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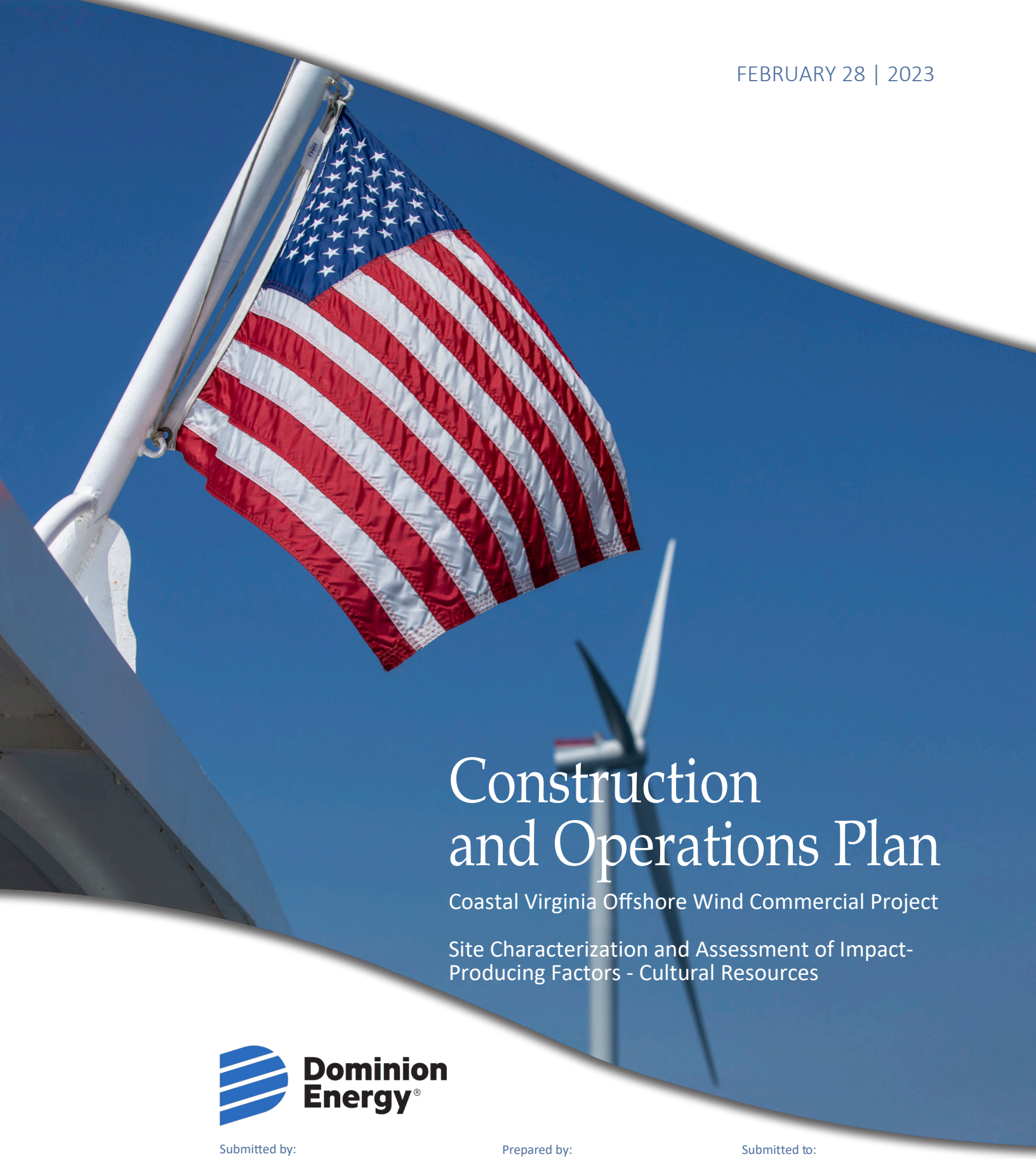

Construction and Operations Plan

Coastal Virginia Offshore Wind Commercial Project

Site Characterization and Assessment of Impact-Producing Factors - Cultural Resources

Dominion Energy®

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4.3 Cultural Resources

This section discusses cultural resources in the offshore and onshore portions of the Project Area, the potential impacts to those resources, and the protection measures and best management practices (BMPs) that will be employed during Project construction.

Cultural resources include archaeological sites, historic standing structures, objects, districts, and traditional cultural properties that illustrate or represent important aspects of prehistory or history 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 in the National Register of Historic Places (NRHP).

Consultation under Section 106 of the NHPA of 1966 (54 U.S.C. § 306108) is triggered by a federal undertaking, i.e., when projects require federal permits, the use of federal funds, or occur on federal lands. Such federal undertakings require consultation by federal agencies with the State Historic Preservation Office (SHPO), interested Native American tribes, and other consulting parties. These consultations identify the Area of Potential Effects (APE), architectural or other cultural resources that are listed in or are potentially eligible for listing in the NRHP, and potential adverse effects to those resources from the federal undertaking. Additionally, compliance with NHPA Section 110(f) is also required when National Historic Landmarks (NHLs) are present.

To ensure compliance with Section 106 requirements, BOEM has developed Guidelines for Providing Archaeological and Historic Property Information (BOEM 2020). The information in this section has been developed in compliance with those guidelines.

Consistent with 30 Code of Federal Regulations (CFR) § 585.102, BOEM will establish the APE and provide for coordination and consultation in Section 106 reviews with the SHPOs, including for the Onshore Project Components.

Effective December 1, 2020, BOEM formally implemented NEPA substitution for NHPA Section 106 reviews of COPs in accordance with 36 CFR § 800.8, Coordination with the National Environmental Policy Act. Under this consolidated substitution process, the purposes and requirements of both statues will be met. Initiation of the Section 106 process, ongoing consultation, identification of historic properties, assessment of potential adverse effects to historic properties, and proposals to avoid, minimize, and mitigate adverse effects to historic properties will be fully integrated with NEPA scoping, analysis, and reporting (Draft Environmental Impact Statement) and reflected in supplemental COP filings. It is anticipated that final measures to avoid, minimize, and mitigate adverse effects to historic properties will be presented in the Final Environmental Impact Statement and that such measures will be made part of the Record of Decision (ROD). As part of this substitution process, BOEM recommends engaging Tribes and consulting parties that would like to provide input to support the planning and execution of the cultural resources surveys. Dominion Energy has engaged Tribes and consulting parties as the survey plans are developed and will continue to do so throughout the process of completing the cultural resources surveys.

A Section 106 Phased Identification Plan was developed for the Project (Appendix DD) due to a lack of private property access permissions during the initial phase of terrestrial archaeological survey. The Section 106 Phased Identification Plan was developed in compliance with Section 106 regulations and guidance

provided by BOEM and outlined the processes and schedule to guide the completion of terrestrial archaeological survey.

As a public utility, Dominion Energy is required to obtain several approvals from the State Corporation Commission (SCC) for the Project, which includes an SCC determination of the final onshore route alignment. Initially the APE included multiple route options and associated facilities which were included in the various onshore cultural surveys. Since October 2021, the Terrestrial Archaeological Resources Assessment (TARA) Phase IB excavations were focused on a single onshore route option as the Preferred Option (Interconnection Cable Route 1).

4.3.1 Marine Archaeological Resources

This section describes the marine archaeological resources currently known to be present in the waters within the Offshore Project Area.

Dominion Energy conducted a HRG survey and geotechnical investigation to identify NRHP-listed and NRHP-eligible submerged archaeological resources, geological features with pre-contact period archaeological sensitivity, and remote sensing anomalies or targets with the potential to be post-contact submerged cultural resources. The data presented in Section 4.3.1.1, Affected Environment, includes marine archaeological resources identified through background research and the surveys. A Marine Archaeological Resource Assessment (Appendix F) report was prepared to present all marine cultural resources identified through the survey, recommendations for NRHP-eligibility of identified resources, potential impacts to resources resulting from construction, O&M, and decommissioning of the Project, and proposed measures and BMPs to avoid, minimize, and/or mitigate potential impacts to marine archaeological resources as necessary.

Other assessments and reports detailed within this COP related to marine archaeological resources include:

- Physical and Oceanographic Conditions (Section 4.1.1); and
- Marine Archaeological Resource Assessment (Appendix F).

This section draws information from several sources of data, reports, and studies in the assessment of marine archaeological resources. These sources include publicly available data, previous cultural resources studies, and data gathered by Dominion Energy within the Offshore Project Area (site-specific HRG and geotechnical investigations).

4.3.1.1 Affected Environment

This section was prepared in accordance with BOEM's site characterization requirements in 30 CFR § 585.626(3) and BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (BOEM 2020).

The Marine Archaeological APE includes the Offshore Project Area and any associated construction ROWs or work areas (as described in Section 3.4.1, Offshore Construction and Installation). The APE was designed to include offshore portions of the Project where marine archaeological resources may be subject to direct effects from construction, O&M, and decommissioning of the Project. The APE includes the footprint of all Offshore Project Components as well as any temporary seafloor disturbance areas.

Typically, surveyed areas include additional width to accommodate potential rerouting for Offshore Project Components or micrositing to avoid identified cultural resources, unexploded ordnance, or other sensitive features. The components of the APE are detailed in Table 4.3-1 below. It should be noted that the MARA maximum APE as listed in Table 4.3-1 in some instances does not align with the maximum PDE listed in Section 3, Description of Proposed Activity. The MARA was prepared based on a more conservative design scenario; see Appendix F, Marine Archaeological Resources Assessment for more information.

