



Kitty Hawk Wind



Construction and Operations Plan

Chapter 6 - Cultural Resources

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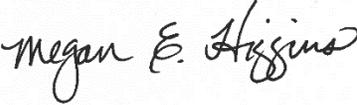
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COP – Chapter 6: Cultural Resources

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Table of Contents

Table of Contents	1	
Table of Figures	2	
Table of Tables	2	
Abbreviations & Definitions	3	
6	CULTURAL RESOURCES	4
6.1	Marine Archaeological and Cultural Resources	4
6.1.1	Affected Environment	5
6.1.2	Impacts Analysis for Construction, Operations, and Decommissioning	7
6.2	Terrestrial Archaeological and Cultural Resources	10
6.2.1	Affected Environment	10
6.2.2	Impacts Analysis for Construction, Operations, and Decommissioning	13
6.3	Aboveground Historic Resources	16
6.3.1	Affected Environment	16
6.3.2	Impacts Analysis for Construction, Operations, and Decommissioning	22
6.4	Visual Resources	33
6.4.1	Affected Environment	33
6.4.2	Impacts Analysis for Construction, Operations, and Decommissioning	36
6.5	References	42
6.5.1	Marine Archaeological and Cultural Resources	42
6.5.2	Terrestrial Archaeological and Cultural Resources	42
6.5.3	Aboveground Historic Resources	43
6.5.4	Visual Resources	44

Table of Figures

Figure 6.1-1	Illustration of Scour Protection for Monopile Foundation	6
Figure 6.3-1	Offshore Viewshed PAPE	19
Figure 6.3-2	Onshore Viewshed PAPE	20
Figure 6.3-3	Historic Properties within Offshore Viewshed PAPE	25
Figure 6.3-4	Historic Properties within Each Onshore Viewshed PAPE	26
Figure 6.4-1	Visual Study Area for the WTG Layout	34
Figure 6.4-2	Key Observation Points	37

Table of Tables

Table 6.1-1	Representative Footprint(s) of Seabed Disturbing Offshore Activities and Facilities within the Offshore PAPE	5
Table 6.2-1	Terrestrial Archaeological PAPE	11
Table 6.3-1	Historic Property Data within the Offshore Viewshed PAPE	23
Table 6.3-2	Historic Property Data within the Onshore Viewshed PAPE	24
Table 6.3-3	Summary of Historic Property Visibility within the Offshore Viewshed PAPE	29
Table 6.3-4	Summary of Historic Property Visibility within the Onshore Viewshed PAPE	31
Table 6.4-1	Key Observation Points	38
Table 6.5-1	Data Sources	42

Abbreviations & Definitions

Acronym	Definition
APE	area of potential effects
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
COP	Construction and Operations Plan
ESP	electrical service platform
HRG	high-resolution geophysical
km	kilometer
KOP	Key Observation Point
Lease Area	designated Renewable Energy Lease Area OCS-A 0508
m	meter
NCHPO	North Carolina State Historic Preservation Office
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PAPE	preliminary area of potential effects
Project	the Kitty Hawk North Wind Project
QMA	Qualified Marine Archaeologist
ROW	right-of-way
SHPO	State Historic Preservation Office
the Company	Kitty Hawk Wind, LLC
VDHR	Virginia Department of Historic Resources
VSA	Visual Study Area
Wind Development Area	approximately 40 percent of the Lease Area in the northwest corner closest to shore (19,441 hectares)
WTG	wind turbine generator

6 CULTURAL RESOURCES

Cultural resources include archaeological sites, historic standing structures, objects, districts, and traditional cultural properties that illustrate or represent important aspects of prehistory (before circa Anno Domini 1600) or history (after circa Anno Domini 1600) or that have important and long-standing cultural associations with established communities or social groups. Significant archaeological and architectural properties are generally defined by the eligibility criteria for listing on the National Register of Historic Places (NRHP), which include age (generally over 50 years old), integrity, and historical significance.

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 United States Code § 470f) requires that, when projects require federal permits, receive federal funding, or occur on federal lands, the lead federal agency must consult with the appropriate state historic preservation office (SHPO) and interested Native American Tribes to consider the effects of a project to cultural resources.

In 2014, the Bureau of Ocean Energy Management (BOEM) executed a Programmatic Agreement with the North Carolina State Historic Preservation Officer (NCHPO) and the Advisory Council on Historic Preservation to formalize agency jurisdiction and coordination of the review of offshore renewable energy development regarding historic and cultural resources (BOEM 2014). The Programmatic Agreement recognized that issuing renewable energy leases on the Outer Continental Shelf constituted an “undertaking” subject to Section 106 of the NHPA. BOEM, as the lead federal agency for the review of the Construction and Operations Plan (COP), has the authority to initiate consultations with the Virginia Department of Historic Resources (VDHR), the NCHPO, the Advisory Council on Historic Preservation, and federally recognized Native American Tribes. These consultations will identify the offshore and onshore area of potential effects (APE) and potential impact-producing factors to archaeological, architectural, or other cultural resources listed on, or are potentially eligible for listing on, the NRHP. An APE, as defined by 36 Code of Federal Regulations (CFR) § 800.16(d), is “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.”

6.1 Marine Archaeological and Cultural Resources

This section describes the marine archaeological and cultural resources within and surrounding the offshore review area, which includes approximately 40 percent of the designated Renewable Energy Lease Area OCS-A 0508 (Lease Area) in the northwest corner closest to shore (19,441 hectares; the Wind Development Area) and the offshore export cable corridor. Potential impacts to marine archaeological and cultural resources resulting from construction, operations, and decommissioning of the Kitty Hawk North Wind Project (Project) are discussed. Avoidance and minimization measures proposed by Kitty Hawk Wind, LLC (the Company) are also described in this section.

Other assessments detailed within this COP that are related to marine archaeological and cultural resources include:¹

- Marine Site Investigation Report (Appendix K); and
- Marine Archaeological Resources Assessment (Appendix X).
- Section 106 Supporting Materials (Appendix GG)

For the purposes of this section, the review area includes the offshore Project components and the areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project.

¹ Terrestrial archaeological resources are discussed separately in Section 6.2 and Appendix Y.

1 This section was prepared in accordance with 30 CFR § 585.626(a)(5), 30 CFR § 585.627(a)(6), BOEM's
 2 *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585*
 3 *(BOEM 2020)* and the *Programmatic Agreement Among the U.S. Department of the Interior, Bureau of*
 4 *Ocean Energy Management; North Carolina State Historic Preservation Officer; and the Advisory Council*
 5 *on Historic Preservation Regarding Review of Outer Continental Shelf Renewable Energy Activities Under*
 6 *Section 106 of the National Historic Preservation Act (BOEM 2014)* to support BOEM's National
 7 Environmental Policy Act and NHPA review of the COP. A full marine archaeological analysis, including
 8 review of geophysical and geotechnical survey methods and data analysis, developed with the assistance
 9 of a Qualified Marine Archaeologist (QMA), is provided in Appendix X Marine Archaeological Resources
 10 Assessment.

11 Additional background data to supplement this analysis was obtained from the following sources:

- 12 • Global GIS Data Services, LLC, Global Maritime Wrecks Database;
- 13 • National Oceanic and Atmospheric Administration Automated Wreck and Obstruction Information
- 14 System;
- 15 • National Oceanic and Atmospheric Administration Electronic Navigation Charts Database;
- 16 • Engagement with the VDHR, which acts as the SHPO;
- 17 • Virginia Cultural Resources Information System, a digital repository of recorded cultural resource
- 18 surveys and sites maintained by VDHR;
- 19 • NCHPO's GIS Database; and
- 20 • BOEM's *Commercial Wind Lease Issuance and Site Assessment Activities on the Outer*
- 21 *Continental Shelf Offshore North Carolina: Revised Environmental Assessment (2015)*.

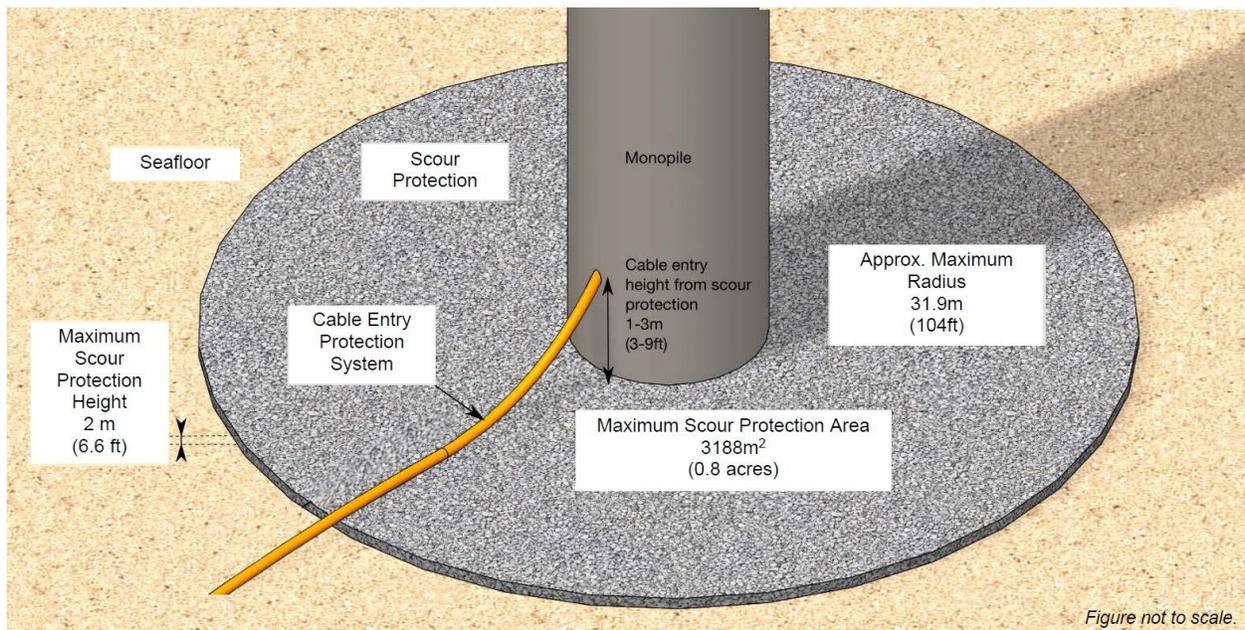
22 **6.1.1 Affected Environment**

23 The affected environment, with regard to marine archaeological and cultural resources, is referred to as the
 24 offshore preliminary area of potential effects (PAPE). The offshore PAPE is defined as the entire Wind
 25 Development Area and the offshore export cable installation corridor. Areas and depths of disturbance for
 26 individual Project components within the offshore PAPE are described in Table 6.1-1. An illustrative diagram
 27 of foundation scour protection is shown in Figure 6.1-1.

28 **Table 6.1-1 Representative Footprint(s) of Seabed Disturbing Offshore Activities and Facilities**
 29 **within the Offshore PAPE**

Project Component	Maximum Horizontal Area of Disturbance	Maximum Depth of Disturbance (meters)
WTG and ESP foundations	30.9 hectares a/	95 b/
Monopile foundation (long-term)	Diameter: 63.7 m 3,188 m ² c/	55
Piled jacket foundation (long-term)	Diameter: 13.3 m (per leg) 557 m ² c/ d/	95
Suction caisson jacket (long-term)	Diameter: 36.7 m (per leg) 3,848 m ² c/	18
All foundation types (temporary vessel impacts)	1,200 m ² e/	10
Inter-array cables	240 km (length) x 100 m (width) f/ 2,400 hectares	2.5 (trench) g/ 3 (vessels) h/
Offshore export cables	80 km (length) x 810 m (width) i/ 6,480 hectares	2.5 (trench) g/ 3 (vessels) h/

Project Component	Maximum Horizontal Area of Disturbance	Maximum Depth of Disturbance (meters)
Horizontal directional drilling	910 m (length) x 810 m (width) j/	25 k/
<p>Notes:</p> <p>a/ Based on temporary and long-term impacts for 67 monopile foundations and three suction caisson jacket foundations, representing a total of 69 wind turbine generators (WTGs) and one electrical service platform (ESP), with maximum scour protection</p> <p>b/ Based on 3- or 4-legged piled jacket foundations</p> <p>c/ Per foundation if scour protection is required</p> <p>d/ Based on 4-legged foundation</p> <p>e/ Per foundation, in addition to area of long-term impact. Area is inclusive of the seabed clearance and installation vessel jacking and/or anchoring performed by jack-up vessels with up to six legs and/or anchored installation barges with a maximum 8-point anchor spread. Temporary impacts from construction will be within the Wind Development Area portion of the offshore PAPE</p> <p>f/ Assumes 100-m-wide installation corridor, inclusive of installation vessel jacking and/or anchoring</p> <p>g/ Below stable seabed elevation</p> <p>h/ Maximum depth of installation vessel jacking and/or anchoring</p> <p>i/ Assumes 810-m-wide installation corridor to allow for optimal routing of the cables, inclusive of installation vessel jacking and/or anchoring</p> <p>j/ Horizontal directional drilling activities will occur within the offshore export cable installation corridor. Length is measured from the onshore landfall area seaward</p> <p>k/ Maximum depth of disturbance is based on a target horizontal directional drilling depth of 18 m. Anticipated landfall design is shown in Appendix H Sandbridge Export Cable Landfall Conceptual Design Study</p>		



1

2 **Figure 6.1-1 Illustration of Scour Protection for Monopile Foundation**

3 In accordance with BOEM regulations and guidance, the Project’s offshore PAPE has been thoroughly
 4 analyzed and assessed by the QMA, with the results detailed in Appendix X Marine Archaeological
 5 Resource Assessment.

6 The QMA’s assessment includes an analysis of potential cultural resources sitting on top of the seafloor,
 7 as well as partially or fully buried items. The QMA also assessed buried geomorphic features of
 8 archaeological interest that could represent paleolandscapes with traditional religious and cultural
 9 importance. The assessment also includes a literature review and background research in order to

1 understand the environmental and cultural contexts of the region and to determine the potential for
2 undiscovered archaeological sites within the PAPE. Additionally, the QMA analysis includes a full marine
3 archaeological resources assessment, utilizing data from high-resolution geophysical (HRG) survey
4 campaigns, including multibeam echosounder, side scan sonar, sub-bottom profiler, magnetometer, and
5 geotechnical investigation data. The HRG survey plans were developed in coordination with the QMA in
6 order to ensure that data collection methods will provide valid and comprehensive data for the QMA to use
7 during the marine archaeological analysis. For additional details on HRG survey plans, see Section 4.1
8 Physical and Oceanographic Conditions.

