residential development along the coastline with additional residential development inland, but surrounded by patches of mature trees. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point, however; views from residences not directly in front of the beach are mostly obscured by existing development and mature trees. Vegetation is scattered throughout the area surrounding individual homes. From this beach location, unobstructed views of the Atlantic Ocean can be seen. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are personal watercraft from nearby recreation users. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers would see the ocean. Residents are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents views of residents and tourists that are accessing the beach from this location. Views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the max tip. WTGs located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce new vertical elements into the viewscape along the horizon at a distance of approximately 36.9 mi (58.9 km) or greater from the viewer. From this location, under clear conditions, the WTGs appear as thin white lines in rows just over the horizon in the distance. The white color of the WTGs creates some contrast as the thin lines of the blades appear to be floating out on the ocean, however, the blades are very small and faint from this location. When the blades are in motion, this may draw attention to the turbines after extended viewing

of the area. When weather conditions are less than sunny and clear (e.g., fog, clouds), the WTGs will be less visible. At a distance of approximately 36.9 mi (58.9 km) the thin form of the tips of the blades will blend with the light color of the sky, further diminishing contrast to no contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 1. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear slightly above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 1.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

Whale Head Bay Albacore Street Entrance – Elevated

This residential beach view is taken at the end of a road with public access to the beach. Each road with access to the beach includes a slightly elevated mound, which is where this viewpoint is located. Residential properties are located on either side of the road between the Atlantic Ocean and the beach, and similar to Whale Head Bay Residential View 4, a row of houses lines the beach while inland other residential properties are scattered throughout. The neighborhood is a mixture of single-story, two-story, and multiple story residential housing. Beyond the first row of residential houses which have direct views towards the Atlantic Ocean, are other houses scattered through the area along lines of scattered trees and shrubs. Beach access is directly from the Albacore Street entrance as well as the houses lined along the beach. The landscape surrounding this location includes long sandy beaches along the coastline and the Atlantic Ocean.

Existing View

The landscape surrounding this location is characterized by residential development along the coastline with additional residential development inland, but surrounded by scattered trees and bushes. Views from the beach are unobstructed and dominated by the open expanse of the Atlantic Ocean with the horizon line as the main focal point, however; views from residences not directly in front of the beach are mostly obscured by existing development and vegetation. Vegetation is scattered throughout the area surrounding individual homes. From this slightly elevated beach location, unobstructed views of the Atlantic Ocean can be seen. The Atlantic Ocean is visible from the foreground through the seldom seen distance zones, as are personal watercraft from nearby recreation users. This KOP provides unobstructed views toward the Lease Area. Because residents are likely to stroll along the beach, they would see the ocean in the periphery whereas beachgoers would see the ocean. Residents are anticipated year-round whereas beachgoers (sunbathing) are likely more prominent in the summer months.

View with the Project (Maximum Representative Wind Turbines)

This KOP primarily represents slightly elevated views of residents and tourists that are accessing the beach from this location. Views towards the WTGs will be unobstructed and the portion of the maximum representative WTGs that are closest to the viewer and visible above the horizon include view from the max tip. WTGs located farther from the viewer begin to fall below the horizon. From this KOP only a portion of the WTG blades of the maximum representative WTGs will appear above the horizon. The WTGs will introduce several new vertical elements into the viewscape along the horizon at a distance of approximately 39.1 mi (62.9 km) or greater from the viewer. From this location, under clear conditions, the WTGs appear as thin white lines just over the horizon in the distance. The white color of the WTGs creates some contrast as the thin lines of the blades appear to be floating out on the ocean, however, the blades are very small and faint from this location. When the blades are in motion, this may draw attention to the turbines after extended viewing of the area. When weather conditions are less than sunny and clear (e.g., fog, clouds), the WTGs will be less visible. At a distance of approximately 39.1 mi (62.9 km) the thin form of the tips of the blades will blend with the light color of the sky, further diminishing contrast to no contrast. Therefore, it is anticipated that the WTGs will appear as a subordinate feature in the landscape. As such, the WTGs will create weak visual contrast which corresponds to a visibility rating of 1. Under some atmospheric conditions, such as haze or fog, the visibility of the WTGs will be reduced and, in some instances, will not be visible and would create no visual contrast. The Offshore Substations will not be perceived from this location.

View with the Project (Preferred Representative Wind Turbines)

From this location, the blades of the WTG structure of the preferred representative WTGs will appear above the horizon. The preferred representative WTGs also appears as a subordinate feature in the landscape. As such, the Project will create weak visual contrast which corresponds to a visibility rating of 1.

Simulations representing views of the preferred representative turbines from this location are included in Attachment I-1-5.

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