Table 4.3-1. MARA APE

Offshore Project Component	Metric	MARA Maximum APE
WTG Monopile Foundations	Maximum diameter	36 ft (11 m)
	Maximum seabed penetration	197 ft (60 m)
	Maximum scour protection (diameter)	230 ft (70 m)
	Maximum turbine work area (diameter)	984 ft (300 m)
Inter-Array Cable	Maximum burial depth	9.8 ft (3 m)
	Maximum trench depth a/	11.5 ft (3.5 m)
	Maximum trench width	49 ft (15 m)
	Maximum trench length	up to 300.7 mi (484 km)
	Average length per cable	5,868 ft (1,789 m)
	Pre-lay grapnel run (inclusive of construction area)	65.6 ft (20 m) per cable
Offshore Substation	Maximum number of piles per offshore substation	12
	Maximum diameter of each pile	11.5 ft (3.5 m)
	Maximum depth of each pile	295.3 ft (90 m)
	Maximum scour protection per leg (diameter)	230 ft (70 m)
	Maximum construction footprint per offshore substation	306.8 x 283.8 ft (93.5 x 86.5 m)
	Temporary construction impacts per offshore substation	656 x 164 ft (200 x 50 m) adjacent to the western side of each offshore substation
Offshore Export Cable	Maximum burial depth	16.4 ft (5 m)
	Maximum trench depth b/	18 ft (5.5 m)
	Maximum total cable length	416.9 mi (671 km)
	Average cable length per cable	(9 cables) 46.3 mi (74.5 km)
	Maximum trench width	49 ft (15 m) per cable
	Maximum width of construction corridor per cable	65.6 ft (20 m)

Notes:
a/ trench depth is based on maximum burial depth of 9.8 ft (3 m) to top of cable plus 1.6 ft (0.5 m) to bottom of trench
b/ trench depth is based on maximum burial depth of 16.4 ft (5 m) to top of cable plus 1.6 ft (0.5 m) to bottom of trench

Previous Cultural Resources Studies

Background research determined that since the late 1990s, 11 studies have been conducted within the Offshore Project Area. These studies and a brief summary of their results are presented in Table 4.3-2. Inquiries directed to the Norfolk District Office of the USACE revealed that one additional study related to surveys executed within a shipping channel leading to the Port of Norfolk had been conducted; however, that report was not readily available at the time. Further pursuit of the document using resources at the archives at the VDHR resulted in no response. The report will be reviewed when available through either the Norfolk District Office of the USACE or the VDHR.

Table 4.3-2. Previous Hydrographic and Cultural Resources Remote Sensing Investigations Within and in the Vicinity of the Offshore Project Area

Date	Author(s)	Title	Client/Agency	Contractor	Summary Results
1996	David Robinson and Martha Williams	*Phase I Remote Sensing Marine Archeological Survey of the Proposed Dredge Site at Sandbridge Shoal, Virginia Beach, Virginia*	Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA	R. Christopher Goodwin & Associates, Inc., Frederick, MD	The survey identified six "relatively weak" magnetic anomalies within the surveyed project area; no further investigations were recommended.
1998	Gordon Watts	*Phase I Remote Sensing Archaeological Survey of the Sandbridge Shoal Borrow Areas Near Virginia Beach, Virginia*	U. S. Army Corps of Engineers, Wilmington District	Tidewater Atlantic Research, Inc., Washington, NC	The survey identified no magnetic or acoustic anomalies within the proposed borrow area, which lay 3 nautical miles (nm) 6 kilometers (km) offshore of Sandbridge, VA. This survey area was expanded by Watts' 2007 work.
2005	Lawrence T. Krepp	*Virginia: Approaches to Chesapeake Bay: 8 NM southeast of Cape Henry* (Hydrographic Descriptive Report #11401).	National Oceanic and Atmospheric Administration/National Ocean Service (NOAA/NOS)	NOAA/NOS	Basic hydrographic data obtained by side-scan sonar and multi-beam sonar. Coverage was limited to areas between 30 and 60 feet ((ft; 9 and 18 meters [m]) charted depths. This survey encountered three items that are listed on the vessel wreck table including an unidentified vessel characterized as an obstruction. Surveyors recommended removal of this item.
2006	Emily Christman	*Virginia: Approaches to Chesapeake Bay: 10 NM southeast of Cape Henry.* (Hydrographic Descriptive Report #11301)	NOAA/NOS	NOAA/NOS	This report was part of a series responding to concerns of the Virginia and Maryland Pilots a/ Associations for updated hydrographic data. Twenty-five (25) square nautical miles (nm^2; 86 square kilometers [km^2]) were surveyed using side-scan sonar and shallow-water multi-beam sonar equipment.
2006a	Raymond Slagle	*Approaches to Chesapeake Bay: 15 NM southeast of Cape Henry* (Hydrographic Descriptive Report #H11303)	NOAA/NOS	NOAA/NOS	This report was part of a series of multi-beam and side-scan sonar surveys that responded to concerns of Virginia and Maryland Pilots' Associations for updated hydrographic data and to accommodate deep draft bulk carriers. The survey covered 13 nm^2 (45 km^2).
2006b	Raymond Slagle	*VA: Approaches to Chesapeake Bay: 17 NM southeast of Cape Henry* (Hydrographic Descriptive Report #H11568)	NOAA/NOS	NOAA/NOS	This side-scan sonar and multi-beam echosounder survey investigated a total of 27 nm^2 (93 km^2) southeast of the Chesapeake Bay buoy. This survey found one previously unidentified wreck, which was described as "mostly buried in sediment, with a prominent mast at the bow," at a depth of 57 ft (19 m).
2007	Gordon Watts	*Archeological Remote Sensing Survey of Offshore Borrow Areas near Sandbridge, Virginia*	U. S. Army Corps of Engineers, Wilmington District	Tidewater Atlantic Research, Inc., Washington, NC	Phase I remote sensing of two proposed borrow areas 3 mi (5 km) offshore of Sandbridge, VA. The survey detected 90 magnetic and/or acoustic anomalies, of which two were confirmed as vessels (one barge and one potential historic wreck). Forty-six (46) additional targets were assessed as potentially significant. Avoidance of all targets was recommended.
2009	Shepard M. Smith	*Virginia: Chesapeake Bay and Approaches: Cape Henry to Portsmouth Marine Terminal.* (Hydrographic Descriptive Report #D00151).	NOAA/NOS	NOAA/NOS	The extreme southeastern segment of this hydrographic survey appears to intersect with the Offshore Export Cable Route Corridor. The entire area surveyed under this order encompassed a total of 32.5 nm^2 (111.5 km^2). The survey entailed recording both multi-beam and side-scan sonar data. All previously charted soundings were found to be accurate within 2 ft (1 m), with depth variations tending towards shoaling. No NOAA (2018) targets were examined during this survey.
2011a	Lawrence T. Krepp	*Virginia: Approaches to Chesapeake Bay: 29 NM East of Cape Henry.* (Hydrographic Descriptive Report #H12309).	NOAA/NOS	NOAA/NOS	This multi-beam and side-scan sonar survey identified two previously charted NOAA (2018) items that are listed in the table of wrecks and obstructions provided in this report. The first item is described a debris field, and NOAA's background research for this vessel indicates that it was torpedoed in 1943 rather than having been sunk as the result of a collision. The second item was found to be associated with several other wrecks that were deliberately scuttled to form an artificial fishing reef.
2011b	Lawrence T. Krepp	*Virginia: Approaches to Chesapeake Bay: Cape Henry to Rudee Inlet* (Hydrographic Descriptive Report #H12315).	NOAA/NOS	NOAA/NOS	Purpose of survey was to update current navigation charts, with special emphasis on concerns expressed by Virginia pilots about depth of clearance for deep-draft coal ships, and to examine two potential new shipping lanes proposed by Virginia's Maritime Association. The side-scan sonar and vertical beam echo sounder survey covered a total area of 364 nm^2 (1249 km^2), including portions that intersect with the Offshore Export Cable Route Corridor. The single item that is listed on the wreck table was not examined, as depths in that area were too shallow. Three previously uncharted wrecks also were identified; none of these appeared to be within the current Offshore Project Area.
2017	Sherilyn Lau	*Virginia: Virginia Beach, VA: 5 NM east of Rudee Inlet* (Hydrographic Descriptive Report #W00412)	NOAA/NOS	NOAA/NOS	Summary only presented online; full descriptive report not available for this multi-beam survey. Summary indicates that "Survey data is not adequate to supersede prior surveys and nautical charts in the common area ."

Charted Wrecks and Obstructions

Table 4.3-2 and Table 4.3-3 present the combined results of a search of four data sets (BOEM 2013; NOAA 2018 [wrecks and obstructions database]; Charles 2004; and Gentile 1992) that provide specific coordinates for 107 charted submerged wrecks and obstructions within the Offshore Project Area and a 1 mi (2 km) buffer zone around the Offshore Export Cable Route Corridor. Table 4.3-3 has been subdivided into four sections: formally named vessels (28 total); diver-named wrecks (e.g., nicknames assigned by the sport diving community to individual resources) (13 total); unidentified/unnamed wrecks (55 total); and objects/obstructions (11 total). Current mapping efforts have eliminated duplicate entries. Specific details, such as vessel sizes, date and cause of vessel losses, cargos, and destinations, were obtained by reviewing additional online websites that contain vessel-specific information; these sources are cited at the bottom of the table and the complete references are included in Section 4.3.1.5, References.

Four considerations should be kept in mind when assessing the results presented in Table 4.3-3. First, submerged cultural resources include not only vessels themselves, but also associated structures, such as pilings, piers, and breakwaters, that may present hazards to navigation. Second, wrecked vessels frequently do not remain intact. Their component parts may separate to become individually charted, and disassociated pieces of wreckage may have been moved away from their original locations by currents and tides. Third, hydrographic surveys that chart such hazards are conducted repeatedly over a number of years and may register such disassociated wreckage as separate items, or remove items, which are no longer considered a hazard. Finally, with reference to specific entries in Table 4.3-3, although latitude/longitude coordinates seem to place these within or in the vicinity of the Offshore Project Area, verbal descriptions provided with those entries clearly indicate widely varying locations that are well removed from the Offshore Project Area. Where such discrepancies exist, the entire entry line has been shaded gray in Table 4.3-3.

Unanticipated Discoveries

In accordance with Lease Stipulation 4.2.7, Dominion Energy notified BOEM of two shipwreck discoveries within the Lease Area. One wreck was discovered on May 11, 2020 (Initial Shipwreck Notification–001), while conducting offshore HRG reconnaissance survey operations. The shipwreck measured approximately 131.2 ft (40.0 m) long, 32.8 ft (10.0 m) wide, and expressed approximately 9.8 ft (3.0 m) of relief above the seabed (Figure 4.3-1). The wreck correlated to an area noted on a NOAA Raster Navigation Chart but was not identified in the NOAA Wrecks and Obstructions Database (NOAA 2018).

A second potential wreck was identified on August 13, 2020 (Initial Shipwreck Notification–005[1]), while conducting offshore HRG reconnaissance survey operations. The second shipwreck measured approximately 164 ft (50 m) long, 32.8 ft (10 m) wide, and expressed approximately 3.2 ft (1.0 m) of relief above the seabed (Figure 4.3-2). The wreck is described as protruding from sloping bathymetry and exposing a potentially prow-like structure. The wreck was not identified in the NOAA Wrecks and Obstructions Database (NOAA 2018).

[1] The second shipwreck notification was inadvertently named Initial Shipwreck Notification–005.