9 Marine cultural resources that may be located off of the Atlantic east coast could include resources dating
10 from the pre-contact to historic periods. Potential exists for pre-contact submerged cultural resources in the
11 PAPE given the pre-contact occupation of the once-exposed North Carolina Outer Continental Shelf.
12 Historic marine cultural resources that are commonly found on the seabed include shipwrecks and related
13 debris, such as anchors. As with many developed shorelines, the Project is located in a region with a
14 longstanding history of fishing and marine uses. The North Carolina Environmental Assessment made a
15 Finding of No Historic Properties Affected for the issuance of commercial leases in the North Carolina Wind
16 Energy Areas based on existing and available information. However, the Environmental Assessment noted
17 that reported shipwrecks in the Atlantic Shipwreck Database include 16 possible sites within and
18 surrounding the Kitty Hawk Wind Energy Area (BOEM2015). Reconnaissance-level archaeological surveys
19 conducted by the National Oceanic and Atmospheric Administration's Office of Marine Sanctuaries and
20 BOEM, which covered approximately half of the Lease Area, identified 15 side scan sonar targets, several
21 of which were further analyzed through diver investigations (Carrier et al. 2017). The QMA completed an
22 archaeological desktop review prior to the 2019 reconnaissance level HRG survey and preliminarily
23 identified 26 reported shipwrecks listed in databases within 1.0 mile of the survey area, which included the
24 Lease Area and offshore export cable corridor, as well as a number of potential historic shipwrecks reported
25 in the region by primary and secondary sources. The HRG survey campaigns fully assessed the review
26 area.

27 6.1.2 Impacts Analysis for Construction, Operations, and Decommissioning

28 The potential impact-producing factors resulting from the construction, operations, and decommissioning
29 of the Project are based on the maximum design scenario from the Project Design Envelope (see Chapter
30 3 Description of Proposed Activity). The maximum vertical depth of effect for marine archaeological and
31 cultural resources is represented by 3- or 4-legged piled jacket foundations, whereas the maximum
32 horizontal area of effect is represented by 67 monopile foundations and three suction caisson jacket
33 foundations with maximum scour protection, representing a total of 69 wind turbine generators (WTGs) and
34 one electrical service platform (ESP).

35 Additionally, the maximum design scenario includes the maximum burial depth and width of the installation
36 corridor for the inter-array and offshore export cables. A Summary of Applicant-Proposed Avoidance,
37 Minimization, and Mitigation Measures is provided in Appendix FF.

38 6.1.2.1 Construction

39 During construction, the potential impacts to marine archaeological and cultural resources may include the
40 following:

- 41 • Disturbance to submerged marine archaeological and cultural resources.

42 **Disturbance to submerged marine archaeological and cultural resources.** Disturbance to submerged
43 marine archaeological and cultural resources may occur as a result of disturbance to the seabed during
44 installation of the offshore components of the Project. Offshore components, which have the potential to
45 disturb submerged resources during installation activities, include the WTGs and ESP foundations and
46 associated scour protection, as well as installation of the inter-array and offshore export cables. Additionally,

1 there is potential for disturbance to submerged marine archaeological and cultural resources from Project
2 equipment, such as the anchoring of installation vessels or the legs of jack-up vessels. Sediment
3 suspension and deposition as a result of cable installation may temporarily settle on the seafloor and further
4 impact submerged marine archaeological and cultural resources. However, suspended sediments would
5 settle close to the offshore export cable trench following cable installation; modeled deposition thicknesses
6 were less than 4 centimeters within 25 m of the trench centerline and less than 0.05 centimeters within 150
7 m of the trench centerline (Appendix M Sediment Transport Modeling Report). Disturbance to submerged
8 marine archaeological and cultural resources will be avoided to the extent practicable through the thorough
9 analysis of the review area conducted by the QMA and adherence to the resulting recommended avoidance
10 buffers. Disturbance to known resources that cannot practicably be avoided would only occur with
11 appropriate consultations and approvals. Additional archaeological investigation of resources that cannot
12 be avoided may be needed in order to determine whether or not they are historic properties and to fully
13 assess Project effects. Furthermore, the Company will develop and implement an Unanticipated
14 Discoveries Protocol to avoid and mitigate impacts to unknown resources.

15 As described above, a marine survey contractor collected HRG data across the entire PAPE in 2019 and
16 2020 following BOEM archaeological survey guidelines and the Project's QMA data transfer protocol.
17 Material recovered from 13 geotechnical boreholes collected for engineering purposes across the Wind
18 Development Area were submitted for radiocarbon dating to assist in the characterization of the
19 paleolandscapes and delineation of geomorphic features of archaeological interest. The marine
20 archaeological resources assessment of the HRG data within the PAPE identified three potential
21 submerged cultural resources (Targets 01–03) within the gradiometer, side-scan sonar, and/or multibeam
22 echosounder datasets, all of which are located within the offshore export installation cable corridor. Target
23 01 appears to represent a shipwreck in the side-scan sonar imagery and is tentatively identified as the
24 historic shipwreck Elizabeth, a German cargo ship that foundered in a storm in 1887. Target 02 depicts
25 debris resembling anchor chain in the side-scan sonar imagery that could be related to a historic shipwreck.
26 Target 03 consists of a magnetic anomaly that shares characteristics with verified shipwreck magnetic
27 signatures and, therefore, may represent a buried shipwreck. The QMA recommends avoidance of these
28 targets by a minimum distance of 100 m (328 ft) around Target 01, and a buffer of 50 m (164 ft) around the
29 outer extents of the Targets 02 and 03 magnetic anomalies or acoustic contacts.

30 HRG data identified 21 geomorphic features of archaeological interest within the PAPE, 14 within the Wind
31 Development Area and 7 within the offshore export installation cable corridor, which represent relict channel
32 margins that may have been subaerially exposed and available for past human use. The features possess
33 archaeological potential; however, no direct evidence of associated human occupation has been
34 documented in the HRG or geotechnical data. The features, therefore, represent portions of buried
35 landscapes that may be of cultural significance to Native American communities. The QMA recommends
36 avoidance of these features where practicable. For targets or features that cannot be avoided by Project
37 impacts, the QMA, in consultation with the Company, has developed a Historic Properties Treatment Plan
38 with recommended actions to minimize and/or mitigate effects to those resources (Appendix GG Section
39 106 Supporting Materials). Government to government consultation between BOEM and consulting Tribes
40 under Section 106 of the NHPA will further assist in the identification of, assessment of effects to, and
41 mitigation measures for landscapes potentially eligible for listing in the NRHP.

42 **6.1.2.2 Operations and Maintenance**

43 During operations, the potential impacts to marine archaeological and cultural resources may include the
44 following:

- 45 • Disturbance to submerged marine archaeological and cultural resources.

46 **Disturbance to submerged marine archaeological and cultural resources.** Disturbance to submerged
47 marine archaeological and cultural resources may occur as a result of seabed disruption during operations

1 and maintenance activities within the review area (i.e., activities involving repair vessels anchoring and
2 submarine cable repairs). However, repairs and other future activities will only occur within previously
3 disturbed portions of the review area which have been previously assessed by the QMA, such as the
4 offshore export cable corridor and existing WTG and ESP locations. Therefore, adherence to the QMA
5 recommended avoidance buffers will still be in effect, and no submerged resources are anticipated to be
6 disturbed.

7 **6.1.2.3 Decommissioning**

8 Impacts resulting from the decommissioning of the Project are expected to be similar or less than those
9 experienced during construction. Decommissioning techniques are further expected to advance during the
10 useful life of the Project. A full decommissioning plan will be provided to BOEM for approval prior to
11 decommissioning activities, and potential impacts will be re-evaluated at that time.

6.2 Terrestrial Archaeological and Cultural Resources

This section describes the archaeological and cultural resources located within and surrounding the onshore Project Area. The onshore Project Area includes the export cable landfall, onshore export cable installation corridors, onshore substation site, and any temporary or permanent construction or staging areas (specific to this resource). Potential impacts to terrestrial archaeological and cultural resources resulting from construction, operations, and decommissioning of the Project are discussed. Avoidance, minimization, and mitigation measures proposed by the Company are also described in this section.

Other assessments detailed within this COP that are related to terrestrial archaeological and cultural resources include:²

- Phase IA Cultural Resources Sensitivity Assessment Report, Phase IB Archaeological Survey Report, and Phase II Archaeological Investigation Report (Appendix Y); and
- Section 106 Supporting Materials (Appendix GG).

For the purposes of this section, the review area includes the onshore Project components and associated areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project.

This section was prepared in accordance with 30 CFR § 585.627(a)(6) to support BOEM's National Environmental Policy Act review of and NHPA Section 106 consultation related to the COP.

Data required to complete this analysis was obtained from the following sources:

- Engagement with the VDHR, which acts as the SHPO;
- Virginia Cultural Resources Information System, a digital repository of recorded cultural resource surveys and sites maintained by VDHR; and
- Phase IA Cultural Resources Sensitivity Assessment Report, Phase IB Archaeological Survey Report, and Phase II Archaeological Investigation Report (Appendix Y).

6.2.1 Affected Environment

When discussing archaeological and cultural resources, the affected environment is referred to as the APE. The APE, as defined by 36 CFR § 800.16(d), is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." For the purposes of this section, the PAPE, or review area, will be referred to as the Terrestrial Archaeological PAPE. As stated above, the Terrestrial Archaeological PAPE includes the depth and breadth of terrestrial areas potentially impacted by ground disturbing activities related to the construction, operations, and decommissioning of onshore Project components (see Table 6.2-1).

A Phase IA Cultural Resources Sensitivity Assessment was conducted for the Terrestrial Archaeological PAPE by SEARCH, Inc. in September and October 2019 for the western route option and onshore substation site (Appendix Y). The assessment consisted of pedestrian reconnaissance, a review of relevant archaeological and historical literature, a review of historical cartographic resources, and a review of Virginia Cultural Resources Information System data. The Phase IA assessment evaluated the potential impacts to archaeological resources that might result from construction, operations, and decommissioning of the Project. It determined that the western route option onshore export cable corridor extends through areas of low, moderate, and high sensitivity for archaeological resources. A Phase IB archaeological survey was recommended for the proposed onshore substation site and sections of the onshore export cable corridor that would not be collocated within existing roadways and utility corridors. Archaeological

² Marine archaeological and cultural resources are discussed separately in Section 6.1 and Appendix X; aboveground historic resources are discussed in Section 6.3 and Appendix Z.

1 monitoring during construction onshore at the export cable landfall and during installation of the onshore
 2 export cables was also recommended in the Phase IA.

3 **Table 6.2-1 Terrestrial Archaeological PAPE**

Project Component	Maximum Horizontal Area of Disturbance	Maximum Depth of Disturbance
Cable landfall	1.0 hectare a/	25 m b/
Onshore export cable installation area	9.2 km (length) x 30 m (width, underground) or 46 m (width, overhead) 32.6 hectares	7.5 m c/ 17 m (crossing of Asheville Bridge Creek)
Onshore substation and switching station	13.1 hectares	18 m

Notes:
 a/ The area of disturbance associated with cable landfall is included in the offshore PAPE, as described in Section 6.1.1. Horizontal directional drilling activities, including staging, will occur within the parking lot along the public ROW for Sandbridge Road.
 b/ Maximum depth of disturbance is based on a target horizontal directional drilling depth of 18 m. Anticipated landfall design is shown in Appendix H Sandbridge Export Cable Landfall Conceptual Design Study.
 c/ Splice vaults may be required along the onshore export cable route, which would have a maximum depth of up to 7.5 m. As the exact locations of splice vaults are not known, this depth is assumed as the maximum for the entire route, with the exception of a potential trenchless crossing of Asheville Bridge Creek, which may be up to 17 m.

4
 5 In August of 2020, SEARCH, Inc. conducted a Phase IB archaeological survey in accordance with an
 6 approved survey plan (Phase IB Archaeological and Aboveground Historic Resources Survey Protocol,
 7 dated June 2020) at the proposed onshore substation site and along portions of the onshore export cable
 8 corridors³ that were not collocated with existing roadways and utility corridors. The following subsections
 9 provide a synopsis of the results and recommendations provided in the Phase IA Cultural Resources
 10 Sensitivity Assessment (Appendix Y), the Phase IB Archaeological Survey Report, the Phase IB
 11 Archaeological Survey Addendum Report, and the Phase II Investigation of 44VB0430 and 44VB0431
 12 Report (Appendix Y). During additional Phase IB fieldwork completed in August of 2022 two additional
 13 archaeological sites were identified and initially reported in the Phase IB Archaeological Survey Addendum
 14 Report. In that report, these two sites (Resource 4 and Resource 5) were recommended for avoidance, or
 15 if avoidance is not possible, Phase II investigation. Phase II investigation of these two sites would take
 16 place once a Phase II Research Design can be reviewed and approved by BOEM and VDHR.

17 **6.2.1.1 Cable Landfall**

18 Onshore Project components were sited to avoid the use of undeveloped land and maximize the use of
 19 previously disturbed lands to the extent practicable. The export cable landfall is located within a parking lot
 20 at the eastern terminus of the public right-of-way (ROW) for Sandbridge Road, where the road meets
 21 Sandbridge Beach in the City of Virginia Beach, Virginia. A parking lot located just south of the public ROW
 22 for Sandbridge Road (near Sandbridge Beach) will serve as the temporary construction staging and
 23 operations area.

24 A review of Virginia Cultural Resources Information System data, conducted as part of the Phase IA
 25 assessment, did not identify any previously recorded cultural resource surveys or archaeological sites at
 26 the landfall. Pedestrian reconnaissance of the landfall during the Phase IA assessment and Phase IB

³ The onshore export cable corridors assessed in the Phase IB cover the routes originally described in the COP; however, the segments and naming of these routes has changed. These routes are the Sandbridge route (formerly referred to as the eastern route with a deviation down General Booth Boulevard to the onshore substation site), the western route option (which is a combination of the western route and western route General Booth option, entering the onshore substation site from the southeast), and the Sandbridge route Corporate Landing option (which is the former eastern route). The Sandbridge route Corporate Landing option has since been removed the Project Design Envelope.

1 survey did not identify any cultural resources at the landfall. Given the presence of the existing parking lot,
2 there is no potential for near surface archaeological deposits. However, the depth of the disturbance to
3 construct the parking lot is unknown. No subsurface investigations were undertaken during the Phase IB
4 investigation due to the lack of suitable surface conditions to allow for shovel testing.

5 **6.2.1.2 Onshore Export Cable Corridors**

6 The onshore export cable corridor contains eight archaeological resources. Six of these were identified by
7 five previous surveys, while two were identified by the Phase IB survey in support of the Project. The five
8 previous cultural resource surveys directly overlap with the Sandbridge route and western route option
9 onshore export cable corridors. The six archaeological resources identified during these surveys are within
10 or immediately adjacent to the onshore export cable corridors. These sites are 44VB0120, 44VB0123,
11 44VB0281, 44VB0380, 44VB0291, and one resource that has not been assigned a site number.