Table 4.3-3. Charted Wrecks and Obstructions Within and in the Vicinity of the Offshore Project Area

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
Bureau of Ocean Energy Management (BOEM) (2013) #3673	Vessel	*Sea Salt II*	Oil Screw	Unknown	0/0/1972	Foundered	No further information.
BOEM (2013) #3671	Vessel	*Powell* a/	Steamer	Unknown	4/6/1920	Unknown	No further information.
BOEM (2013) #5699	Vessel	*Jacob Kienzle*	Schooner	179 GT	7/29/1884	Abandoned	No further information.
BOEM (2013) #10152; Gentile (1992) #321, #324	Vessel	*Edgar E. Clark* b/	Steamship/Tanker	9647 T (Displacement); 499 feet (ft) (152 meters [m]) (L); 68 ft (21 m) (W); 30 ft (9 m) (D)	3/1/1942; 0/0/1977	Torpedoed, Scuttled	WW II Liberty Ship; laid down 1943 and torpedoed by *U-124*. Subsequently scuttled as part of artificial reef.
BOEM (2013) #9586	Vessel	*Teresa*	Steamship	Unknown	3/21/1942	Unknown	No further information.
BOEM (2013) #9295	Vessel	*Philmar*	Fishing Vessel	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #9649; Gentile (1992) # 313,314	Vessel	*James E. Haviland* c/	Steam Screw	7177 GT; 128.9 ft (39.2 m) (L); 17.4 ft (5.3 m) (W); 10.6 ft (3.2) (D)	0/0/1976	Scuttled	WW II Liberty Ship; laid down 1943. Scuttled as part of artificial reef.
BOEM (2013) #9650; Gentile (1992) #311	Vessel	*Webster*	Steam Screw	Unknown	Unknown	Scuttled	WW II Liberty Ship. Scuttled as part of artificial reef.
BOEM (2013) #10184; Gentile (1992) #338	Vessel	USCGC *Cuyahoga* e/	Cutter (Diesel Screw)	320 GT; 129 ft (39 m) (L); 24 ft (7 m) (W)	10/20/1978	Collision/Scuttled	Collided with 521 ft (159 m) M/V *Santa Cruz* II in Chesapeake Bay. Towed to Portsmouth; then sunk as part of artificial reef.
BOEM (2013) #10315; National Oceanic and Atmospheric Administration (NOAA) (2018) #1608; Gentile (1992) #398	Vessel	*Stormy*	Fishing Vessel/Oyster Boat	40 ft (12 m) (L)	Unknown	Unknown	No further information.
BOEM (2013) #10316; NOAA (2018) #3419; Gentile (1992) #404	Vessel	*Salty Sea II*	Fishing Vessel/Clam Boat	105 ft (32 m) (L)	0/0/1972	Unknown	Reported depth is 62 ft (19 m) but, NOAA (2018) entry specifies 45 ft (14 m). No further information.
NOAA (2018) #11448; Gentile (1992) #384	Vessel	*Gulf Hustler*	Fishing Vessel	77 ft (24 m) (L)	Unknown	Unknown	Depth reported as 66 ft (20 m). Vessel merely reported as "sunk." No further information.
NOAA (2018) #903; Charles (2004) #34; Gentile (1992) #306, #307, #310	Vessel	*John Morgan* i/	Steamship	7176 GT; 441.6 ft (134.6 m) (L); 56.8 ft (17.3 m) (W); 34.8 ft (10.6 m) (D).	6/1/1943	Collision	Liberty ship bound from Philadelphia to India with cargo of assorted munitions. Collided with Steamship (SS) *Montana.* Vessel split in two and exploded; stern sank immediately. Casualties: 42 crew and 25 armed guards. Previously charted as 96 ft (29 m) depth; revised to 55 ft (17 m).
NOAA (2018) #11430; Gentile (1992) #408	Vessel	*Kingston Ceylonite* g/	Steam Screw	448 GT; 160.4 ft (48.9 m) (L); 26.6 ft (8.1 m) (W); 14.1 ft (4.3 m) (D)	6/15/1942	Explosion (Mine)	British sub chaser (ex-trawler) loaned to Navy. Struck mine and eighteen (18) British crew perished; 14 were rescued. NOAA (2018) reports depths of between 49-53 ft (15-16 m).
Charles (2004) #36	Vessel	*Rogist*	Yacht	Unknown	Unknown	Unknown	Launched in 1929. No further information.
Gentile (1992) #308, #309, #312	Vessel	*George P. Garrison* j/	Steamer/Cargo	7244 GT; 441.6 ft (134.6 m) (L); 56.8 ft (17.3 m) (W); 34.8 ft (10.6 m) (D)	2/20/1975	Scuttled	Liberty ship.
Gentile (1992) #318, #319	Vessel	SS *Trepca* h/	Steamer/Cargo	5042 GT; 407.2 ft (124.1 m) (L); 53.5 ft (16.3 m) (W); 27.9 ft (8.5 m) (D)	3/13/1942	Torpedoed	Yugoslav registry, enroute from Denarera to Portland, ME; cargo: bauxite. Torpedoed by U-332. Four(4) fatalities. NB: Gentile gives two sets of coordinates for this wreck. Possibly vessel broke in half.
Gentile (1992) #332	Vessel	*Tercel* (formerly *Kern*) k/	Tug	Unknown	Unknown	Unknown	Wreck is in two pieces, bow and stern about 80 ft (24 m) apart.
BOEM (2013) #10391; NOAA (2018) #880; Gentile (1992) #334	Vessel	*Lillian Luckenbach* f/ (formerly SS *Marica*)	Steamship (Oil Screw)	6369 GT; 448.8 ft (137 m) (L); 60 ft (18 m) (W); 25 ft (8 m) (D)	3/27/1943	Collision	Cargo vessel collided with SS *Cape Henlopen*. Reportedly demolished.
BOEM (2013) #10150; NOAA (2018) #14916; Gentile (1992) #387	Vessel	*Francis E. Powell (61, Macy Willis)*	Tanker	7096 GT; 431 ft (131 m) (L); 59 ft. (18 m) (W)	1/27/1942	Torpedoed	Sunk by U-130, enroute from Port Arthur, TX to Providence, RI. Cargo was furnace oil and gasoline. Four (4) dead. Depth: 80 ft (24 m).
BOEM (2013) #2638	Vessel	*Clam Boat*	Trawler	Unknown	Unknown	Unknown	Depth: 50 ft (15 m).
BOEM (2013) #3179	Vessel	*Manhattan*	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #5400	Vessel	USS *Schurtz* m/ *(formerly* SMS *Geier)*	Steamer (Cruiser)	1630 GT; 254 ft (77 m) (L); 32 ft (10 m) (W); 14 ft (4 m) (D)	6/21/1918	Collision	Composite hull, copper sheathed. Collided with SS *Florida*; one (1) dead.
BOEM (2013) #10200	Vessel	*Buck Ridge*	Unknown	Unknown	Unknown	Unknown	Reported depth of 43 ft (13 m).

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
BOEM (2013) #10215	Vessel	*Hans*	Unknown	Unknown	Unknown	Unknown	Reported depth of 67 ft (20 m).
BOEM (2013) #10216	Vessel	Norwegian freighter	Freighter	Unknown	Unknown	Unknown	Reported depth of 70 ft (21 m).
BOEM (2013) #10421	Vessel	*Monroe* d/	Steam Freighter	4704 GT; 366 ft (111 m) (L); 46 ft (14 m) (W)	1/30/1914	Collision	This Old Dominion Line steamship carried passengers between New York and Norfolk. Proceeding northbound to NYC when it collided with the southbound SS *Nantucket* in fog. Forty-one (41) lives lost. Reported depth of 86 ft (26 m).
BOEM (2013) #10424; NOAA (2018) #1262	Vessel	*Wayne*	Schooner	820 GT	0/0/1913	Sunk	Three-masted vessel.
BOEM (2013) #10203	Vessel	"Robinson's Blinker"	Unknown	Unknown	Unknown	Unknown	Reported depth of 41 ft (13 m).
BOEM (2013) #9747	Vessel	"Junk"	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #10207	Vessel	"Seventy-Five Foot Stones"	Unknown	Unknown	Unknown	Unknown	Reported depth of 63 ft (19 m).
BOEM (2013) #10213	Vessel	"Blackfish wreck"	Unknown	Unknown	Unknown	Unknown	Reported depth of 73 ft (22 m).
BOEM (2013) #9731)	Vessel	"Middle Ground Wreck"	Steam Screw	Unknown	Unknown	Unknown	Reported depth of 72 ft (21.9 m).
BOEM (2013) #9647; Gentile (1992) #328	Vessel	"Paddlewheel"	Paddlewheel (possible Steamer)	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #330	Vessel	″Old Ship″	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #350, #353	Vessel	″Chicken Scratch″	Unknown	Unknown	Unknown	Unknown	No further information. NB: Gentile gives two sets of coordinates for this wreck.
Gentile (1992) #380, #381	Vessel	"Dolly Parton Wreck"	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #316, #317	Vessel	"300 ft Wreck"	Unknown	Unknown	Unknown	Unknown	Wooden vessel. No further information.
Gentile (1992) #388	Vessel	"Stanchion Wreck"	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #396	Vessel	"River Front Junction"	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #932;	Vessel	"Four A Wreck"	Unknown	Unknown	Unknown	Unknown	No further information.
Charles (2004) #35	Vessel	Unknown	Brig	Unknown	2/8/1805	Unknown	Cargo was rum and sugar.
BOEM (2013) #9677	Vessel	Unknown	Barge (Steel)	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #933	Vessel	Unknown	Freighter	Unknown	Unknown	Unknown	Stern section only.
BOEM (2013) #917	Vessel	Unknown	Barge (Steel)	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #959	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #8996; Northern Maritime Research (NMR) (2002) #554057	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8499; National Oceanic and Atmospheric Administration (NOAA) (2018) #2940	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth is 44 ft (13 m). Hydrographic survey in 2005 classified this item as disproved.
BOEM (2013) #8500; NOAA (2018) #3329	Vessel	Unknown	Unknown	Unknown	0/0/1942	Unknown	Nearest state is VA. 2005 hydrographic survey (Christman 2006) did not find this item.
BOEM (2013) #8600; NOAA (2018) #779	Vessel	Unknown	Schooner	Unknown	0/0/1910	Unknown	Three-masted vessel. Nearest state is VA. No further information.
BOEM (2013) #8601; NOAA (2018) #788	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Reported depth of 56 ft (17 m). No further information.
BOEM (2013) #8620; NOAA (2018) #7526	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Christman (2006) recommended deleting 52 ft (16 m) deep obstruction.
BOEM (2013) #8621; NOAA (2018) #7527	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8622; NOAA (2018) #7528	Vessel/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	NOAA (2018) obstruction cleared to depth of 59 ft (18 m). Nearest state is VA. No further information.
BOEM (2013) #8622; NOAA (2018) #7529	Vessel/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	NOAA (2018) reports "old anchor buoy weight" as obstruction at 58 ft (18 m), cleared to 57 ft (17 m). Nearest state is VA. No further information.
BOEM (2013) #8632; NOAA (2018) #8152	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Reported depth: 35 ft (11 m). Nearest state is VA. No further information.