12 The Phase IB survey of the proposed Sandbridge route and western route option⁴ onshore export cable
13 corridors was undertaken in August 2020, and additional survey was completed in August 2022. Following
14 a review of the 2019 Commonwealth Heritage Group technical report documenting surveys that were
15 undertaken following completion of the Phase IA assessment, it was determined that the only portions of
16 the onshore export cable corridors that were not previously subject to cultural resources survey or disturbed
17 should be subject to subsurface testing. Subsurface investigation of these locations identified two
18 archaeological resources of undetermined NRHP-eligibility. These two sites are referred to as Resource 4
19 and Resource 5 in the Phase IB Archaeological Survey Addendum Report, and have been recommended
20 for avoidance, or Phase II Investigation if avoidance by the Project is not possible (Appendix Y Phase IA
21 and IB Archaeological Survey Reports).

22 The Stone Family Cemetery (44VB0380) was revisited during the Phase IB investigation but was not
23 evaluated as part of the survey technical report (Appendix Y Phase IA and IB Archaeological Survey
24 Reports). SEARCH, Inc. recommends the proposed Project components avoid the Stone Family Cemetery
25 by a minimum of 15 m. The Stone Family Cemetery is included in the Avoidance and Monitoring Plan
26 (Attachment A to Appendix Y Phase IB Archaeological Survey Report).

27 The site identified by the Commonwealth Heritage Group that has not been assigned a site number was
28 not revisited during the Phase IB survey, as property access was not granted. This site is located near the
29 public ROW for Sandbridge Road within a portion of the onshore export cable corridor that may utilize
30 overhead or underground transmission lines.

31 Due to past disturbances, portions of previously recorded sites 44VB0120, 44VB0123, 44VB281, and
32 44VB291 are not anticipated to extend within the Terrestrial Archaeological PAPE. However, due to the
33 archaeologically sensitive nature of the area and the unknown extent of disturbance caused by pavement
34 installation along the thoroughfares contained within the Terrestrial Archaeological PAPE, SEARCH, Inc.
35 recommends that the onshore export cable installation be monitored by a qualified archaeologist during the
36 construction.

37 **6.2.1.3 Onshore Substation Site**

38 Based on background research and pedestrian reconnaissance, the onshore substation site has remained
39 intact despite being surrounded by sprawling suburban development. The site contains some surficial
40 evidence of disturbance, but is located in a high probability area for the presence of pre-contact period
41 archaeological sites. The proposed onshore substation and switching station are also located within an
42 area that was considered to possibly contain historic-period archaeological sites. A farmstead dating from
43 1780 (or earlier) was identified during the cartographic review in the general vicinity of the onshore
44 substation site (Appendix Y Phase IA and IB Archaeological Survey Reports). Due to the inherent

⁴ Referred to in the Phase IB as the eastern route, the western route, and the combined onshore export cable route.

1 inaccuracy of georeferencing from a hand-drawn, eighteenth-century map, there is a high potential for
2 structural remains or an affiliated archaeological assemblage to be located within the onshore substation
3 site. Given the high potential for pre-contact and historic-period archaeological resources, it was
4 recommended that the onshore substation site be subject to Phase IB archaeological survey.

5 The resulting Phase IB survey of the onshore substation site was conducted in August 2020. Pedestrian
6 survey and subsurface shovel testing located three archaeological resources. Two of these sites (Resource
7 1 [44VB0430], Resource 2 [44VB0431]) were considered to contain potentially intact eighteenth,
8 nineteenth, and early twentieth century remains and have the potential to add new and important
9 information to the prehistory/history of Virginia (Appendix Y Phase IA and IB Archaeological Survey
10 Reports). As a result, the sites were subject to Phase II investigation to assess their eligibility for listing on
11 the NRHP. Phase II investigation at these two sites found that neither site exhibited sufficient archaeological
12 integrity to be considered NRHP-eligible, and no further cultural resources work was recommended
13 (Appendix Y Phase II Archaeological Investigation Report). The third archaeological site (Resource 3
14 [44VB0432]) contains agricultural drainage tile and modern debris and is recommended not eligible for
15 listing in the NRHP.

16 **6.2.1.4 Operations and Maintenance Facilities**

17 A final determination regarding the suitable location of the operations and maintenance (O&M) facility will
18 be made upon conclusion of thorough site assessments and due diligence of all locations under
19 consideration. The Terrestrial Archaeological PAPE for the O&M facility will be defined using a process of
20 phased identification and evaluation, in consultation with BOEM and the relevant state historic preservation
21 office, as defined in 36 CFR § 800.4(b)(2), and in accordance with the Cultural Resources Management
22 Plan for Kitty Hawk North Wind Project O&M Facility (Appendix GG).

23 **6.2.2 Impacts Analysis for Construction, Operations, and Decommissioning**

24 The potential impact-producing factors resulting from the construction, operations, and decommissioning
25 of the Project are based on the maximum design scenario from the Project Design Envelope (see Chapter
26 3 Description of Proposed Activity). For terrestrial archaeological and cultural resources, the maximum
27 design is represented by the maximum width of the onshore export cable corridor and the disturbance of
28 the entire onshore substation site during construction. A Summary of Applicant-Proposed Avoidance,
29 Minimization, and Mitigation Measures is provided in Appendix FF.

30 **6.2.2.1 Construction**

31 During construction, the potential impacts to terrestrial archaeological and cultural resources may include
32 the following:

- 33 • Direct disturbance of undeveloped land during construction of the onshore substation and switching
34 station;
- 35 • Direct disturbance of land during installation of the onshore export cables;
- 36 • Direct disturbance of land at the export cable landfall; and
- 37 • Direct disturbance of land at the O&M facility.

38 **Direct disturbance of undeveloped land during the construction of the onshore substation and**
39 **switching station.** Based on the maximum design scenario, construction of the onshore substation and
40 switching station may disturb the entire onshore substation site. A Phase IB archaeological investigation
41 identified two then potentially NRHP-eligible archaeological resources located within the onshore substation
42 site. Phase II work was conducted at the onshore substation site in October 2021, and the Phase II Report
43 recommended that both sites be considered ineligible for listing in the NRHP, and that no further cultural
44 resources work be done. The Company will develop and implement an Unanticipated Discoveries Protocol
45 to avoid and mitigate impacts to unknown resources.

1 **Direct disturbance of land during installation of the onshore export cables.** Installation of the onshore
2 export cables along the public ROW for Sandbridge Road may require tree clearing along the road and
3 within the utility right-of-way (ROW) between the public ROW for Sandbridge Road and Atwoodtown Road.
4 The City of Virginia Beach has commenced construction of its VII-A Project, which will straighten and widen
5 Sandbridge Road along a portion of the proposed onshore export cable route. The onshore export cable
6 route to support the Project will be constructed after the City of Virginia Beach VII-A Project is complete.
7 Any additional temporary staging areas necessary to support onshore construction activities are anticipated
8 to be located on previously disturbed lands. A Phase IB archaeological survey conducted along the
9 Sandbridge route and western route option⁵ onshore export cable corridors identified two archaeological
10 resources of undetermined NRHP-eligibility. These resources (included in the Phase IB Archaeological
11 Survey Addendum Report, Appendix Y) have been recommended for avoidance by the Project by a
12 minimum distance of 15-m (50-ft), or if avoidance is not possible, a Phase II investigation. Two previously
13 recorded archaeological resources within the Sandbridge route and western route option onshore export
14 cable corridors will be avoided. In addition, a program of archaeological monitoring will be implemented
15 during excavation activities in areas believed to be previously undisturbed to identify any potentially intact
16 terrestrial archaeological deposits that may remain within the onshore export cable corridors. The Company
17 will develop and implement an Unanticipated Discoveries Protocol to avoid and mitigate impacts to
18 unknown resources.

19 **Direct disturbance of land at the export cable landfall.** The landfall will be located in a parking lot.
20 However, considering the high sensitivity of the environment for archaeological and cultural resources, and
21 the significant historic land use of the region (see Appendix Y Phase IA and IB Archaeological Survey
22 Reports), SEARCH, Inc. recommends the monitoring of excavation activities during construction at the
23 landfall to inspect the excavations for evidence of any intact archaeological deposits that may remain. The
24 Company will develop and implement an Unanticipated Discoveries Protocol to avoid and mitigate impacts
25 to unknown resources.

26 **Direct disturbance of land at the O&M facility.** The Terrestrial Archaeological PAPE for the O&M facility
27 will be defined using a process of phased identification and evaluation, in consultation with BOEM and the
28 relevant state historic preservation office, as defined in 36 CFR § 800.4(b)(2). The Company has developed
29 a Cultural Resources Management Plan (Appendix GG) that details how direct physical effects will be
30 determined, a description of what will be done to identify archaeological resources, how adverse effects will
31 be assessed, and how mitigation measures will be developed in consultation with NHPA consulting parties
32 to resolve effects. This plan has been written in a programmatic fashion for all potential outcomes to be
33 considered, including construction of new building(s), modification of existing buildings, and use of existing
34 building(s) without modification. The phased identification process will align with the relevant sections of
35 the NHPA Section 106 implementing regulations (36 CFR Part 800) and will be developed in consultation
36 with BOEM and VDHR. The final plan will be incorporated into applicable proposals for mitigation, as
37 needed.

38 **6.2.2.2 Operations and Maintenance**

39 During operations, no impacts to terrestrial archaeological and cultural resources are anticipated as no
40 additional ground-disturbing activities are proposed following construction of the Project. If additional
41 ground-disturbing activities outside of the Project footprint become necessary in the future, measures
42 implemented to limit impacts to potential cultural resources would be established during the required
43 permitting activities. These measures would be anticipated to be similar to those undertaken during
44 construction. Operational noise and visibility resulting from the Project are expected to be consistent with
45 the existing environment. As such, there would be no adverse effect to any potentially NRHP-listed, eligible,

⁵ Referred to in the Phase IB as the eastern route and western route.

1 or potentially eligible sites within the onshore Project Area. For an in-air acoustic impacts discussion, see
2 Section 4.4 In-Air Acoustic Environment and Appendix O In-Air Acoustic Assessment.

3 **6.2.2.3 Decommissioning**

4 Impacts resulting from decommissioning of the Project are expected to be similar (or less than) those
5 experienced during construction. Decommissioning techniques are further expected to advance during the
6 useful life of the Project. A full decommissioning plan will be provided to BOEM for approval prior to
7 decommissioning activities, and potential impacts will be reevaluated at that time.

6.3 Aboveground Historic Resources

This section describes the aboveground historic resources within and surrounding the Project Area, which includes the Wind Development Area, export cable corridors, and onshore substation. Historic architectural resources are generally defined as districts, buildings, structures, objects, or sites that are 50 years old or older and are listed in, or determined to be eligible for, inclusion in the NRHP. Tribal engagement was initiated in February 2020 and remains ongoing. To date, no Traditional Cultural Properties have been identified; however, any Traditional Cultural Properties will be included in a supplemental filing if identified. Potential impacts to historic properties resulting from construction, operations, and decommissioning of the Project are discussed. Avoidance and minimization measures proposed by the Company are also described in this section.

Other assessments detailed within this COP that are related to aboveground historic resources include:⁶

- Visual Resources (Section 6.4);
- Historic Resources Visual Effects Assessments (Appendix Z);
- Visual Impact Assessment (Appendix AA); and
- Section 106 Supporting Materials (Appendix GG).

Assessments of the effects on historic resources are required to support BOEM's National Environmental Policy Act review and consultation under Section 106 and Section 110(f) of the NHPA. BOEM provides guidance that an analysis of visual effects on historic properties should be conducted in a manner acceptable to the relevant SHPO for the state(s) within the areas that will have a view of the Project's onshore or offshore components (BOEM 2020). The analysis of visual effects on historic properties for the Project was prepared by SEARCH, Inc. and will be provided as Appendix Z.

Identification of aboveground historic resources was based on standard practices within the discipline, as well as engagement with federal and state agencies, including BOEM, the National Park Service, NCHPO, VDHR, and interested Native American Tribes (see Appendix B Summary of Agency and Stakeholder Engagement).

6.3.1 Affected Environment

The following approach was undertaken to identify the review areas for aboveground historic resources and to define the Offshore and Onshore Viewshed PAPE. The PAPE is defined by 36 CFR § 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." No physical alterations to historic properties are proposed. Therefore, only visual impacts are assessed. For the purposes of this section, the PAPE will be referred to as the Offshore Viewshed PAPE and/or the Onshore Viewshed PAPE. Visual impacts to historic resources from the underground portion of the onshore export cable would be limited to temporary impacts during the construction phase. The underground cable is therefore not included in this analysis.

6.3.1.1 Offshore Viewshed PAPE

To determine an offshore PAPE for visual effects, the offshore infrastructure design parameters were examined along with the curvature of the earth to determine a maximum theoretical visibility limit of up to 74 kilometers (km) surrounding the Wind Development Area, termed the preliminary Visual Study Area (VSA). The VSA was then further refined, based on the findings of the initial Visual Impact Assessment to a study area of up to 56 km, which represents the maximum distance at which the Project may be visible. Within 56 km, visibility is only expected on the clearest days. Casual observers may view the infrastructure

⁶ Terrestrial archaeological resources are discussed separately in Section 6.2 and Appendix Y; marine archaeological and cultural resources are discussed in Section 6.1 and Appendix X.

1 at distances up to 48.2 km, and between 48.2 and 56 km, only observers with a fixed gaze in ideal conditions
2 would be able to perceive the WTGs.

3 The VSA was used as a starting point to develop an initial Offshore Viewshed PAPE, as it represents the
4 maximum theoretical limit of visibility for the Wind Development Area. Within the identified study area, the
5 initial Offshore Viewshed PAPE was refined using both a digital elevation model and National Land Cover
6 Database data. The mapping provided a visual representation of all areas within the VSA where visibility is
7 obstructed due to topography and vegetation. After completing the modeling, online mapping programs
8 were used to further refine the PAPE with a consideration for the surrounding built environment. Most areas
9 are so densely developed that only the beachfront properties currently have clear views of the ocean. In
10 areas with less density, the PAPE includes second row buildings with the potential for open ocean views.
11 Outside the beachfront, the Offshore Viewshed PAPE includes areas of higher elevation that have longer
12 viewing distances over intervening land masses. These may be beyond the 56 km visibility limit
13 (Figure 6.3-1).

14 **6.3.1.2 Onshore Viewshed PAPE**

15 Onshore infrastructure with the potential for long-term visual effects includes the proposed onshore
16 substation, switching station, and overhead interconnection on an identified parcel in Virginia Beach,
17 Virginia, and an option for a 3.1 km section of overhead transmission line along public ROW for Sandbridge
18 Road and in an existing utility ROW between Sandbridge Road and Atwoodtown Road, as part of the
19 Sandbridge route and western route. Viewshed PAPEs for these onshore Project components were
20 determined by the size and overall height of the proposed structures and by the characteristics of the
21 surrounding environment.