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
BOEM (2013) #8633; NOAA (2018) #8277	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Depth is 48 ft (15 m). depth. Wreck located near VA. No further information.
BOEM (2013) #8634; NOAA (2018) #8278	Vessel/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Wreck/obstruction located near VA at 47 ft (14 m). depth. No further information.
BOEM (2013) #8669; NOAA (2018) #9930	Vessel	Unknown	Passenger/Cargo	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8695; NOAA (2018) #12992	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Wreckage depth: 43 ft (13 m). Near VA. No further information.
BOEM (2013) #8696; NOAA (2018) #12993	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Reported depth of wreckage: 51 ft (16 m). Located near VA. Removal of this item was recommended.
BOEM (2013) #8708; NOAA (2018) #11433	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth: 60 ft (18.3 m).
BOEM (2013) #8709; NOAA (2018) #11434	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported BOEM depth: 58 ft (17.7 m). Reported NOAA (2018) depth: 64 ft (20 m).
BOEM (2013) #8711; NOAA (2018) #11431	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth: 60 ft (18 m).
BOEM (2013) #8855; NMR (2002) #536111	Vessel	Unknown	Fishing Vessel	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8948; NMR (2002) #600821	Vessel	Unknown	Unknown	Unknown	0/0/1959	Unknown	Wreck depth: 46 ft (14 m) near VA.
BOEM (2013) #8989; NMR (2002) #553919	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8990; NMR (2002) #553925	Vessel	Unknown	Unknown	Unknown	0/0/1942	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8991; NMR (2002) #553931	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #8993; NMR (2002) #553985	Vessel	Unknown	Sailing Vessel (Unidentified Type)	Unknown	0/0/1924	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9022; NMR (2002) #552983	Vessel	Unknown	Unknown	Unknown	7/7/1943	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9025; NMR (2002) #552155	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9296; NMR (2002) #528209	Vessel	Unknown	Fishing Vessel	Unknown	Unknown	Unknown	Reported depth: 99 ft (30 m); nearest state is VA.
BOEM (2013) #9119; NMR (2002) #548681	Vessel	Unknown	Unknown	Unknown	0/0/1925	Unknown	Nearest state is VA. Reported depth: 56 ft (17 m). No further information.
BOEM (2013) #9186; NMR (2002) #539171	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. Reported depth: 56 ft (17 m). No further information.
BOEM (2013) #9625	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	Reported depth of 41.0 ft (12.5 m).
BOEM (2013) #9221; NMR (2002) #534059	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9234; NMR (2002) #531701	Vessel	Unknown	Unknown	Unknown	Unknown	Unknown	Nearest state is VA. No further information.
BOEM (2013) #9646; Gentile (1992) #303	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #9652	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
NOAA (2018) #15065	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	NOAA (2018) reports depth as 14.41 fathoms (86.46 ft).
NOAA (2018) #14904	Vessel	Unknown/ Unidentified	Unknown	180 ft (L)	(Reported) 4/0/1988	Unknown	Described as "steel hulled vessel." No further information.
NOAA (2018) #15063	Vessel	Unknown/ Unidentified	Unknown	Unknown	(Reported) 2011	Unknown	Reported depth is 10.7 fathoms (64.2 ft). No further information.
NOAA (2018) #15064	Vessel	Unknown/ Unidentified	Unknown	Unknown	(Reported) 2011	Unknown	Reported depth is 14.73 fathoms (88.38 ft). No further information.
NOAA (2018) #15147	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	Reported depth is 27.4 ft (8.4 m). No further information.

Ref./Item Nos.	Wreck/Obstruction	Name	Type	Vessel Size (GT/ L/W/D)	Date Lost	Cause	Additional Comments
Gentile (1992) #300	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #305	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #327	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #343	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #352	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #401	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #406	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #407	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
Gentile (1992) #409	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	No further information.
BOEM (2013) #4362	Vessel	Unknown	Freighter	Unknown	Unknown	Unknown	Verbal description gives general location as NC.
BOEM (2013) #9729	Vessel	Unknown/ Unidentified	Unknown	Unknown	Unknown	Unknown	Reported depth of 103 ft (31 m).
BOEM (2013) #8710; NOAA (2018) #11435	Object/Obstruction	Artificial Reef	N/A	N/A	Unknown	N/A	No further information.
BOEM (2013) #1095	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Cluster of three magnetic anomalies consistent with shipwreck debris. Depth: 41 ft (12.5 m). No further information.
BOEM (2013) #1089	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Two (2) magnetic anomalies consistent with shipwreck debris. Depth: 41 ft (13 m). No further information.
BOEM (2013) #1088	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Cluster of three magnetic anomalies consistent with shipwreck debris. Depth: 43 ft (13 m). No further information.
BOEM (2013) #1087	Object/Obstruction	Unknown	Unknown	Unknown	Unknown	Unknown	Two magnetic anomalies consistent with shipwreck debris. Depth: 41 ft (13 m). No further information.
BOEM (2013) #4401	Object/Obstruction	Train Cars	Wreckage	Unknown	Unknown	Unknown	Verbal description gives general location as North Carolina. Depth: 42–60 ft (13–18 m).
NOAA (2018) #11431	Obstruction	Unknown	N/A	N/A	N/A	N/A	Reported depth is 60 ft (18 m).
NOAA (2018) #3330	Obstruction	Pier Remains	N/A	N/A	(Reported) 1976	N/A	Unmapped remains of apparent shoreline pier; feature had disappeared from charts by 1980.
NOAA (2018) #3331	Obstruction	Piling	N/A	N/A	(Reported) 1975	N/A	Feature had disappeared from charts by 1980.
NOAA (2018) #3332	Obstruction	"Sand Trap"/Breakwater?	N/A	N/A	(Reported) 1975	N/A	Feature had disappeared from charts by 1980.
NOAA (2018) #2940	Obstruction	Unknown	N/A	N/A	N/A	N/A	No further information.

Note:
In some cases, latitude/longitude coordinates place listed items within or in the vicinity of the study area, but alternate verbal descriptions indicate widely varying locations outside of the Project study area. Where such discrepancies exist, entry lines have been shaded gray.

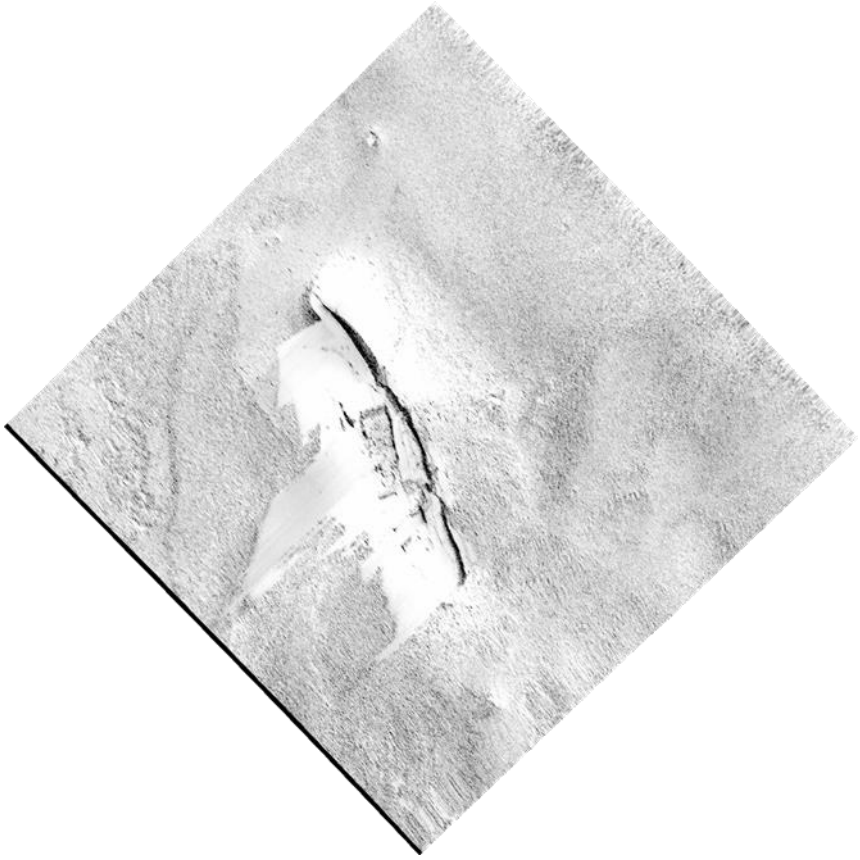

Figure 4.3-1. Side Scan Sonar Image of the Shipwreck Reported in the Initial Shipwreck Notification–001

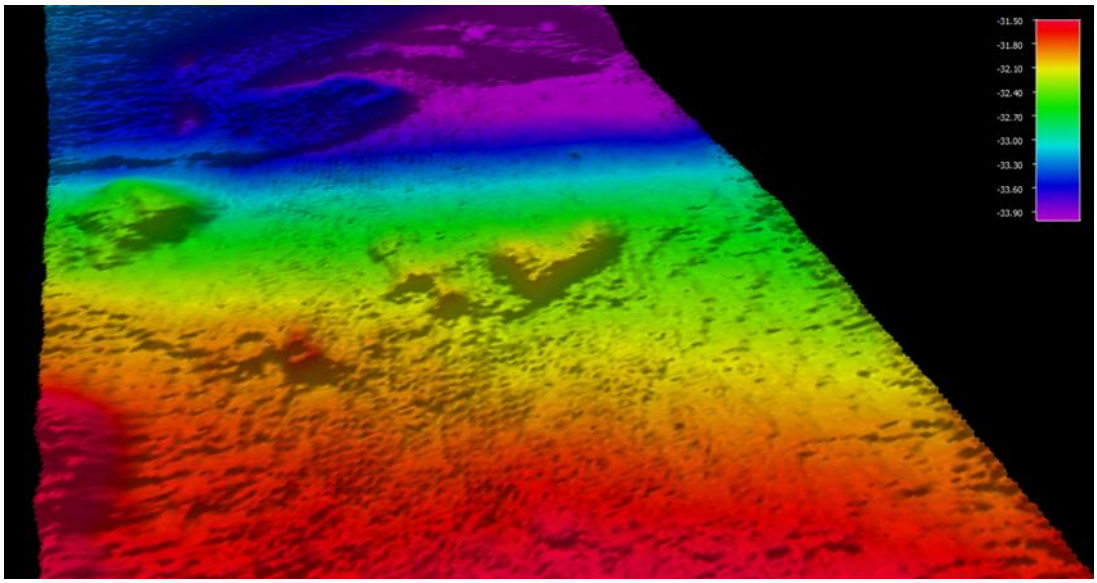

Figure 4.3-2. Oblique 3-Dimensional View of Gridded Raw Multibeam Data along Line TLB50 Showing the Potential Shipwreck Reported in the Initial Shipwreck Notification–005[2]

[2] The second shipwreck notification was inadvertently named Initial Shipwreck Notification–005.

Four additional wrecks were discovered while conducting offshore HRG reconnaissance survey operations within the Lease Area and were reported on May 13, 2020 (Initial Shipwreck Notification–002 and Initial Shipwreck Notification–003). Sonar reports created by the Virginia Marine Resources Commission in 2008 list locational data for the wrecks along with side-scan sonar images. This information was compared with the locations and images generated for the shipwreck notifications. The first and second contacts of Initial Shipwreck Notification–003 were identified as most likely belonging to two named vessels.

On March 16, 2021, while conducting low-frequency, high-resolution geophysical survey operations, survey equipment became entangled within an unknown object (unknown to the survey vessel crew at the time) on the seafloor that was later determined to be a shipwreck. This shipwreck was previously identified on May 13, 2020, and reported to BOEM as noted above. The shipwreck encountered was not noted on the electronic navigational chart used during survey operations by the survey vessel. An incident report was submitted to BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) in accordance with 30 CFR § 585.831 on March 17, 2021. BSEE provided a response on April 7, 2021, noting that the incident was being reviewed and that Dominion Energy was cleared to recover the equipment that was entangled in the shipwreck. They also recommended that Dominion Energy should contact the Virginia Marine Resources Commission (VMRC) to provide notification that remote sensing gear was lost on one of the reefed vessels, as well as to provide the opportunity to participate in both the planning as well as recovery efforts. Dominion Energy provided the incident report to VMRC for review and coordination with USACE.

BOEM Issued a Notice of Noncompliance to Dominion Energy on October 5, 2021 for the entangled survey equipment. Dominion Energy submitted a plan for corrective action to BOEM on October 19, 2021. The equipment was safely and successfully recovered on December 28, 2021. On January 31, 2022 Dominion Energy submitted a letter to BOEM addressing all corrective actions requesting closure of the issue. BOEM issued a closure letter for this issue to Dominion Energy on July 20, 2022.

On April 5, 2021, six additional shipwrecks were reported that were discovered during the offshore HRG survey campaign. Of these, three shipwrecks have been previously charted in the NOAA Automated Wreck and Obstruction Information System (AWOIS) database (Initial Shipwreck Notification – 010, 011, and 014). The other three (Initial Shipwreck Notification – 012, 013, and 015), appeared to be new discoveries. The shipwreck discovered on June 21, 2020 (Initial Shipwreck Notification – 012) measured approximately 98 ft (30 m) long, 36 ft (11 m) wide, and expressed approximately 3 ft (1 m) of relief above the seabed (See Figure 4.3-3). The shipwreck discovered on October 7, 2020 (Initial Shipwreck Notification – 013) measured approximately 371 ft (113 m) long, 102 ft (31 m) wide, and expressed approximately 7 ft (2 m) of relief above the seabed (See Figure 4.3-4). The shipwreck discovered on August 9, 2020 (Initial Shipwreck Notification – 015) measured approximately 105 ft (32 m) long, 20 ft (6 m) wide, and expressed approximately 13 ft (4 m) of relief above the seabed (See Figure 4.3-5). None of these three wrecks were identified in the NOAA Wrecks and Obstructions Database (NOAA 2018).

Figure 4.3-3. Side Scan Sonar Image of the Shipwreck Reported in the Initial Shipwreck Notification–012

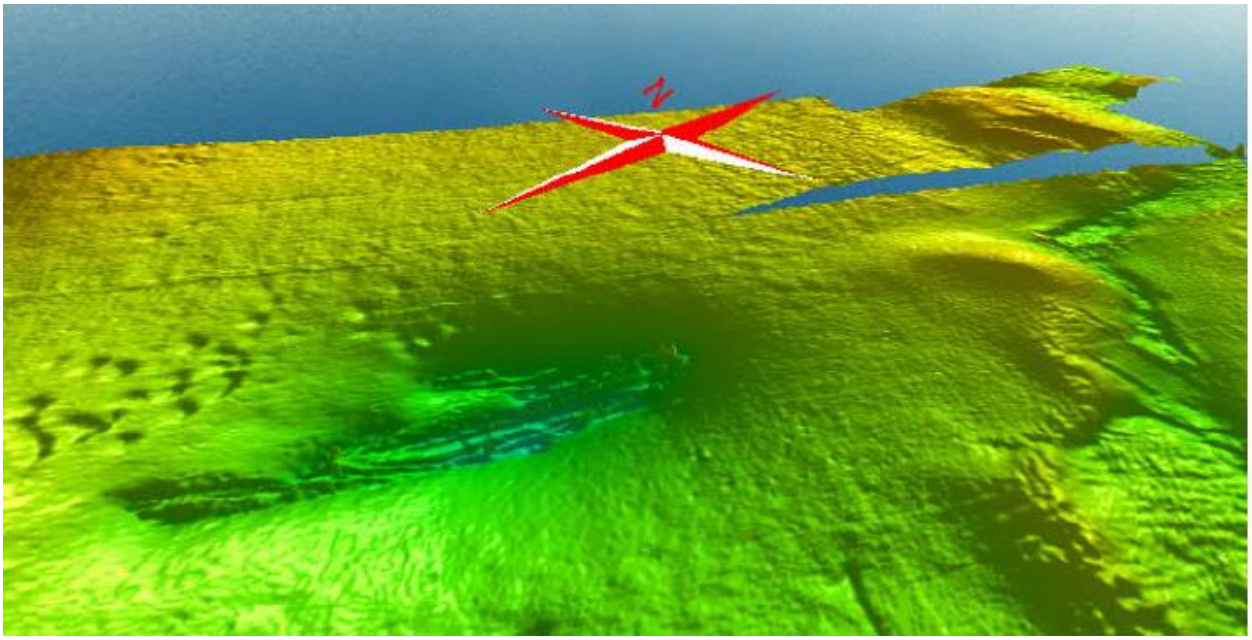

Figure 4.3-4. Oblique 3-Dimensional View of Gridded Raw Multibeam Data along WTG04 Showing the Potential Shipwreck Reported in the Initial Shipwreck Notification–013

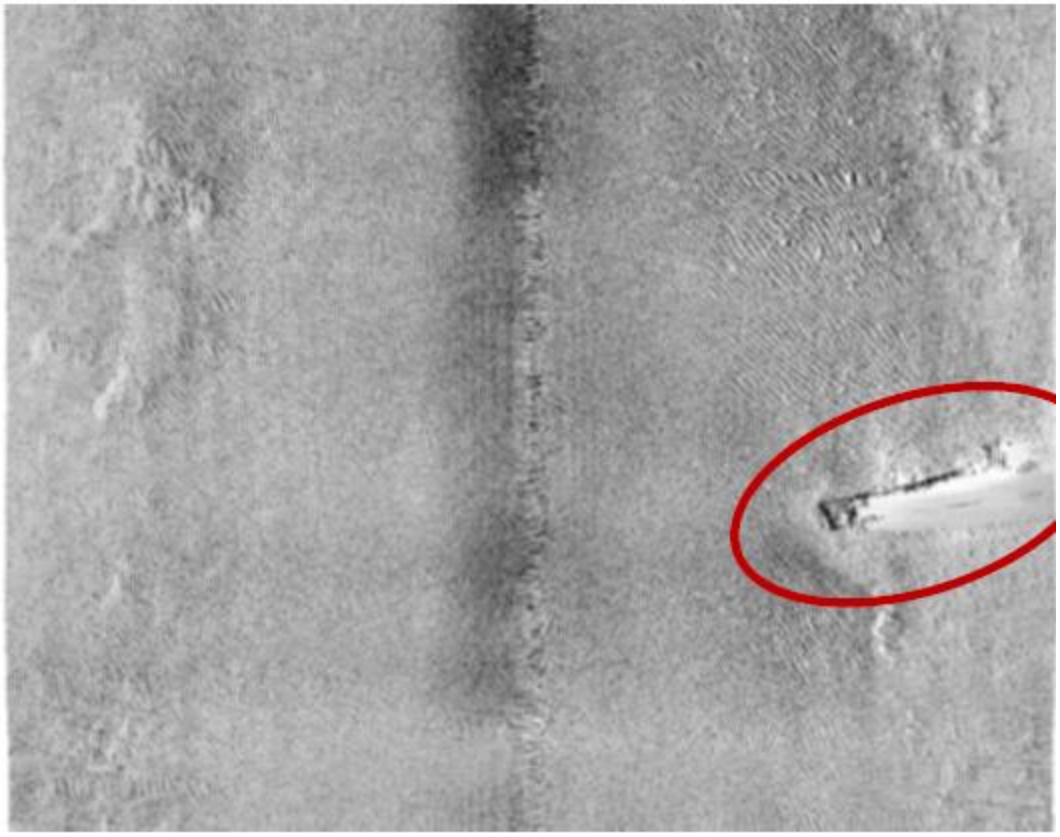

Figure 4.3-5. Side Scan Sonar Waterfall Image of the Shipwreck Reported in the Initial Shipwreck Notification–015

4.3.1.2 Research Design

Research Objectives

The HRG survey data gathered to date has been reviewed by a qualified marine archaeologist (QMA) to identify magnetic anomalies, sonar contacts, and sub-bottom acoustic reflectors that may represent significant submerged cultural resources, in order to provide management recommendations. Submerged cultural resources include the complete range of historic properties as defined by Section 106 of the NHPA and paleolandforms (ancient submerged landform features or "ASLFs") that have a high probability of containing pre-contact archaeological sites (BOEM 2020).

The natural and anthropogenic forces that impact shipwrecks typically deposit or scatter ferrous and nonferrous objects, such as fasteners, anchors, engine parts, ballast, weaponry, cargo, tools, wooden or iron hull remains, and miscellaneous related debris across the seabed. Comprising what are known as debris fields, these objects normally can be detected with a remote sensing array that includes a marine magnetometer (or gradiometer), side scan sonar, sub-bottom profiler, and a multibeam echo sounder. Such an array detects and records anomalous magnetic, acoustic, and seismic signatures. Critical elements in the interpretation of such anomalies are their spatial distribution or patterning, and in the case of magnetic anomalies, their amplitude (deflection of the earth's magnetic field), duration, and orientation (Camidge et al. 2010). Given the importance of anomaly patterning, and the correlation of data from the entire remote sensing array, accurate sensor tracking/positioning is essential.