22 The tallest structures of the onshore substation are assumed to be a maximum of 26 m in height, with
23 thinner lightning protection structures that may extend to 29 m. The area is currently bordered by a parking
24 lot to the northwest, a stormwater management facility to the north, an overhead high-voltage transmission
25 line and agricultural fields to the southeast, and a densely wooded area to the south and west. The Onshore
26 Viewshed PAPE was delineated in accordance with VDHR's *Guidelines for Assessing Impacts of Proposed
27 Electrical Transmission Lines and Associated Facilities on Historic Resources in Virginia*. The guidelines
28 state that "for all portions of the proposed line to be constructed within existing ROW and where new areas
29 of vegetation will be cleared outside the existing maintained ROW, the architectural survey will consist of
30 all resources that are within 0.5 mile on either side of the ROW" (VDHR 2008). The Onshore Viewshed
31 PAPE associated with the substation includes a 0.8 km (0.5 mi) area measured from the edge of the
32 development parcel's boundary. A portion of the Sandbridge route and western route options for the
33 onshore export cables may be installed overhead and would be located within an existing utility ROW,
34 including a portion of the public ROW for Sandbridge Road, with existing utility poles and cables. Although
35 the onshore export cables may be installed aboveground, the Company is currently maturing design for an
36 underground configuration. Should the Company utilize the aboveground option, it would require
37 construction of new towers, up to 42 m in height, to support the cables within this overhead portion. This
38 portion of the route may be cleared of trees, as necessary, to support cable installation, up to 46 m in width.
39 The Onshore Viewshed PAPE associated with the overhead transmission line was also delineated in
40 accordance with VDHR's *Guidelines for Assessing Impacts of Proposed Electrical Transmission Lines and
41 Associated Facilities on Historic Resources in Virginia* (VDHR 2008). The PAPE associated with the
42 overhead transmission line includes a 0.8 km area measured from the edge of the ROW for the overhead
43 portion of the line. This PAPE includes mainly forested area and residential and commercial buildings at its
44 termini.

45 A final determination regarding the suitable location of the O&M facility will be made upon conclusion of
46 thorough site assessments and due diligence of all locations under consideration. The Onshore Viewshed
47 PAPE for the O&M facility will be defined using a process of phased identification and evaluation, in

Kitty Hawk North Wind Project

KTH-GEN-CON-PLN-AGR-000067_006 Rev 05 Chapter 6 Cultural Resources



- 1 consultation with BOEM and the relevant state historic preservation office, as defined in 36 CFR §
- 2 800.4(b)(2).

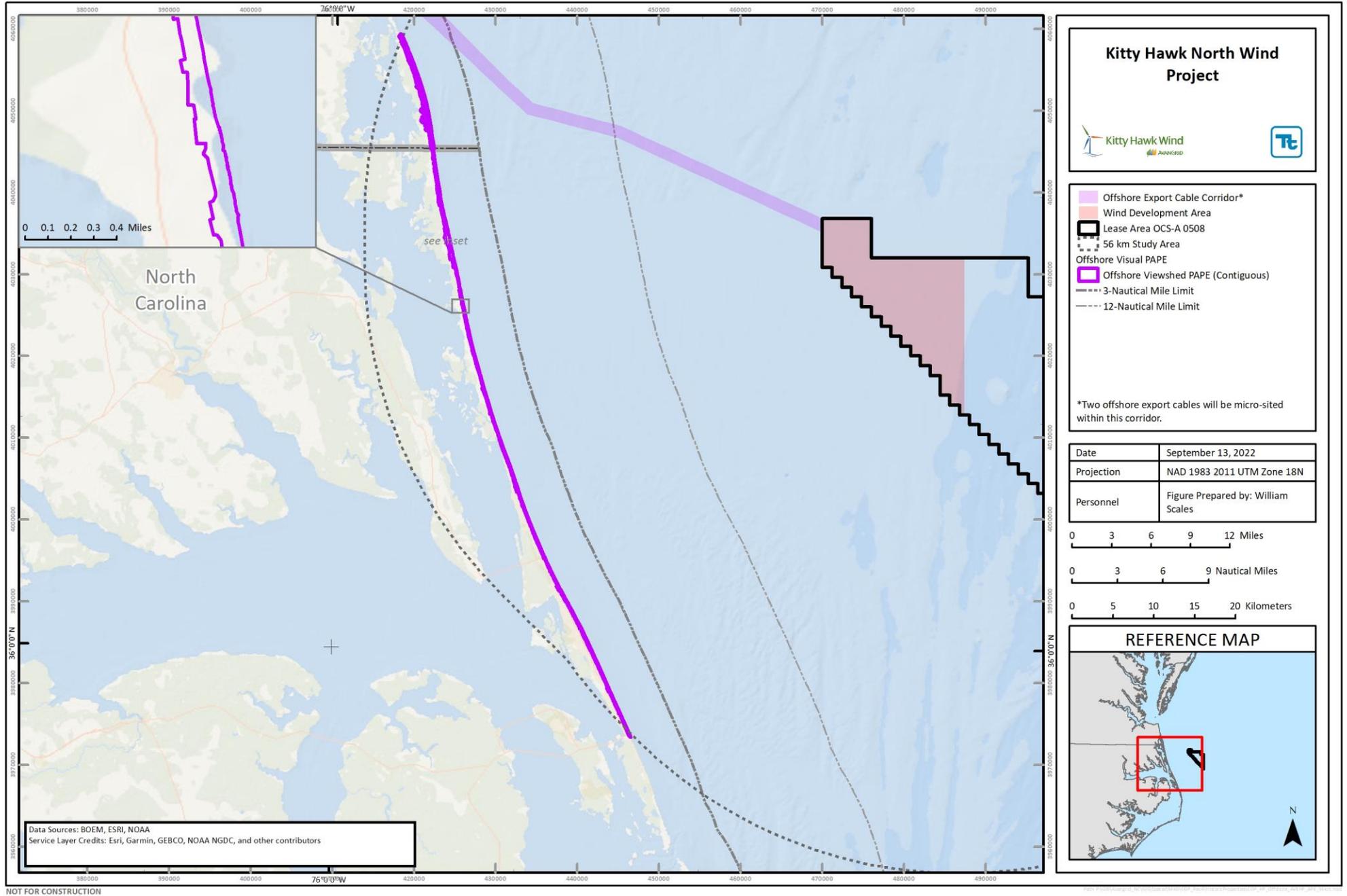


Figure 6.3-1 Offshore Viewshed PAPE

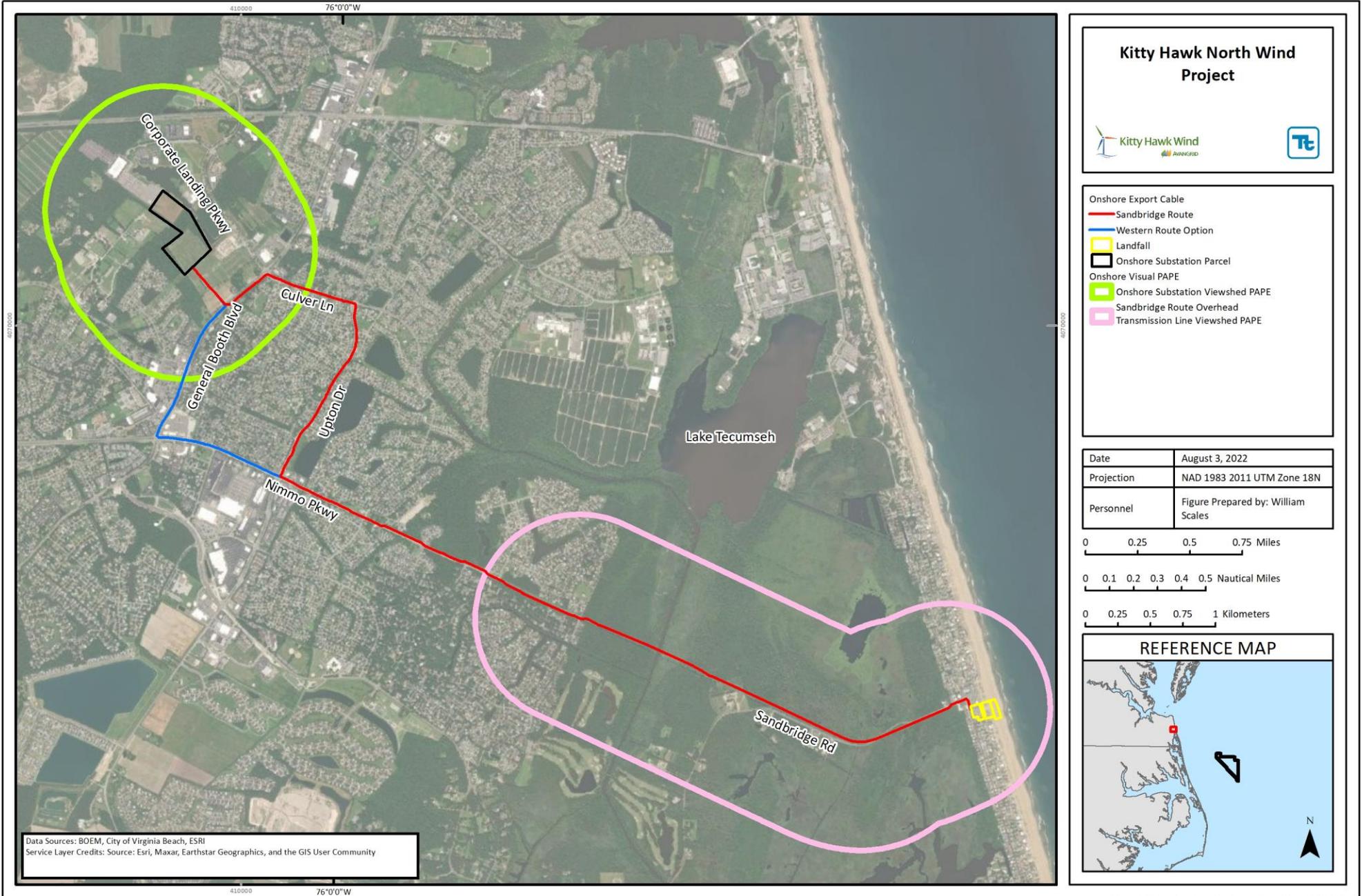


Figure 6.3-2 Onshore Viewshed PAPE

6.3.1.3 Visual Effects Identification and Evaluation Criteria and Analysis

Identification and evaluation of historic properties was conducted for historic resources within the Onshore and Offshore Viewshed PAPes. Identification of historic properties included a review of existing data from both NCHPO and VDHR as well as parcel data from municipal sources. Within the Onshore Viewshed PAPes, a reconnaissance survey was conducted for all resources at least 45 years old within the PAPes. The survey was conducted in accordance with VDHR *Guidelines for Conducting Historic Resources Survey in Virginia* (VDHR 2017).

Within the Offshore Viewshed PAPE, evaluation tiers were established and assigned to each historic resource based upon the type of visibility possible. The area with potential casual visibility is identified as the 48.2 km Evaluation Tier. Between 48.2 km and 56 km, only focused observers will potentially view the Project in ideal conditions. This area without casual visibility potential is identified as the 56 km Evaluation Tier. Identification of historic properties within the 48.2 km Tier included intensive survey. Previously identified NRHP-eligible or -listed properties within 56 km, or with elevated viewing positions, were also included in the 48.2 km Tier evaluation. As stipulated in the 2014 Programmatic Agreement between BOEM, the NCHPO, and the ACHP, the survey was conducted in accordance with the NCHPO's environmental review *Architectural Survey Manual, Survey Database Data Entry Manual, and Digital Photography for Historic Property Surveys and National Register Nominations* (BOEM 2014b; NCHPO 2008, 2009, 2017). Work adhered to the recently updated *Standards for Historic Structure Survey Reports* (NCHPO 2019). Resources within the 56 km Evaluation Tier were not individually surveyed. These resources were reviewed and categorized by property type and all are assumed eligible for purposes of the Project.

Resources in the 56 km Evaluation Tier were assumed eligible, but resources in the onshore Viewshed PAPes and in the 48.2 km Evaluation Tier were individually reviewed for NRHP eligibility. Section 106 of the NHPA defines historic properties as buildings, structures, sites, objects, and districts that are either listed in or eligible for listing in the NRHP. The NRHP Criteria are used for determining the eligibility of a resource to the NRHP (36 CFR § 60.4 and NPS 2002). To be listed in or be eligible for listing in the NRHP, a property must meet one or more of the National Register Criteria for Evaluation, specifically:

- A. The resource must be associated with events that have made a significant contribution to the broad patterns of history;
- B. The resource must be associated with the lives of persons significant in our past;
- C. The property must embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or,
- D. The property must show, or may be likely to yield, information important to history or prehistory (NPS 2002).

In addition to meeting the age and significance criteria, a property must also retain sufficient historic integrity. Research identified 13 historic properties within the 48.2 km Tier of the Offshore Viewshed PAPE (Table 6.3-1) and (Figure 6.3-3) and one historic property (considered eligible for purposes of this review) within the Onshore Viewshed PAPE (Table 6.3-2) and (Figure 6.3-4). The 56 km Evaluation Tier included 475 architectural resources that are assumed eligible for purposes of the Project. Under Section 106, a federal agency determines whether an undertaking will have no adverse effect or an adverse effect on historic properties. To determine whether effects to historic properties are adverse or not, an agency shall apply the Criteria of Adverse Effects as defined in 36 CFR § 800.5:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all

1 *qualifying characteristics of a historic property, including those that may have been*
2 *identified subsequent to the original evaluation of the property's eligibility for the National*
3 *Register. Adverse effects may include reasonably foreseeable effects caused by the*
4 *undertaking that may occur later in time, be farther removed in distance, or be cumulative.*

5 36 CFR § 800.5 also includes examples of adverse effects ranging from destruction to transfer, lease, or
6 sale of a property out of Federal ownership. Examples relevant to the purview of this visual effects analysis
7 include: “change of the character of the property’s use or of physical features within the property’s setting
8 that contribute to its historic significance” and “introduction of visual, atmospheric or audible elements that
9 diminish the integrity of the property’s significant historic features.” Each of the identified historic properties,
10 or resources assumed eligible for purposes of the Project were subject to an effects evaluation under the
11 Criteria of Adverse Effects as defined in 36 CFR § 800.5.

12 **6.3.2 Impacts Analysis for Construction, Operations, and Decommissioning**

13 The potential impact-producing factors resulting from the construction, operations, and decommissioning
14 of the Project are based on the maximum design scenario from the Project Design Envelope (see Chapter
15 3 Description of Proposed Activity). For visual effects to historic resources, the maximum design scenario
16 is the presence of the maximum number of new fixed structures offshore (i.e., WTGs and ESP) and onshore
17 (i.e., onshore substation and towers supporting the aboveground onshore export cables). A Summary of
18 Applicant-Proposed Avoidance, Minimization, and Mitigation Measures is provided in Appendix FF.

19 **6.3.2.1 Construction**

20 During construction, the potential impacts to historic resources may include:

- 21 • Short-term visual impacts during offshore construction and installation activities; and
- 22 • Short-term visual impacts during onshore construction and installation activities.