Geophysical Investigations

Data Matrix

Dominion Energy established data transfer protocols and archaeological information needs for data collection (i.e., detailed surface, subsurface mapping), interpreted data, charting and reporting. Established processes for the transfer of large datasets resulted in a streamlined and efficient workflow process throughout the 2020 and 2021 HRG survey and geotechnical campaigns to ensure that all resulting data products meet the format, content, and other specific data requirements for analysis and BOEM and SHPO review.

HRG Survey Methodology

An HRG survey within the Offshore Project Area was conducted in 2020 and 2021 to support the COP. The HRG survey provides a summary of the geological, archaeological, and cultural resource conditions that exist within the Offshore Project Area. The resulting baseline understanding of the seabed and subsurface sediment conditions support the planning and engineering of the Offshore Project Components. Dominion Energy held pre-survey meetings with BOEM and Native American tribes to discuss the objective of each survey stage, prior to the execution of the survey campaign.

HRG Survey Results

The HRG surveys (2020-2021) provided a summary of the environmental contexts and cultural resources within the Lease Area and along the proposed Offshore Export Cable Route Corridor. The resulting characterization of the seabed and subsurface supports planning of future geophysical, geotechnical, and engineering activities to assist in identifying the preferred planning/layout, installation, and operational right-of-way for the Project.

The HRG survey identified 34,439 magnetic anomalies and 2,268 side scan sonar contacts within the Project APE. Thirty-one potential cultural resources were identified; 18 in the Lease Area and 13 in the Export Cable Route Corridor. In addition to seabed findings, five preserved paleolandforms were identified within the Lease Area. No paleolandforms were identified in the Offshore Export Cable Route Corridor.

Recommended minimum avoidance zones for these resources were designed based on the extent of these potential resources gleaned from side scan sonar, MBES, SBP, seismic, and magnetometer data (Table 4.3-4 and Table 4.3-5).

Table 4.3-4. Potential Cultural Resources Identified within the Export Cable Route Corridor and Lease Area

Target ID a/	Associated Side Scan Sonar Contacts	Associated Magnetic Anomalies	Location	Centroid Easting (X) b/	Centroid Northing (Y) b/	Longitude c/	Latitude c/	Cultural Resources Recommended Minimum Avoidance Area
Target 1	BE-S21-0011	-	Lease Area	480211.89	4085680.89	-75.22216	36.91694	164 ft (50 m) radius from center point
Target 2	WTG23-S20-0005	WTG23-M20-0241	Lease Area	479800.58	4079902.33	-75.22662	36.86484	164 ft (50 m) radius from center point
Target 3	WTG10-S21-0017	WTG11-M20-1286	Lease Area	473039.11	4094677.03	-75.30300	36.99785	164 ft (50 m) radius from center point
Target 4	WTG17-S20-0021, WTG17-S20-0022, WTG17-S20-0026, WTG17-S20-0027, WTG17-S20-0028, WTG17-S20-0029	WTG17-M20-0150	Lease Area	472916.89	4082415.94	-75.30394	36.88732	164 ft (50 m) radius from center point
Target 5	WTG18-S20-0008	WTG18-M20-0287, WTG18-M20-0288, WTG18-M20-0289, WTG18-M20-0290	Lease Area	473347.98	4081318.28	-75.29906	36.87744	164 ft (50 m) radius from center point
Target 6	WTG17-S20-0015	WTG17-M20-0564, TLC-M20-0620, TLC17-M20-0621	Lease Area	471946.75	4080901.69	-75.31477	36.87364	164 ft (50 m) radius from center point
Target 7	WTG18-S21-0074, WTG18-S21-0075, WTG18-S21-0076	-	Lease Area	473113.49	4079368.38	-75.30162	36.85986	164 ft (50 m) radius from center point
Target 8	-	WTG11-M20-0935, WTG11-M20-0922, WTG11-M20-1321, WTG11-M20-0930, WTG11-M20-0932	Lease Area	468856.21	4088274.12	-75.34975	36.94001	164 ft (50 m) radius from visible extent (3.96 ac [1.60 ha])
Target 9	WTG16-S20-0003	WTG16-M20-0191, WTG16-M20-0194	Lease Area	469562.43	4079424.18	-75.34146	36.86025	164 ft (50 m) radius from center point
Target 10	TLB-S20-0083, TLB-S20-0084, TLB-S20-0085, WTG07-S21-0136, WTG07-S21-0137, WTG07-S21-0138	WTG07-M21-0127, WTG07-M21-0128	Lease Area	466148.32	4091084.41	-75.38028	36.96524	164 ft (50 m) radius from visible extent (3.38 ac [1.37 ha])

Target ID a/	Associated Side Scan Sonar Contacts	Associated Magnetic Anomalies	Location	Centroid Easting (X) b/	Centroid Northing (Y) b/	Longitude c/	Latitude c/	Cultural Resources Recommended Minimum Avoidance Area
Target 11	WTG08-S20-0036	WTG08-M20-0669	Lease Area	466179.73	4090048.85	-75.37989	36.95591	164 ft (50 m) radius from visible extent (2.99 ac [1.21 ha])
Target 12	WTG10-S21-0010	WTG11-M20-0599, WTG10-M21-0154, WTG11-M20-0603, TLC-M20-0390	Lease Area	465833.30	4084526.26	-75.38353	36.90612	164 ft (50 m) radius from center point
Target 13	WTG13-S21-0057	WTG14-M20-0099	Lease Area	465198.06	4077751.07	-75.39035	36.84502	164 ft (50 m) radius from center point
Target 14	TLB-S20-0135	-	Lease Area	464568.70	4074707.55	-75.39726	36.81756	164 ft (50 m) radius from visible extent (4.18 ac [1.69 ha])
Target 15	WTG03-S20-0008	WTG03-M20-0539	Lease Area	462574.39	4094176.61	-75.42059	36.99298	164 ft (50 m) radius from visible extent (4.18 ac [1.69 ha])
Target 16	-	TLC-M20-0227, WTG04-M20-0425, WTG04-M20-0426, WTG04-M20-0427, WTG04-M20-0429, WTG04-M20-0430, WTG04-M20-0432, WTG04-M20-0434, WTG04-M20-0435, WTG04-M20-0437, WTG04-M20-0441	Lease Area	462630.51	4093159.30	-75.41990	36.98382	459 ft (140 m) radius from center point
Target 17	WTG04-S20-0007	WTG04-M20-0346	Lease Area	461827.91	4091066.88	-75.42882	36.96492	164 ft (50 m) radius from center point
Target 18	BW-S21-0079	BS-M21-0033, BS-M21-0034	Lease Area	457483.62	4075185.41	-75.47673	36.82157	164 ft (50 m) radius from center point
Target 19	SSS_A_185, BW-S21-0016	BW-M21-0134	Offshore Export Cable Route Corridor	456674.39	4079162.94	-75.48603	36.85739	164 ft (50 m) radius from center point
Target 20	SSS_A_161	M11126	Offshore Export Cable Route Corridor	453941.74	4076906.78	-75.51654	36.83693	164 ft (50 m) radius from center point
Target 21	SSS_A_155	-	Offshore Export Cable Route Corridor	453615.59	4076944.02	-75.52020	36.83725	164 ft (50 m) radius from center point

Target ID a/	Associated Side Scan Sonar Contacts	Associated Magnetic Anomalies	Location	Centroid Easting (X) b/	Centroid Northing (Y) b/	Longitude c/	Latitude c/	Cultural Resources Recommended Minimum Avoidance Area
Target 22	-	M1106, M1071, M11987	Offshore Export Cable Route Corridor	452108.85	4077214.34	-75.53712	36.83961	164 ft (50 m) radius from visible extent (3.80 ac [1.54 ha])
Target 23	SSS_B_133	M2724	Offshore Export Cable Route Corridor	447971.85	4074788.60	-75.58335	36.81752	164 ft (50 m) radius from center point
Target 24	SSS_B_131	M12603	Offshore Export Cable Route Corridor	447514.25	4075107.86	-75.58850	36.82038	164 ft (50 m) radius from center point
Target 25	SSS_C_130	M14636, M4366	Offshore Export Cable Route Corridor	442040.76	4073017.11	-75.64971	36.80121	164 ft (50 m) radius from center point
Target 26	SSS_C_112	M3642	Offshore Export Cable Route Corridor	436051.12	4073173.62	-75.71686	36.80223	164 ft (50 m) radius from center point
Target 27	SSS_D_182	M5143, M5166	Offshore Export Cable Route Corridor	434673.88	4072221.99	-75.73222	36.79356	164 ft (50 m) radius from center point
Target 28	SSS_D_082	-	Offshore Export Cable Route Corridor	431873.61	4072942.49	-75.76367	36.79986	164 ft (50 m) radius from center point
Target 29	SSS_D_334	M24026, M6016	Offshore Export Cable Route Corridor	429789.37	4073111.40	-75.78704	36.80123	164 ft (50 m) radius from center point
Target 30	SSS_E_064, SS_E_161, SSS_E_125	M7009	Offshore Export Cable Route Corridor	426640.81	4072902.44	-75.82232	36.79911	164 ft (50 m) radius from center point
Target 31	SSS_F_034	-	Offshore Export Cable Route Corridor	414943.66	4074539.10	-75.95360	36.81288	164 ft (50 m) radius from center point

Notes:
a/ Targets are in alpha-numeric order.
b/ Projected coordinate system in UTM18N NAD1983 (2011), meters.
c/ Projected coordinate system in NAD1983 (2011).
"-" indicates no magnetic anomaly associated with the side scan sonar contact.

Table 4.3-5. Paleolandform features identified within the Lease Area.