23 Physical effects to historic resources during the construction of the onshore infrastructure are not expected
24 and are not discussed further.

25 **Short-term visual impacts during offshore construction and installation activities.** During
26 construction, Project-related vessels will be present within and transiting to or from the Wind Development
27 Area and along the offshore export cable corridor. As vessel traffic is common along the Atlantic coast, it is
28 anticipated that the vessels required to transport Project components from shore to the offshore Project
29 Area will not substantially increase traffic in the vicinity of the Project. Most vessels used for Project
30 construction will be similar in size and form to existing commercial vessels. Therefore, visual impacts to the
31 casual observer are not anticipated.

32 Larger vessels used for Project construction, such as barges or jack-up vessels, may be more noticeable
33 to viewers on shore given their size relative to existing vessels. However, these visual effects will be short-
34 term, limited to the time it takes for the vessels to travel from port to the Project Area. Viewers along the
35 coast will also have distant views of construction in the Wind Development Area, including the lights
36 necessary to perform nighttime construction activities. However, these visual effects will be short-term
37 because construction vessels and equipment will only be present during construction and will not be present
38 once construction is completed.

39 Installation of the offshore export cables in nearshore waters will introduce Project-related vessels relatively
40 close to shore, in the areas near landfall. While these vessels will be easily visible from shore, they will not
41 remain in any area for more than several weeks. Because of the relatively short duration that they will be
42 in any single location, construction vessels are not anticipated to adversely affect onshore historic
43 resources.

1 **Table 6.3-1 Historic Property Data within the Offshore Viewshed PAPE**

Historic Property	Location	SHPO ID	NRHP Status	NRHP Criteria	Significance
Currituck Beach Lighthouse, Currituck Beach Lightkeepers House, Currituck Beach Lighthouse Complex Boundary Expansion	1101 Corolla Village Road, Corolla, NC	CK0106	NRHP-listed	A, C	The property is listed for its historical significance under the themes of Commerce, Maritime History, Social History, and Architecture.
(Former) Currituck Beach Lifesaving Station	1780 Ocean Pearl Road, Corolla, NC	CK0025	NRHP-eligible	C	The property is eligible as an intact example of a George R. Tolman's Quonochontaug Lifesaving Station design.
Wash Woods Lifesaving Station	1994 Sandfiddler Road, Corolla, NC	CK0088	NRHP-eligible	A, C	The property is eligible for its significance under the themes of Maritime History and as a good example of Victor Mindeleff's Chatham design.
Bodie Island Light Station	8210 Bodie Island Lighthouse Road, Nags Head, NC	DR0001	NRHP-listed	C	The property is listed for its significance under the themes of Maritime History and Transportation as well as Architecture and Engineering as a good example of a United States Lighthouse Board standardized design.
Wright Brothers National Memorial	1000 N. Croatan Highway, Kill Devil Hills, NC	DR0014	NRHP-listed	A, B, C	The property is listed for its significance under the themes of Invention, Architecture, Landscape Architecture, and Conservation.
Wright Brothers National Memorial Landscape	1000 N. Croatan Highway, Kill Devil Hills, NC	N/A	NRHP-eligible	N/A	This property was evaluated as part of a National Park Service Cultural Landscape Inventory. It is significant as an example of a designed commemorative landscape. The NCHPO concurred with the NRHP eligibility recommendation.
Mackey House	218 Ocean Boulevard, Southern Shores, NC	DR00412	NRHP-eligible	C	The property is eligible for its significance under the theme of Architecture as a good example of the flat top building form.
176 Ocean Blvd	176 Ocean Boulevard, Southern Shores, NC	DR00416	NRHP-eligible	C	The property is eligible for its significance under the theme of Architecture as a good example of the flat top building form.

Historic Property	Location	SHPO ID	NRHP Status	NRHP Criteria	Significance
Pipkin House	170 Ocean Boulevard, Southern Shores, NC	DR00417	NRHP-eligible	C	The property is eligible for its significance under the theme of Architecture as a good example of the flat top building form.
Sea Foam Motel	7111 South Virginia Dare Trail, Nags Head, NC	DR0506	NRHP-listed	A, C	The property is eligible for its significance under the themes of entertainment and recreation as well as architecture as a good example of a motor court in the Outer Banks.
Mattie Midgett Store and House	4008 South Virginia Dare Trail	DR0574	NRHP-listed	A, C	The property is eligible for its significance under the themes of commerce and architecture as an intact key commercial establishment in the Outer Banks.
House	114 Station Bay Drive, Duck, NC	DR0693	NRHP-eligible	C	The property is eligible for its significance under the theme of Architecture as it remains a relatively intact example of a small early beach cottage in Duck, NC.
<p>In addition to the 13 historic properties listed in this table, the evaluation in the Historic Resources Visual Effects Assessment includes 475 resources in the 56-km Tier. None of the properties have a formal determination of eligibility with the NCHPO, and they were assumed eligible for purposes of this review. The review categorizes the resources by property type to assign significance. Definitions for the property types and a full list of resources are included in Appendix Z.</p>					

1 **Table 6.3-2 Historic Property Data within the Onshore Viewshed PAPE**

Historic Property	Location	SHPO ID	NRHP Status	NRHP Criteria	Significance
House	2376 London Bridge Road, Virginia Beach, VA	N/A	Not accessible but considered NRHP-eligible for purposes of Section 106 evaluation	C	Due to a lack of access, the building could not be fully evaluated. For the purposes of this analysis, it is assumed significant under the theme of Architecture.

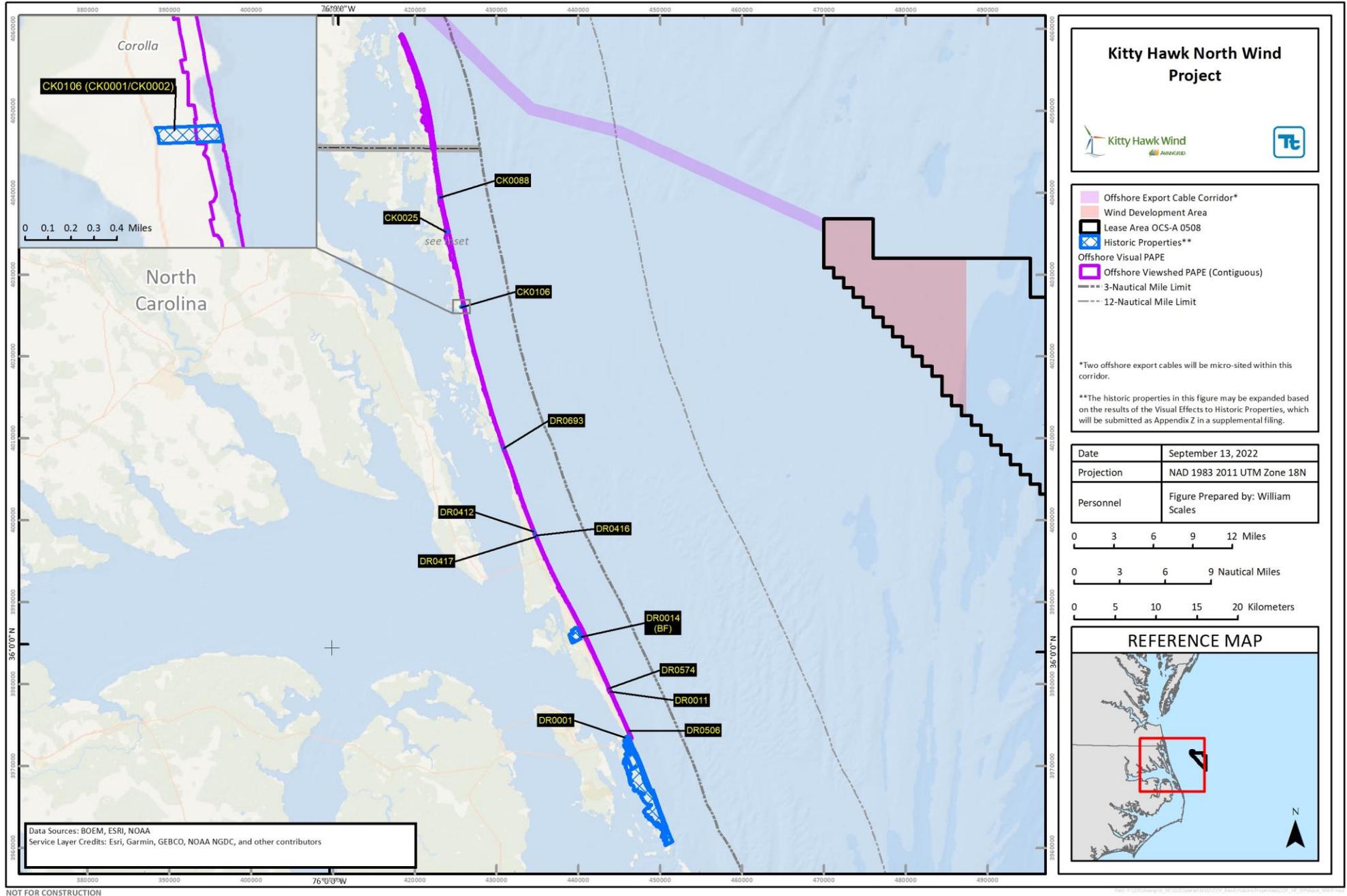


Figure 6.3-3 Historic Properties within Offshore Viewshed PAPE

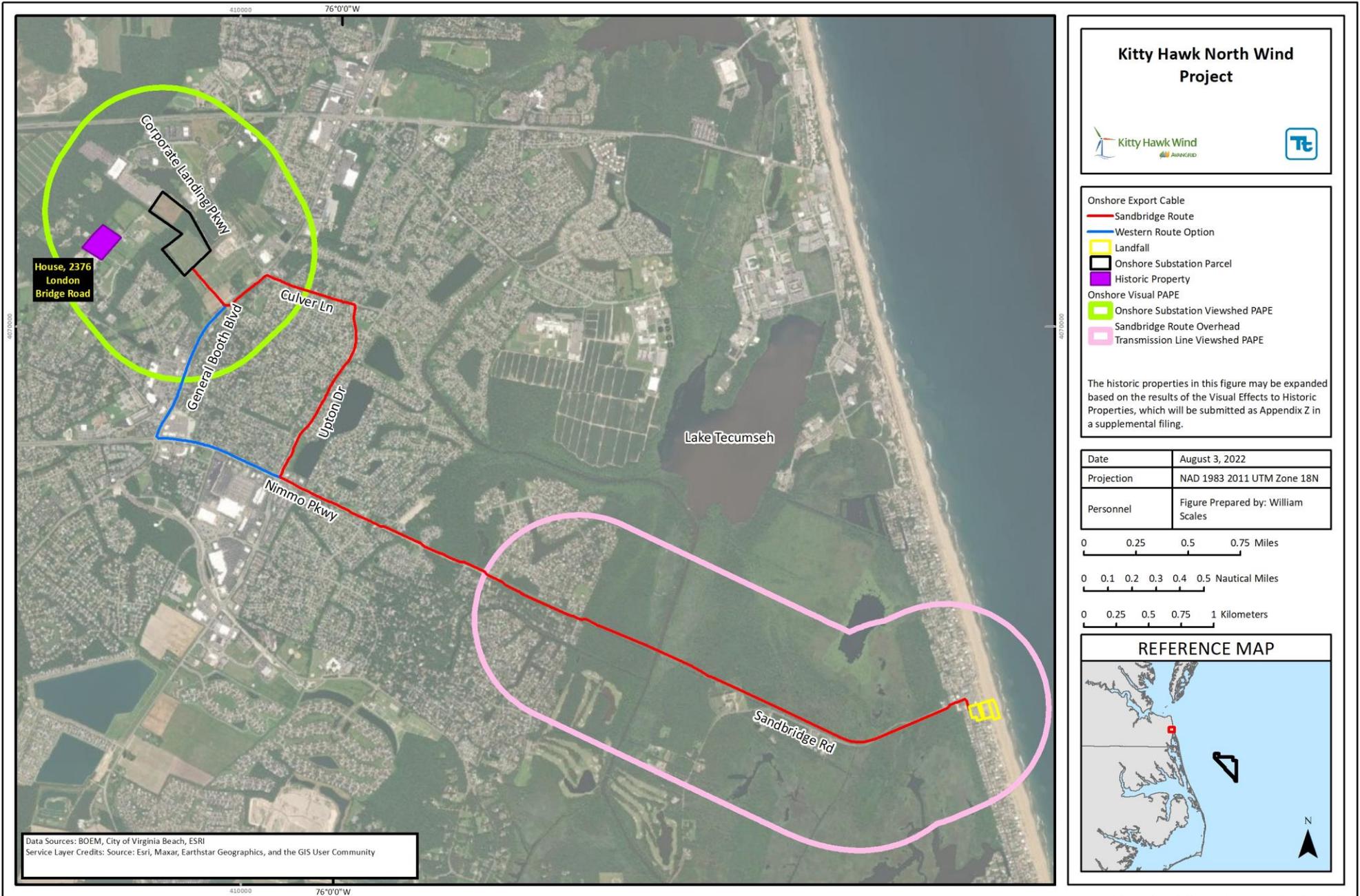


Figure 6.3-4 Historic Properties within Each Onshore Viewshed PAPE

1 **Short-term visual impacts during onshore construction and installation activities.** During
2 construction of the onshore substation and within the onshore export cable installation corridor, potential
3 short-term visual effects would result from construction activities and the presence of construction
4 equipment and work crews. During Project construction of the onshore substation, the presence of
5 construction equipment, materials, and crews would be dominant primarily for viewers associated with
6 residential areas directly south of the proposed substation. However, some of the visual effects would be
7 short-term because construction equipment and crews would be removed once construction is completed.
8 Views of Project construction from areas not immediately adjacent to the onshore substation site would be
9 mostly screened by vegetation and/or development. Visual impacts to these viewers would mostly be limited
10 to construction traffic on local roads. Although the onshore export cables for the Sandbridge route and
11 western route option would be located within an existing utility ROW that contains existing utility poles and
12 cables, installation may require construction of new towers and may require tree clearing, which may
13 introduce short-term visual impacts.

14 Other onshore Project components associated with the landfall and the underground portion of the onshore
15 export cables would occur at-grade and would offer temporary views of construction equipment only to
16 areas immediately adjacent to the construction.

17 The Onshore Viewshed PAPE for the O&M facility will be defined using a process of phased identification
18 and evaluation, in consultation with BOEM and the relevant state historic preservation office, as defined in
19 36 CFR § 800.4(b)(2). The Company will provide BOEM with a detailed plan for how direct visual effects
20 will be determined, a description of what will be done to identify historic properties, how adverse effects will
21 be assessed, and how mitigation measures will be developed in consultation with NHPA consulting parties
22 to resolve effects; if applicable. This plan will be written in a programmatic fashion for all potential outcomes
23 to be considered, including construction of new building(s), modification of existing buildings, and use of
24 existing building(s) without modification. The phased identification process will align with the relevant
25 sections of the NHPA Section 106 implementing regulations (36 CFR Part 800) and Section 110(f) and will
26 be developed in consultation with BOEM and VDHR. The final plan will be incorporated into applicable
27 proposals for mitigation, as needed.

28 **6.3.2.2 Operations and Maintenance**

29 During operations, the potential impacts to historic resources may include:

- 30 • Long-term visual impacts resulting from the presence of new fixed structures offshore (e.g., WTGs);
- 31 and
- 32 • Long-term visual impacts resulting from the presence of new fixed structures onshore (e.g.,
- 33 onshore substation and overhead export cables).

34 **Long-term visual impacts resulting from the presence of new fixed structures offshore.** Historic
35 architectural resources have the potential to be affected during Project operations, primarily in the form of
36 direct visual impacts. The presence of new fixed structures offshore (e.g., WTGs) within view from historic
37 properties may change the views from these places.

38 The properties with the potential to be affected by the Project are those where the traditional maritime
39 setting is an important part of the property's significance. An adverse effect occurs when an undertaking
40 affects the "characteristics of a historic property that qualify the property for inclusion in the National
41 Register in a manner that would diminish the integrity of the property's location, design, setting, materials,
42 workmanship, feeling, or association" (36 CFR § 800.5(a)(1)).

43 To support review, the Project identified an Offshore Viewshed PAPE of up to 56 km within which historic
44 properties have been identified. Existing survey data from the NCHPO, parcel data, and aerial and street
45 view imagery were reviewed to identify historic properties in the Offshore Viewshed PAPE.

1 As described in Section 6.3.1.3, the identification of historic properties was approached differently based
2 upon the assigned evaluation tier. Resources within the 48.2 km Tier without determination of eligibility on
3 file and at least 45 years old were intensively surveyed. Resources within the potential 56 km Tier are
4 assumed eligible for purposes of this review and were not individually surveyed. For the surveyed
5 resources, identification followed the process stipulated in the 2014 Programmatic Agreement between
6 BOEM, the NCHPO, and the ACHP; the survey was conducted in accordance with the North Carolina
7 Historic Preservation Office's environmental review *Architectural Survey Manual, Survey Database Data*
8 *Entry Manual, and Digital Photography for Historic Property Surveys and National Register Nominations*
9 (BOEM 2014; NCHPO 2008, 2009, 2017). Work adhered to the recently updated *Standards for Historic*
10 *Structure Survey Reports* (NCHPO 2019). A total of 51 historic resources were included in the survey, and
11 13 historic properties were identified. Each of the 13 NRHP-Listed and NRHP-Eligible resources within the
12 48.2 km Evaluation Tier has been included in the offshore visual effects analysis presented in Appendix Z,
13 and are summarized in Table 6.3-3. The 475 architectural resources within the 56 km Evaluation Tier are
14 categorized by property type. Each property type is described in the text and a property-type based effects
15 analysis is included in Appendix Z.

16 Visual impacts are minimized through BOEM's siting of the Lease Area, which considered visual impacts
17 in the selection of offshore lease blocks for the Wind Energy Area (BOEM 2014). Distance is the primary
18 mitigating factor, with the Project's Visual Impact Assessment finding that the overall impacts to viewers
19 will be minor to negligible at key observation points within its visual study area. With the exception of those
20 with elevated viewing positions, historic properties beyond 55 km (34.8 mi) will have no visibility of the
21 nighttime Federal Aviation Administration obstruction lighting due to distance and curvature of the earth.
22 WTG towers, nacelles, and blades will be off-white or light gray color in order to decrease visual contrast
23 with the sky under most daytime lighting conditions, in line with measures recommended by BOEM (2021),
24 reducing the visibility from shore. Furthermore, navigational lighting that minimizes the visibility of the WTGs
25 and ESP, without compromising safety, will also be employed (see Chapter 3 for additional information).

26 **Long-term visual impacts resulting from the presence of new fixed structures onshore.** Historic
27 architectural resources have the potential to be affected during Project operations, primarily in the form of
28 direct visual impacts.

29 Existing survey data with the VDHR, parcel data, and current and historic aerial images were reviewed for
30 the Onshore Viewshed PAPE for the overhead export cables. Along the Sandbridge route, the review
31 identified 87 total historic resources greater than 45 years old.⁷ All 87 historic resources were determined
32 not eligible for inclusion in the NRHP. The Onshore Viewshed PAPE for the onshore substation site included
33 10 resources greater than 45 years old. One was assumed eligible for purposes of the Project, and the
34 remaining nine were determined not eligible for inclusion in the NRHP. A summary of the identification of
35 historic properties and an effects evaluation are available in Appendix Z. The one identified historic property
36 and a summary of visibility from that location is included in Table 6.3-4.

⁷ The analysis of visual effects on historic properties used a 45-year standard to allow a cushion for environmental review in advance of construction. Resources generally must be 50 years old or older to be eligible for inclusion in the NRHP.

1 **Table 6.3-3 Summary of Historic Property Visibility within the Offshore Viewshed PAPE**

Resource	Status	NRHP Criteria	SHPO ID	Distance to Wind Development Area	Visibility
Currituck Beach Lighthouse, Currituck Beach Lightkeepers House, Currituck Beach Lighthouse Complex Boundary Expansion	NRHP-listed	A, C	CK0106	45 km	The Wind Development Area would be visible from the lighthouse lantern, the highest vantage point in the lighthouse.
(Former) Currituck Beach Lifesaving Station	NRHP-eligible	C	CK0025	46 km	Views of the Wind Development Area are possible.
Wash Woods Lifesaving Station	NRHP-eligible	A, C	CK0088	47 km	Views of the Wind Development Area are possible.
Bodie Island Light Station	NRHP-listed	A, C	DR0001	61 km	The property falls outside the 48 km boundary that defines much of the Offshore PAPE and was included in the 48.2 km Tier due to the height of the lantern's viewing platform. At a distance of 61 km, the Wind Development Area is near the theoretical limit of visibility and may not be discernible on the horizon.
Nags Head Beach Cottage Row Historic District	NRHP-listed	A, C	DR0011	54 km	The historic district falls outside the 48 km boundary that defines much of the Offshore PAPE and was included in the 48.2 km Tier due to its NRHP-listed status. The historic district includes beachfront houses with clear views to the sea. Due to distance, views will be negligible.
Wright Brothers National Memorial	NRHP-listed	A, B, C	DR0014	53 km	The property falls outside the 48 km boundary that defines much of the Offshore PAPE and was included as a discontinuous area of the PAPE due to the height of the dune, which allows for increased viewing distance. Although the Wind Development Area will be visible from the top of the dune, the views will be minimal due to distance.
Wright Brothers National Memorial Landscape	NRHP-eligible	N/A	N/A	53 km	The property falls outside the 48 km boundary that defines much of the Offshore PAPE and was included in the 48.2 km Tier due to the height of the dune, which allows for increased viewing distance. Although the Wind Development Area will be visible from the top of the dune, the views will be minimal due to distance.

Resource	Status	NRHP Criteria	SHPO ID	Distance to Wind Development Area	Visibility
Mackey House	NRHP-eligible	C	DR00412	48 km	There may be views of the Wind Development Area from the rear deck, but it is not expected to be visible either from the house or any other ground level points on the parcel.
176 Ocean Blvd	NRHP-eligible	C	DR00416	48 km	Views of the Wind Development Area would be limited.
Pipkin House	NRHP-eligible	C	DR00417	48 km	While there may be partial views of the water from the rear of the home, the dune and vegetation appear to largely obscure views. The Wind Development Area may be partially visible from select areas of the parcel.
Sea Foam Motel	NRHP-listed	A, C	DR0506	56 km	The property falls outside the 48 km boundary that defines much of the Offshore PAPE and was included in the 48.2 km Tier due to its NRHP-listed status. The motel has a beachfront location, though ground-level views will likely be obscured by dunes. There are potential views from the building's second-story guest rooms. At a distance of 56 km, visibility will be negligible.
Mattie Midgett Store and House	NRHP-listed	A, C	DR0574	54 km	The property falls outside the 48 km boundary that defines much of the Offshore PAPE and was included in the 48.2 km Tier due to its NRHP-listed status. The store and house buildings have an inland location, and the views will be largely obscured by beachfront houses between the buildings and the beach. Visibility will also be mitigated by distance and will be negligible at 54 km.
House	NRHP-eligible	C	DR0693	45 km	There are no water views from ground level next to the house, nor from the building's interior. The parcel has a private boardwalk offering beach access from the house that includes a small viewing platform at the top of the dune, and this appears to be the only location on the parcel from which the Wind Development Area might be visible.

1 **Table 6.3-4 Summary of Historic Property Visibility within the Onshore Viewshed PAPE**

Resource	Status	NRHP Criteria	SHPO ID	Distance to Onshore Project Components	Visibility
House	Not accessible but considered eligible for purposes of Section 106 evaluation	C	N/A	0.4 km to onshore substation	Views from the property toward the site are across three parcels, all of which contain buildings and trees. In addition, the historic building on the parcel is within a grove of mature trees and is not likely to have any views to the west. It is possible the 42 m transmission towers or 29 m lightning protection would be partially visible from the property.

2

1 The Onshore Viewshed PAPE for the O&M facility will be defined using a process of phased identification and
2 evaluation, in consultation with BOEM and the relevant state historic preservation office, as defined in 36 CFR
3 § 800.4(b)(2). The Company will provide BOEM with a detailed plan for how direct visual effects will be
4 determined, a description of what will be done to identify historic properties, how adverse effects will be
5 assessed, and how mitigation measures will be developed in consultation with NHPA consulting parties to
6 resolve effects. This plan will be written in a programmatic fashion for all potential outcomes to be considered,
7 including construction of new building(s), modification of existing buildings, and use of existing building(s) without
8 modification. The phased identification process will align with the relevant sections of the NHPA Section 106
9 implementing regulations (36 CFR Part 800) and Section 110(f) and will be developed in consultation with
10 BOEM and VDHR. The final plan will be incorporated into applicable proposals for mitigation, as needed.

11 **6.3.2.3 Decommissioning**

12 Impacts resulting from decommissioning of the Project are expected to be similar or less than those
13 experienced during construction. Decommissioning techniques are further expected to advance during the
14 useful life of the Project. A full decommissioning plan will be provided to BOEM for approval prior to
15 decommissioning activities, and potential impacts will be re-evaluated at that time.

6.4 Visual Resources

This section describes the visual resources within and surrounding the Project Area, which includes the Wind Development Area, the export cable corridor, and the onshore substation and switching station site. Potential impacts to visual resources resulting from construction, operations, and decommissioning of the Project are discussed. Avoidance, minimization, and mitigation measures proposed by the Company are also described in this section.

Other assessments detailed within this COP that are related to visual resources include:

- Aboveground Historic Resources (Section 6.3);
- Recreation and Tourism (Section 7.1);
- Historic Resources Visual Effects Assessment (Appendix Z); and
- Visual Impact Assessment (Appendix AA).

This section was prepared in accordance with 30 CFR § 585.627(a)(7), BOEM's *Information Guidelines for a Renewable Energy Construction and Operations Plan* (2020), and Sullivan's *Methodology for Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States* (2021). The Visual Impact Assessment is informed by meetings with cooperating agencies, including BOEM, the National Park Service, the NCHPO, VDHR, and Native American Tribes.

For the purposes of this section, the review area includes the offshore and onshore Project components, and the areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project. The offshore portion of the review area, referred to as the Visual Study Area (VSA), consists of a distance of up to 74 km (40 nautical miles [nm] / 46 miles [mi]) around the Wind Development Area (Figure 6.4-1). The onshore portion of the review area includes the onshore export cable corridor and areas within 1.6 km (1 mi) of the onshore substation site.

6.4.1 Affected Environment

The visual resources affected environment, as described below, is defined/characterized as the coastal and offshore areas (seascape and landscape) where key viewer groups located within the VSA might experience the visual effects of the Project. In general, the types of viewers present within the VSA are classified as local residents, tourists, and mariners. Distinctions among user groups and their expected sensitivity to changes to the landscape/seascape, based on activity types and viewing characteristics, are standard components of a visual impact assessment.

The VSA is generally characterized by broad expanses of open water and an elongated barrier island (the Outer Banks). The surface of the water varies from smooth and relatively level during calmer weather to undulating and rough 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 elements that are evident near the Project's offshore components include buoys, channel markers, and warning lights within and around the proposed Project location. Additionally, marine vessel traffic, including military vessels, barges, container ships, cruise ships, commercial and recreational fishing, recreational boating, and ferry transportation are common throughout the VSA (see Section 7.3 Marine Transportation and Navigation and Appendix BB Navigation Safety Risk Assessment). In addition to these human-made visual intrusions located at or near sea-level, aircraft (including their associated nighttime safety lighting) are common visual intrusions seen above and near the proposed Project offshore components.