Paleolandform ID	Centroid Easting (X) a/	Centroid Northing (Y) a/	Centroid Longitude b/	Centroid Latitude b/	Minimum Depth BSB	Area of Recommended Minimum Avoidance (ac)	Within Project Component APE
P-01	459831.40	4094886.30	-75.45145	36.99927	-33.66 c/	10.71	No
P-02-A	462187.59	4094324.99	-75.42494	36.99431	-10.03	103.22	WTG 12-3
P-02-B	462202.35	4093629.24	-75.42474	36.98803	-4.81	7.15	No
P-03	470982.94	4092002.05	-75.32601	36.97368	-8.69	9.91	No
P-04-A	464988.91	4089923.42	-75.39325	36.95474	-3.41	3.94	No
P-04-B	464412.23	4089748.22	-75.39972	36.95314	-4.60	22.05	No
P-05	478064.32	4077106.66	-75.24602	36.83960	-23.49	5.45	No

Notes:
a/ Projected coordinate system in UTM18N NAD1983 (2011), meters.
b/ Projected coordinate system in NAD1983 (2011).
c/ Depth for P-01 is provided as below MLLW

Geotechnical Clearances

The QMA has issued geotechnical clearance reports for the WTG locations and for locations along the Offshore Export Cable Route Corridor. A QMA reviewed the HRG survey data in the Lease Area within a 328 by 656 ft (100 by 200 m) rectangular analytical area centered on each of the geotechnical locations co-located at each WTG. Within the Offshore Export Cable Route Corridor, HRG survey data was reviewed within a 591 by 787 ft (180 by 240 m) rectangular analytical area centered on each of the geotechnical sampling locations. The reviewed data included, at a minimum, three parallel lines or two intersecting lines of HRG survey data that captured each of the locations. The HRG review focused on identification of any potential submerged cultural resources and buried, preserved landforms. If any analytical area intersected with a potential cultural resource, then the geotechnical sample location or analytical area was moved, or the analytical area was reduced in size. The geotechnical clearance letters are included in Appendix L, Summary of Agency and Stakeholder Engagement.

Ground Model and Paleoenvironment

A geologic ground model has been developed to determine the ground conditions within the Lease Area (Geo SubSea 2020). This ground model is supported by the collected HRG data that is interpreted within the IHS Markit Kingdom geoscience software to map subsurface seismic layers and features. These interpretations also are supported by sediments and other samples collected during borehole sampling. Preliminary assessment of sediments and seismic stratigraphy indicate that the subsurface conditions and remnant landforms suggested by these data are consistent with prior studies of the region (Mallinson et al. 2005; and Mallinson et al. 2010). These remnant landforms include fluvial systems, barrier islands, back barrier environments including estuarine and wetland zones, tidal sounds, and shallow marine environments such as shoreface and foreshore zones.

Seismic Stratigraphy

Six distinguishable primary units (Unit A through Unit F) and associated bounding horizons (1 through 6) have been identified within the preliminary ground model (Figure 4.3-6). Units A, B and C are the shallowest units and represent time periods in which there was human occupation. Therefore, they present the greatest potential to contain cultural resources.

Unit C

The top of Unit C is bounded by Horizon 2 and the base by Horizon 2.2. Horizon 2.2 lies 20 to 213 ft (6 to 65 m) below seabed (BSB). Horizon 2.2 is a negative reflector that is predominantly continuous, with variable amplitudes and occasional triplet character. Horizon 2.2 is present through most of the Lease Area but is truncated by Horizon 2 in the northwest; it is shallowest in the northwest and deepest in the southeast (Geo SubSea 2020).

Unit C is the lowest unit in which there is potential for cultural resources. This unit overlies Unit D in all but the northwest portion of the Lease Area and consists of finely stratified reflectors. This suggests that Unit C represents a lower energy environment such as back barrier landforms similar to those found today between modern barrier islands and the mainland. Such environments typically include tidal sounds, brackish tidal marshes, and estuarine environments. Unit C also contains multiple areas of incised and filled channels as well as distinct anticlines. These anticlines could be relict shoreface deposits, relict swale and

ridge features, or deltaic lobes, all of which would be consistent with back barrier landforms experiencing tidal influences and sediment transport along both the foreshore and within the estuaries. Further investigation is needed into these anticlines. Unit C is indicative of an extended (stepwise) regression towards glacial conditions as would be expected between marine isotope stage (MIS) 5E and the Last Glacial Maximum (LGM) during MIS 2 (Geo SubSea 2020).

Unit B

The top of Unit B is bounded by the seafloor in the west and northwestern portions of the Lease Area and by Horizon 1 in the central and eastern survey area. Horizon 2 is the base of Unit B and occurs 3 to 74 ft (1 to 23 m) BSB, with the shallowest parts in the north and central portion of the Lease Area and deeper parts scattered throughout the Study Area. The Horizon 2 reflector is negative amplitude reflector, sometimes occurring as a doublet, and is predominantly continuous within the Offshore Project Area (Geo SubSea 2020).

Unit B overlies Unit C for the majority of the Lease Area except for the northwest (landward) portion, where Unit C is absent and instead overlies Unit D. Unit B consists of reworked/disturbed materials in the north and finely stratified/reworked sediments in the south (Geo SubSea 2020).

SEISMIC UNIT DESCRIPTIONS

Units	Horizons	Description
	Seafloor	
A		Reworked/acoustically transparent sediments and channel fill
	H1	
B		Reworked/acoustically transparent sediments and channel fill in northwest; stratified reflectors and channel fill in southeast
	H2	
C		Finely stratified reflectors generally dipping to the southeast; truncated in the northwest by H2; encompasses majority of conspicuous, positive amplitude anomalies
	H2.2	
D		Coarsely stratified reflectors generally dipping to the southeast, somewhat obscured by the seafloor multiple
	H4	
E		Coarsely stratified reflectors, generally dipping to the southeast, interrupted by broad channel features and associated fill
	H5	
F		Coarsely stratified reflectors generally dipping to the southeast with areas of discontinuity/erosional complexity
	H6	

HORIZON SEISMIC SIGNATURES

Horizon	Range TWTT (Seconds)	Description--seismic signatures
Seafloor	0.024-0.054	Peak (positive), continuous, strong amplitude
H1	0.034-0.054	Trough (negative) and peak (positive), discontinuous, variable amplitude
H2	0.039-0.070	Trough (negative), predominantly continuous, some doublet character
H2.2	0.047-0.109	Trough (negative), predominantly continuous, variable amplitude, some triplet character
H4	0.075-0.122	Peak (positive), predominantly continuous, strong amplitude, some doublet character
H5	0.105-0.179	Peak (positive), predominantly continuous, strong amplitude, some doublet character
H6	0.154-0.236	Peak (positive), continuous, strong amplitude

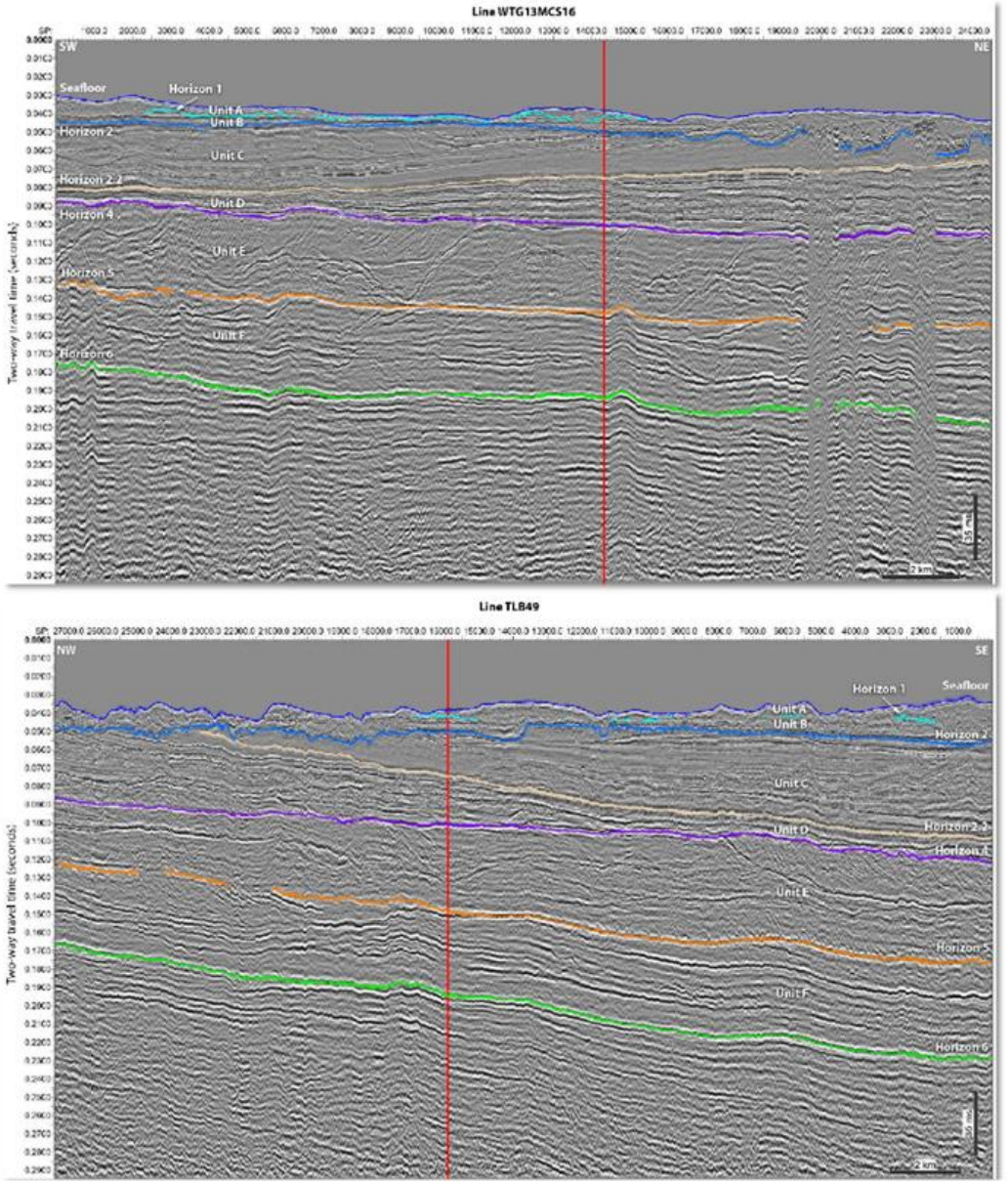

Figure 4.3-6. Summary of Seismic Horizons, Units, and Profiles

This is indicative of partially reworked back barrier sediments associated with marine transgression following subaerial exposure of the middle shelf area. Horizon 2, the lower boundary of Unit B, is interpreted as a subaerial unconformity (Catuneanu et al. 2009) associated with the LGM. As Horizon 2 truncates Units B and C, data indicates this should not be classified as a time-transgressive ravinement surface. Horizon 2 likely corresponds to reflector Q99 identified in Mallinson et al. (2005 and 2010). The complete truncation of Unit C, and likely complete truncation of Unit D further shoreward, suggests that the high-resolution seismic records of Mallinson et al. (2005 and 2010) are compressed with respect to the records because of the lack of the thick C and D units. This is further supported by the work of Thieler et al. (2014), who interpreted the truncation of Q50 (our Horizon 4) by Q99 (our Horizon 2) in the most seaward portion of their A–A profile along the outer shore of Cape Hatteras (Geo SubSea 2020).