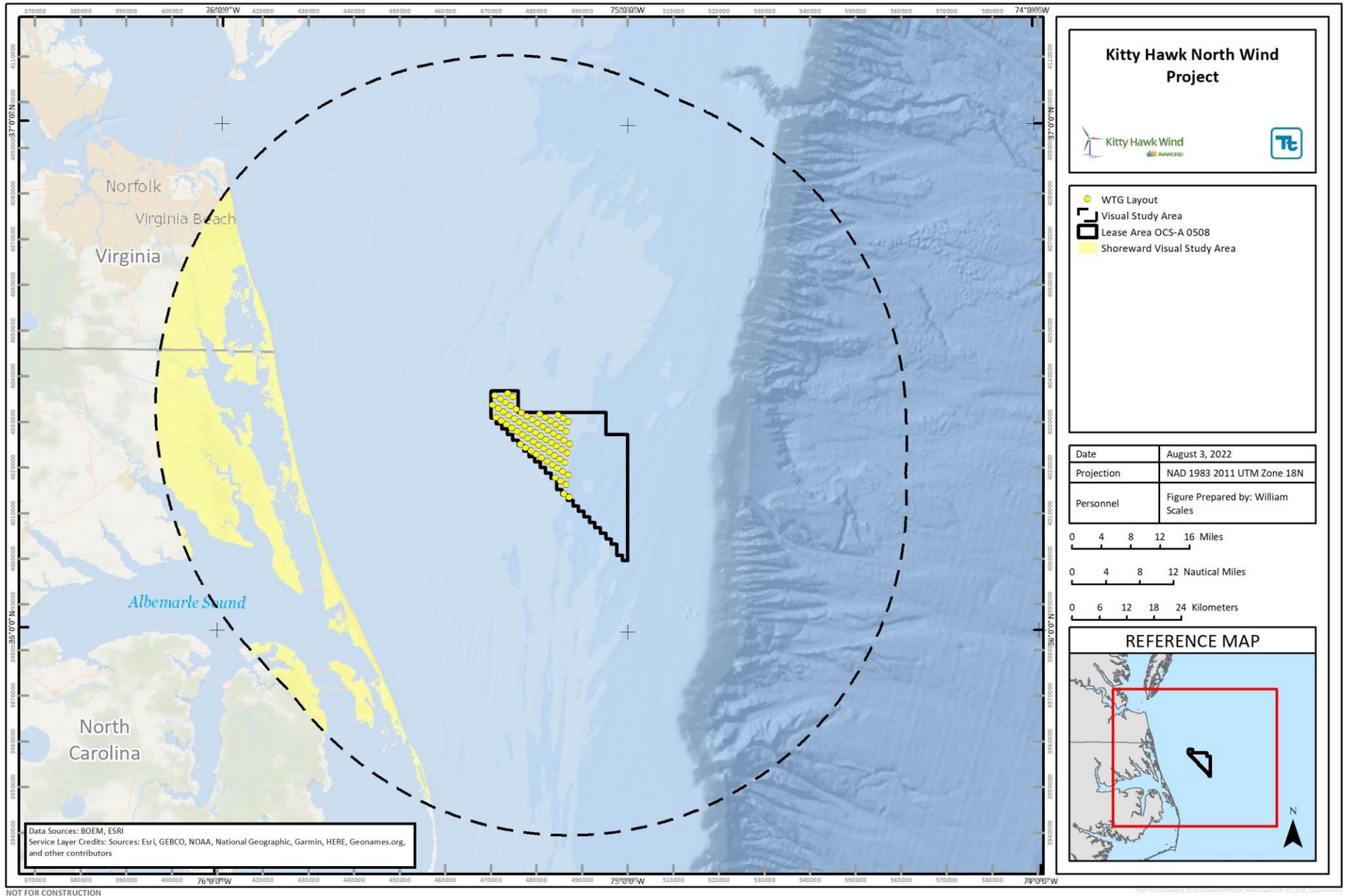


Figure 6.4-1 Visual Study Area for the WTG Layout

1 The onshore export cables may consist of underground and/or aboveground components. The onshore
2 export cables along the Sandbridge route and western route option may be installed overhead for
3 approximately 3.1 km (2 mi) along the public ROW for Sandbridge Road and in an existing utility ROW
4 between Sandbridge Road and Atwoodtown Road. New transmission line towers, up to 42 m tall, may be
5 constructed to support the cables. Final design of the onshore export cables will be informed by the
6 technical and engineering requirements, site-specific presence of natural resources, and engagement with
7 federal, state, and local regulatory authorities. Although the onshore export cables may be installed
8 aboveground, the Company is currently maturing design for an underground configuration. Therefore, this
9 assessment does not further evaluate potential long-term impacts associated with an overhead
10 configuration at this time. Installation of the onshore export cables along the public ROW for Sandbridge
11 Road may require tree clearing along the road and within the utility ROW between Sandbridge Road and
12 Atwoodtown Road.

13 The onshore substation site is located west of the intersection of Corporate Landing Parkway and General
14 Booth Boulevard in an established business park (see Chapter 3 Description of Proposed Activity). The
15 infrastructure at the onshore substation site includes a substation, switching station, and transmission
16 structures. The maximum height of the onshore substation site electrical components is assumed to be 22
17 m, which does not include lightning protection that may extend to 29 m. The transmission structures may
18 reach up to 42 m. The area is bordered by a parking lot to the northwest, a stormwater management facility
19 to the north, an overhead high-voltage transmission line and agricultural fields to the south and east, and
20 densely wooded area to the south and west. A single residential property is bordered by the site and is
21 shielded from the onshore substation by the densely wooded area.

22 **6.4.1.1 Visual Impact Assessment**

23 Based on the size of the offshore Project facilities, with a maximum blade tip height of 317.5 m, 74 km⁸ (40
24 nm / 46 mi) was set as the outer limit of the VSA from the WTG array. The VSA represents the limit of
25 analysis for the Visual Impact Assessment and was established to conservatively identify the area of study.
26 For daytime observations, the VSA is likely conservative and encompasses some areas without actual
27 visibility. For nighttime observations, portions of the VSA may be beyond the visible limit of Federal Aviation
28 Administration lighting under ideal conditions. Meteorological conditions are an important factor and will
29 likely reduce the visibility frequently under certain conditions during both daytime and nighttime hours (see
30 Appendix AA Visual Impact Assessment for additional discussion). The offshore Project components will
31 also include an ESP as well as two offshore export cables; however, the offshore export cables will not be
32 visible. Additionally, based on typical ESP design and the distance that the ESP will be located from shore,
33 it is not anticipated to be visible.

34 As an initial step to evaluate the potential visibility of the Project from shoreside Key Observation Points
35 (KOPs), a computer-based visibility analysis was developed for the specified WTG layout. The mapping
36 analysis was a predictive screening tool used to identify areas where Project components may be potentially
37 visible. The analysis relied on a Digital Surface Model based on the best available LiDAR data to represent
38 topography and surface features such as vegetation, buildings, and other structures in the landscape.

39 The representative KOPs were identified based on the location of the Wind Development Area, the
40 proximity of shoreside locations where there would be an opportunity to view the WTGs, and where the
41 viewing public is likely to be present. Collectively, the locations considered represent a variety of distances
42 and elevations as well as natural, commercial, and cultural settings that are characteristic of the North
43 Carolina and Virginia coastal area. These include sites such as popular beaches, fishing piers, parks, and
44 a national memorial. Locations used by BOEM (2012) during the leasing process were also considered.
45 The Company reviewed the KOPs with BOEM, the National Park Service, NCHPO, VDHR, and Native

⁸ Following guidelines within BOEM 2021.

1 American Tribes. The geographic extent that was evaluated includes parts of North Carolina and Virginia
2 within the VSA.

3 Table 6.4-1 lists the identified KOPs and the criteria for evaluation (see Figure 6.4-2).

4 Fieldwork was completed in June 2021 and May 2022 to capture site photography at each of the KOPs
5 using a high-resolution 50-millimeter digital camera and supporting photographic and geospatial equipment.
6 Working at each KOP location, the crew selected individual photography sites based on accessibility, visual
7 exposure to the Wind Development Area, and the prominence of landscape elements that provided a
8 specific sense of place for the visualizations. The complete Visual Impact Assessment is provided in
9 Appendix AA.

10 6.4.2 Impacts Analysis for Construction, Operations, and Decommissioning

11 The potential impact-producing factors resulting from the construction, operations, and decommissioning
12 of the Project are based on the maximum design scenario from the Project Design Envelope (see Chapter
13 3 Description of Proposed Activity). For visual resources, the maximum design scenario is the presence of
14 new fixed structures offshore (i.e., WTGs and ESP) and onshore (i.e., onshore substation site). A Summary
15 of Applicant-Proposed Avoidance, Minimization, and Mitigation Measures is provided in Appendix FF.

16 6.4.2.1 Construction

17 The potential impacts to visual resources during construction may include the following:

- 18 • Short-term visual impacts during offshore construction and installation activities; and
- 19 • Short-term visual impacts during onshore construction and installation activities.

20 **Short-term visual impacts during offshore construction and installation activities.** Marine vessel
21 traffic is common along the Atlantic coast and it is anticipated that the vessels required to transport Project
22 components to and from the Wind Development Area will not substantially increase the existing volume of
23 traffic along the coasts of Virginia and North Carolina (see Section 7.3 Marine Transportation and
24 Navigation and Appendix BB Navigation Safety Risk Assessment). The majority of the vessels that will be
25 used for Project construction will be similar in size and shape to existing commercial and military vessels
26 already in use in the area.

27 Installation of the offshore export cables in nearshore waters will introduce vessels relatively close to shore
28 along the coast of Virginia. While these vessels will be easily visible from shore, they will not remain in any
29 area for more than several weeks. Because of the relatively short duration that the vessels will be in any
30 single location, they are not anticipated to adversely affect visual resources.

31 Nighttime construction activities are also proposed to occur within the offshore Project Area. Navigation
32 lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform
33 construction activities may be visible from coastal vantage points. However, visual effects resulting from
34 nighttime construction activities will be limited to select locations within the immediate vicinity. These visual
35 effects are anticipated to be short-term as large vessels and lights necessary to perform construction
36 activities will not be present overnight once construction is completed.

37 **Short-term visual impacts during onshore construction and installation activities.** Construction of the
38 onshore substation will involve site clearing and grading, foundation and equipment installation, and site
39 restoration.

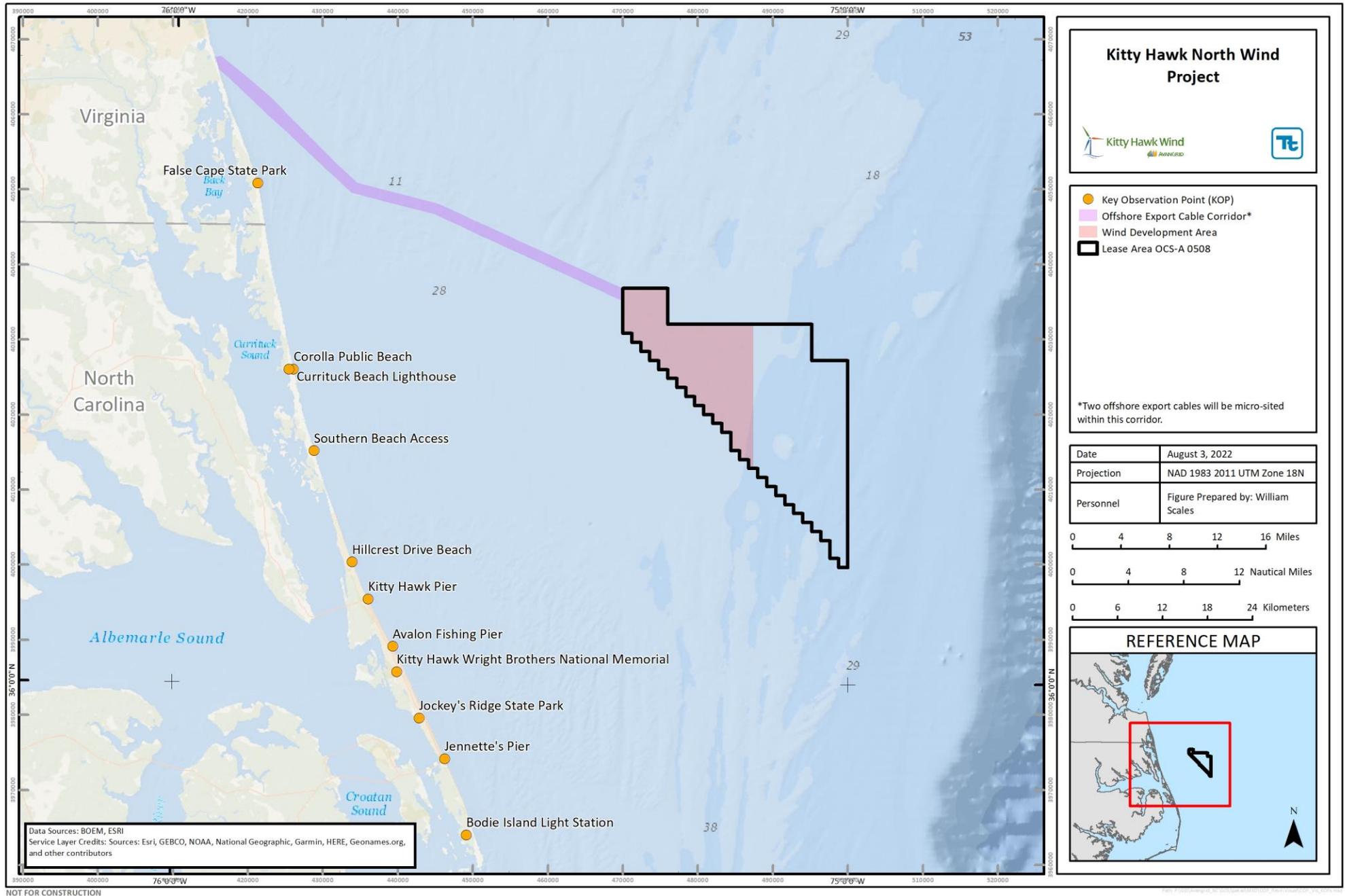


Figure 6.4-2 Key Observation Points

1 **Table 6.4-1 Key Observation Points**

ID	Location	Distance to Nearest WTG	Viewing Elevation	HFOV	Location Description	Character Area
1	False Cape State Park, Virginia	53.4 km (33.2 mi)	3.1 m (10.2 ft)	13.0°	Remote State Park along the southern Virginia coast.	Natural Beachfront
2	Currituck Beach Lighthouse, Corolla, North Carolina	45.6 km (28.3 mi)	47.5 m (155.8 ft)	23.6°	Historic 1873 lighthouse 49.4 m (162.1 ft) tall, highest point in visible range	Conservation Area
3	Corolla Public Beach (Day), Corolla, North Carolina	45 km (28.0 mi)	3.7 m (12.1 ft)	23.9°	Adjacent to densely settled residential waterfront area, nearby KOP 2, identified in BOEM 2012	Developed Beachfront
3A	Corolla Public Beach (Dusk), Corolla, North Carolina	45 km (28.0 mi)	3.0 m (9.8 ft)	23.9°	Adjacent to densely settled residential waterfront area, nearby KOP 2, identified in BOEM 2012	Developed Beachfront
4	Southern Beach Access (Day), Corolla, North Carolina	45.1 km (28.0 mi)	8.4 m (27.6 ft)	27.7°	Southernmost public beach access in Corolla	Developed Beachfront
4A	Southern Beach Access (Night), Corolla, North Carolina	45.1 km (28.0 mi)	4.2 m (13.8 ft)	27.7°	Southernmost public beach access in Corolla	Developed Beachfront
5	Hillcrest Drive Beach (Day), Southern Shores, North Carolina	48.1 km (29.9 mi)	5.2 m (17.1 ft)	29.9°	Public beach in residential area, identified in BOEM 2012	Developed Beachfront
5A	Hillcrest Drive Beach (Overcast Dusk), Southern Shores, North Carolina	48.1 km (29.9 mi)	5.2 m (17.1 ft)	29.9°	Public beach in residential area, identified in BOEM 2012	Developed Beachfront
5B	Hillcrest Drive Beach (Clear Dusk), Southern Shores, North Carolina	48.1 km (29.9 mi)	5.2 m (17.1 ft)	29.9°	Public beach in residential area, identified in BOEM 2012	Developed Beachfront
5C	Hillcrest Drive Beach (Night), Southern Shores, North Carolina	48.1 km (29.9 mi)	5.2 m (17.1 ft)	29.9°	Public beach in residential area, identified in BOEM 2012	Developed Beachfront
6	Kitty Hawk Pier (Overcast), Kitty Hawk, North Carolina	49.9 km (31.0 mi)	7.5 m (24.6 ft)	29.7°	End of hotel pier with ocean view	Developed Beachfront
6A	Kitty Hawk Pier (Clear), Kitty Hawk, North Carolina	49.9 km (31.0 mi)	7.5 m (24.6 ft)	29.7°	End of hotel pier with ocean view	Developed Beachfront

ID	Location	Distance to Nearest WTG	Viewing Elevation	HFOV	Location Description	Character Area
7	Avalon Fishing Pier, Kill Devil Hills, North Carolina	51.7 km (32.1 mi)	7.3 m (24.0 ft)	28.9°	Popular pier with large parking lot in residential area of Kill Devil Hills	Developed Beachfront
8	Wright Brothers National Memorial, Kill Devil Hills, North Carolina	53.8 km (33.4 mi)	28.5 m (93.5 ft)	27.8°	National Memorial and popular tourist site with elevated views	Conservation Area
9	Jockey's Ridge State Park, Nags Head, North Carolina	55.3 km (34.4 mi)	21.8 m (71.5 ft)	26.1°	State park and popular tourist site with elevated dunes	Conservation Area
10	Jennette's Pier, Nags Head, North Carolina	56.4 km (35.0 mi)	13.6 m (44.6 ft)	24.3°	Event space on second level of Jennette's Pier	Developed Beachfront
11	Bodie Island Light Station Bodie Island, North Carolina	62.3 km (38.7 mi)	41.1 m (134.8 ft)	20.7°	Historic lighthouse part of Cape Hatteras National Seashore	Conservation Area

1

1 The onshore export cables may include both underground and/or aboveground portions. The underground
2 onshore export cables will be installed within existing roads, utility ROWs, and previously disturbed areas,
3 to the extent practicable. Following construction, flush-mounted access covers at each underground joint
4 bay will remain for access, if required. The Sandbridge route and western route option onshore export
5 cables may be installed overhead for approximately 3.1 km (2 mi) in the portion of the routes between the
6 public ROW for Sandbridge Road, next to the water tower, and Atwoodtown Road. New transmission line
7 towers may be constructed to support the cables within this overhead portion. Construction activities may
8 include excavating holes for tower foundations and/or direct embedment of towers, cranes setting
9 transmission towers, cable reels, and cranes or helicopters used to string conductor and static wire between
10 transmission towers.

11 These visual effects will be short-term as construction equipment and crews will be removed once
12 construction is completed. Views of Project construction from areas not immediately adjacent to the onshore
13 substation site will be mostly screened by residential, commercial, or industrial buildings; vegetation; and/or
14 topography. Activities at staging and construction facilities will be consistent with the established and
15 permitted uses of these facilities, and the Company will comply with applicable permitting standards to limit
16 environmental impacts from Project-related activities. Visual effects to these viewers will be mostly limited
17 to seeing construction traffic on local roads.

18 **6.4.2.2 Operations and Maintenance**

19 During operations, the potential impacts to visual resources may include the following:

- 20 • Long-term visual impacts resulting from the presence of WTGs; and
- 21 • Long-term visual impacts resulting from the presence of new fixed structures onshore (i.e., onshore
22 substation site and overhead export cables).

23 **Long-term visual impacts resulting from the presence of WTGs.** Views of the offshore Project
24 components (i.e., WTGs) will be limited primarily to coastal areas of Virginia and North Carolina that are
25 within approximately 74 km (40 nm / 46 mi) from the Wind Development Area and have views of the Atlantic
26 Ocean. Areas along the northeastern coast of North Carolina may theoretically have views of a portion of
27 the nacelles (hubs), most of the rotor blades, and tops of the towers under ideal daytime viewing conditions.
28 Viewers along the coast may perceive a change in the landscape/seascape and it is anticipated that the
29 contrast created by the change will vary from minor to negligible. Any perceived change will be greater in
30 areas that are closest to the Wind Development Area and where views are toward the broadside of the
31 Wind Development Area. Perceived changes will be lesser elsewhere on the coastline as viewers get
32 farther away from the Wind Development Area.

33 The perceived change in the landscape/seascape may be somewhat greater in coastal areas with elevated
34 viewing locations (such as from the tops of major sand dunes or lighthouses) where there are elevated
35 views along beaches. In such cases, more of the Wind Development Area may be visible and the Project
36 may appear slightly more prominent due to the elevated views. Project visibility in the shoreward portion of
37 the VSA (the portion of the VSA that is landward of the shoreline, shown in yellow on Figure 6.4-1) is found
38 along the entire shoreline. However, in developed places, the dunes and/or the first row of buildings tend
39 to block views from locations further inland (most of the shoreline within the VSA is developed, such as Kill
40 Devil Hills and Nags Head, North Carolina). Project visibility is concentrated along the immediate shoreline
41 and from a few elevated locations.

42 Obstruction marking lights, installed to meet Federal Aviation Administration and BOEM guidelines, may
43 be visible from locations where the hub, nacelle, and blades of a WTG are visible above the horizon line.
44 These lights will be most visible along the coastline; most inland views will be screened by dunes,
45 vegetation, and/or development. In developed portions of the shoreline where the lights may be visible, the
46 lights will be seen in the context of ambient light from commercial and residential illumination. Exceptions

1 include elevated viewing locations, in which case the lights may be seen in the context of other light sources,
2 such as marine vessels, residential or urban development, streetlights, and vehicle headlights. However,
3 most of the elevated locations, such as lighthouses, the Wright Brothers National Memorial, and Jockey's
4 Ridge State Park are generally closed to visitors after dark when the obstruction lights would be activated.

5 Minimization and mitigation of visual impacts is accomplished in a variety of ways, beginning with siting of
6 the Lease Area. Visual impacts were considered by BOEM in the selection of offshore lease blocks for the
7 Wind Energy Area (BOEM 2014), significantly reducing the potential impact. The layout of the WTGs in
8 evenly spaced rows and columns, although primarily designed to optimize power output and increase
9 navigational safety, also reduces the overall extent of the WTG array when viewed from shore. Lighting and
10 marking guidelines also contribute to visual impact mitigation and the Project will be built in accordance
11 with the appropriate regulations and guidance. Currently, this includes lights flashing in unison at the
12 slowest allowable frequency will further reduce visual impact. BOEM's lighting guidance (BOEM 2021) and
13 the Federal Aviation Administration-required off-white or light gray paint color for WTG towers, nacelles,
14 and blades will also decrease visual contrast with the sky under most daytime lighting conditions, reducing
15 the visibility from shore (BOEM 2021).

16 **Long-term visual impacts resulting from the presence of new fixed structures onshore.** The majority
17 of the Sandbridge route and western route option for the onshore export cable corridors would be located
18 underground; the portion of the Sandbridge route and western route option for the onshore export cable
19 corridors between the public ROW for Sandbridge Road, next to the water tower, and Atwoodtown Road,
20 would be located within an existing utility ROW and adjacent to existing, aboveground utility cables. As
21 such, the existing landscape along the onshore export cable corridor will be preserved, with the exception
22 of trees cleared, and will remain consistent with adjacent uses (see Section 7.10 Land Use and Zoning).

23 The onshore substation site and portion of the onshore export cables installed on aboveground towers, if
24 selected, would result in changes to landscape conditions. The onshore sub station site is located west of
25 the intersection of Corporate Landing Parkway and General Booth Boulevard. The maximum height of the
26 onshore substation site electrical components is assumed to be 22 m. This does not include lightning
27 protection, which may extend to 29 m. The onshore substation site will introduce tall, rectangular forms and
28 vertical and geometric structures into a landscape setting that is surrounded by commercial and residential
29 development and is located within a parcel zoned for light industrial use (see Section 7.10 Land Use and
30 Zoning). The maximum height of equipment, buildings, and walled structures is commensurate with the
31 existing local built environment of the Corporate Landing Business Park. The facility will be compliant with
32 Virginia Beach building codes, electrical standards, and environmental regulations. When the Project
33 reaches the design stage, consideration will be given to visually integrate the substation and switching
34 station into the surrounding landscape and coordinating with regulatory agencies and the City of Virginia
35 Beach.

36 Proposed nighttime lighting associated with the onshore Project components includes security lighting
37 installed along onshore substation perimeter fencing and at building entrances. Security lighting will be
38 directed downward and shielded to avoid light pollution impacts, where possible. The amount of light
39 generated by the security lights will be consistent with existing sources produced by human-made
40 structures near the proposed onshore substation site; therefore, impacts are not expected.

41 **6.4.2.3 Decommissioning**

42 Impacts resulting from decommissioning of the Project are expected to be similar or less than those
43 experienced during construction. Decommissioning techniques are further expected to advance during the
44 useful life of the Project. A full decommissioning plan will be provided to BOEM for approval prior to
45 decommissioning activities, and potential impacts will be re-evaluated at that time.

6.5 References

- 1 See Table 6.5-1 for data sources used in the preparation of this chapter.

Table 6.5-1 Data Sources

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-and-Data/ATL_SLA(3).aspx	http://metadata.boem.gov/geospatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
National Oceanic and Atmospheric Administration	Territorial Sea (12-nautical mile limit)	http://maritimeboundaries.noaa.gov/downloads/USMaritimeLimitsAndBoundariesSHP.zip	https://inport.nmfs.noaa.gov/inport-metadata/NOAA/NOS/OCS/inport/xml/39963.xml

2 6.5.1 Marine Archaeological and Cultural Resources

BOEM (Bureau of Ocean Energy Management). 2014. *Programmatic Agreement Among the U.S. Department of the Interior, BOEM; North Carolina State Historic Preservation Officer; and the Advisory Council on Historic Preservation Regarding Review of Outer Continental Shelf Renewable Energy Activities Under Section 106 of the National Historic Preservation Act*. U.S. Department of the Interior, Bureau of Ocean Energy Management, North Carolina State Historic Preservation Officer, and Advisory Council on Historic Preservation. Available online at: <https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/HP/offshore-windfarm-development.pdf>. Accessed 20 Nov 2020.

BOEM. 2015. *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore North Carolina: Revised Environmental Assessment*. U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. Available online at: <https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/NC-EA-Camera-FONSI.pdf>. Accessed 20 Nov 2020.

BOEM. 2020. *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585*. U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. Available online at: <https://www.boem.gov/sites/default/files/documents/about-boem/Archaeology%20and%20Historic%20Property%20Guidelines.pdf>. Accessed 20 Nov 2020.

Carrier, B., N. DeLong, W. Hoffman, J. Hoyt, and W. Sassorossi. 2017. *North Carolina Collaborative Archaeological Survey: Kitty Hawk Wind Energy Area. Final Report to the U.S. Department of the Interior, Bureau of Ocean Energy Management*. OCS Study BOEM 2017-070. 37 pp. + appendix.

3 6.5.2 Terrestrial Archaeological and Cultural Resources

Commonwealth Heritage Group. 2019. *Cultural Resources Survey Preliminary Engineering for Nimmo Parkway Phase VII-B, City of Virginia Beach, Virginia CIP2-110, PWCN-17-0121*. Completed on behalf of WSP USA and the City of Virginia Beach. VA DHR Survey No. not yet assigned.

1 6.5.3 Aboveground Historic Resources

- BOEM (Bureau of Ocean Energy Management). 2014a. *Announcement of Area Identification: Commercial Wind Energy Leasing on the Outer Continental Shelf Offshore North Carolina*. 7 Aug 2014. Available online at: https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/NC_ArealD_Announcement_.pdf. Accessed 06 Nov 2020.
- BOEM. 2014b. *Programmatic Agreement Among the U.S. Department of the Interior, Bureau of Ocean Energy Management; North Carolina State Historic Preservation Officer; and the Advisory Council on Historic Preservation Regarding Review of Outer Continental Shelf Renewable Energy Activities Under Section 106 of the National Historic Preservation Act*. Available online at: <https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/HP/offshore-windfarm-development.pdf>. Accessed 15 October 2021.
- BOEM. 2020. *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585*. U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. Available online at: <https://www.boem.gov/sites/default/files/documents/about-boem/Archaeology%20and%20Historic%20Property%20Guidelines.pdf>. Accessed 19 Nov 2020.
- BOEM. 2021. *Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development*. Available online at: <https://www.boem.gov/sites/default/files/documents/renewable-energy/2021-Lighting-and-Marking-Guidelines.pdf>. Accessed 09 Jun 2021.
- NCHPO (North Carolina Historic Preservation Office). 2008. *Architectural Survey Manual: Practical Advice for Recording Historic Resources*. Available online at: <https://files.nc.gov/ncdcr/historic-preservation-office/survey-and-national-register/NCHPOSurveyManual-11-2008.pdf>. Accessed 15 Oct 2021.
- NCHPO. 2009. *Manual for Data Entry Historic Properties and Districts Survey Form*. Available online at: <https://files.nc.gov/ncdcr/historic-preservation-office/survey-and-national-register/NCHPOsurveyDataEntryManual-10-2009.pdf>. Accessed 15 Oct 2021.
- NCHPO. 2017. *Digital Photography for Historic Property Surveys and National Register Nominations*. Available online at: <https://www.ncdcr.gov/about/history/division-historical-resources/nc-state-historic-preservation-office/architectural-2>. Accessed 15 Oct 2021.
- NCHPO. 2019. *Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina*. Available online at: https://files.nc.gov/ncdcr/historic-preservation-office/environmental-review/ER-106_110-ReportStandards.pdf. Accessed 15 Oct 2021.
- NPS (National Park Service). 2002. "How to Apply the National Register Criteria for Evaluation." National Register Bulletin 15.
- VDHR (Virginia Department of Historic Resources). 2008. *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia*. Available online at: https://www.dhr.virginia.gov/wp-content/uploads/2018/08/DHR_Guidelines_for_Transmission_Line_Assessment.pdf.
- VDHR. 2017. *Guidelines for Conducting Historic Resources Surveys in Virginia*. Available online at: https://www.dhr.virginia.gov/wp-content/uploads/2018/06/SurveyManual_2017.pdf.

1 **6.5.4 Visual Resources**

BOEM (Bureau of Ocean Energy Management). 2012. "Offshore North Carolina Visualization Study." Available online at: <https://www.boem.gov/renewable-energy/state-activities/offshore-north-carolina-visualization-study>. Accessed 21 Oct 2020.

BOEM. 2014. *Announcement of Area Identification: Commercial Wind Energy Leasing on the Outer Continental Shelf Offshore North Carolina*. 7 Aug 2014. Available online at: https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NC/NC_ArealD_Announcement_.pdf. Accessed 18 Nov 2020.

BOEM. 2020. *Information Guidelines for a Renewable Energy Construction and Operations Plan (COP)*. 27 May 2020. Available online at: <https://www.boem.gov/sites/default/files/documents/about-boem/COP%20Guidelines.pdf>. Accessed 18 Nov 2020.

BOEM. 2021. *Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development*. BOEM. April 2021. Available online at: <https://www.boem.gov/sites/default/files/documents/renewable-energy/2021-Lighting-and-Marking-Guidelines.pdf>. Accessed 14 Jun 2020.

Sullivan, R.G. 2021. *Methodology for Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States*. Washington (DC): U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2021-032.78 p.