Unit A

Unit A is bounded by the seafloor and Horizon 1, and it overlies Unit B. The seafloor horizon is a peak positive reflector with strong, continuous amplitude. The base of Unit A, Horizon 1, is discontinuous and is mainly present in the central, south, and southeastern portions of the Lease Area. The depth of Horizon 1 is variable throughout the Lease Area, ranging from 0 ft (0 m) BSB in the central and eastern portion of the Lease Area to 43 ft (13 m) BSB in the central and southern portions of the Lease Area. Horizon 1 occurs as both a negative and positive reflector with variable amplitudes (Geo SubSea 2020).

Unit A is acoustically transparent and discontinuous in nature, intersecting the seafloor in multiple areas, and disappearing completely in the north/northwestern portions of the Lease Area. Unit A is interpreted as composed of modern, and to some extent, mobile sediments. The lower boundary of Unit A (Horizon 1) is interpreted to be the early Holocene time-transgressive ravinement surface associated with the transition to modern sea level conditions (Fairbanks 1989). Such transitions regularly include the formation and landward migration of barrier island formations, back barrier zones, and transitions of fluvial systems from incising to aggradational. Landforms that might be detected within Unit A include foreshore, shoreface, barrier islands, back barriers, tidal sounds, and estuarine environments including tidal marshes and brackish fluvial systems. The discontinuity of this surface is not surprising given the storm-dominated, hydrodynamic regime of the mid North Atlantic Shelf (Swift et al. 1986; Geo SubSea 2020). Geoarchaeological analysis of sediment samples recovered from boreholes during geotechnical investigations suggests that remnants of these landscapes do survive within the Lease Area, albeit discontinuously.

Sample Collection and Analysis

The overarching goal for the sample collection and analysis process is to inform the development of the probability model for preserved precontact archaeological deposits. To meet this goal, samples acquired during the geotechnical investigations were selected for geoarchaeological analysis based on their potential suitability to retain materials suitable for radiocarbon dating. Samples also were selected based on their potential to aid in paleolandscape reconstruction following sedimentological principles. This was done in parallel to refinement of the ground model developed using HRG surveys.

Sampling Methods

The selected frozen samples were shipped overnight to the QMA for processing. All samples received by the QMA were thawed and portions removed for analysis. Unused portions were re-frozen. Samples selected for grain size analysis were then dried in an oven at 350ºF (177ºC) until fully dried. All samples were visually examined for large lithic materials, shell, and/or macrobotanical materials. If observed, such materials were removed and bagged separately with identification labels.

Selected samples were then subjected to rudimentary grain size analysis, simplified from Folk and Ward (Folk and Ward 1957). Eight-inch (20 cm) screens were used to separate fractions into very coarse sands (0 φ [phi]) and larger, medium to coarse sand (1 φ) and larger, very fine sands (4 φ) and larger, and the silt/clay fraction, represented by grains small enough to pass through the finest mesh to the catch pan. Each separated size fraction was then visually examined again for lithic materials (including micro-debitage), shell, and/or macrobotanical materials that were not apparent during the first visual inspection. A 10x magnifying hand lens was used for this task along with direct lighting. Any additional examples of such materials were extracted and bagged. Each size fraction was then bagged and weighed. Weights were entered into a spreadsheet logging all identifying information, depth in borehole, and interpretation of the landforms represented by the sediments. Samples were assessed against preliminary geotechnical core logs and photographs provided by the geotechnical survey contractor to ensure consistency with prior analysis.

Dating Results and Analysis

Geotechnical surveys (2020/2021) were completed within the Lease Area and Export Cable Route Corridor and to obtain characteristic ranges for relevant geotechnical properties needed for planning and design of offshore foundations and cables. Dominion Energy collected 31 borehole samples in the Lease Area for geoarchaeological analysis during the two years of survey. Eight samples were radiocarbon dead and provided no dates, another five of the samples predate the end of the LGM and the arrival of humans in the Western Hemisphere and another four were dated post end of the LGM but still predated the arrival of humans. Thirteen samples dated to between 16,000 – 11,500 cal BP which corresponds to the Paleoindian Period, and one dated to approximately 10,259-10,051 cal BP which corresponds with the Archaic period.

Table 4.3-6 presents the information gathered from these 31 samples including date when available, analysis of sediments within and located near the sample, analysis of the sample itself including the Multi-Channel Seismic (MCS) seismic data from the borehole location in order to reconstruct the paleolandscape. Calibrated dates before present (cal BP) were determined using Carbon-14/Accelerator Mass Spectrometry (14C AMS) dating.

Table 4.3-6. Archaeological Analysis of Geotechnical Samples

Geotechnical Campaign	Borehole	Sample ID	Depth (m)	Description	Calibrated 14C Accelerator Mass Spectrometry date	Ratio Mass Spectrometry delta 13Carbon (RMS d13C)	Isotope Ratio Mass Spectrometry d18O	Comments
2020 Sampling Results								
GMOP20-G-010	BH-20CB-07-16	PU13	15.5	Bark, unidentified species	Greater than cal BC 44650 (calibrated dates before present [cal BP] 46600)	-26.2 o/oo, depleted, C3 plant	N/A	Evidence for terrestrial surface. No entry in 14C spreadsheet.
GMOP20-G-012	BH-20SB-06-09	PU05-B3	2.8	*Mercenaria* spp. and shell hash	Greater than cal BC 44270 (cal BP 46220)	+0.2 o/oo, enriched, marine waters	1.6, enriched	*Mercenaria* spp. fragments, concreted together in mud. *Mercenaria* spp. show signs of marine growth on both sides of the visible valves, indicating exposure to marine waters before burial in estuarine mud/fine sand. Some fragments of other unidentified shell seen. Bag is labeled BH-20SB-06-09 and sample ID is given as PU05-B3, and depth is given as 9.2 feet (ft; 2.8 meters [m]). 14C spreadsheet appears to have this sample located at BH-20SB-06-07 with sample ID as PU05-B2-C-14.
GMOP20-G-012	BH-20SB-06-09	PU06-B3	2.8	Shell concretions	Greater than cal BC 44270 (cal BP 46220)	+0.2 o/oo, enriched, marine waters	3.74, enriched	Shell concretions including hash and some larger fragments in mud that likely has a significant component of re-crystallization of calcite (freshwater decalcification of shell materials followed by redeposition).
GMOP20-G-012	BH-20SB-06-09	PU07-B4	5.25	Shell fragments	(95.4%) 45263 - 42752 cal BC (47212 - 44701 cal BP)	+0.8 o/oo, enriched, marine waters	-0.63, depleted in d18O	*Mercenaria* spp. fragments, concreted together in mud. *Mercenaria* spp. show signs of marine on both sides of the visible valves, indicating exposure to marine waters before burial in estuarine mud/fine sand. Some fragments of other unidentified shell seen.
GMOP20-G-012	BH-20SB-07-14	PU26-B2	16.5/4.5	Wood	(95.4%) 16253 - 15907 cal BC (18202 - 17856 cal BP)	-29.4 o/oo, depleted, C4 plant	N/A	Wood fragment, either very tumbled or even possibly human modified. Very rectangular in shape with rounded edges. Evidence for a land surface. Mismatch between borehole # and depth. BH-20SB-10-07 given in 14C spreadsheet at a depth of 14.8 ft (4.5 m). This sample may come from BH-20SB-10-07 based on sample type and surrounding sediments but this is unclear at present; sample to be discussed in detail once this item is resolved.
GMOP20-G-012	BH-20SB-07-16	PU13-B2	15.4	Shell, likely oyster (possibly *Crassostrea virginica*)	Greater than cal BC 44270 (cal BP 46220)	+2.0 o/oo, enriched, marine waters	-1.11, depleted	Shell, fragmentary and blackened. Could be pyritized or burned. Interior of shell shows growth of marine organism inside of valve after death. Small rectangular bit of charcoal observed on shell. Shell is delaminated. Interpretation: likely burned.
GMOP20-G-011	BH-20SB-10-07	PU03-BC-C-14	2.8	Wood and other organics	(95.4%) 16021 - 15692 cal BC (17970 - 17641 cal BP)	-25.3 o/oo, depleted, C3 plant	N/A	Sediments are very enriched in organic materials, with some small pebbles in the coarse fraction. All fractions appear to contain organics, and so weights should be considered preliminary and these samples subjected to loss on ignition testing to get percentages of these organics. This sample appears to be a paleosol, probably an upper B horizon in an inceptisol, given the overall context from which it was taken (near or on top of a fluvial point bar). This sample clearly represents a stable land surface that has undergone pedogenesis. It is unclear if the top of the profile has been truncated. However, the abundant organics should provide ample material for radiocarbon dating.
GMOP20-G-012	BH-20SB-10-07	PU03-BC-C-14	3.25	Wood and other organics	(95.4%) 16324 - 15965 cal BC (18273 - 17914 cal BP)	-23.9 o/oo, depleted, C3 plant	N/A	Sediments are very coarse sands with quartz pebbles that are well to very well rounded. Two bark fragments were recovered. Sediments are very dark gray suggesting a high organic content. Coarse particle sizes and dark color of sediments are more consistent with a fluvial point bar landform, possibly an estuarine context. Sediments to be examined for foraminifera.
GMOP20-G-011	BH-20SB-10-07	PU04-BC-C-14	4.7	Wood and other organics	Greater than cal BC 44650 (cal BP 46600)	-26.1 o/oo, depleted, C3 plant	N/A	Sediments are coarse to medium sands with quartz pebbles that are well to very well rounded. Small twig fragments were recovered. Sediments are very dark gray suggesting a high organic content. Particle size suggests fluvial channel and not point bar; lower fines and lower gravel/very coarse sands suggests this.
GMOP-20-G-011	BH-20SB-12-01	PU12-B2-C-14	15.6	Wood and other organics	(95.4%) 11185 - 11039 cal BC (13134 - 12988 cal BP)	-26.5 o/oo, depleted, C3 plant	N/A	Sediments are dominated by medium to fine sands with some clay. Laminae are observed, including several leaf impressions. Ample wood preserved. Interpretation: lacustrine setting, not fluvial.

Geotechnical Campaign	Borehole	Sample ID	Depth (m)	Description	Calibrated 14C Accelerator Mass Spectrometry date	Ratio Mass Spectrometry delta 13Carbon (RMS d13C)	Isotope Ratio Mass Spectrometry d18O	Comments
2021 Sampling Results								
GMOP20-G-017	BH-21SB_CS17	P07-B2-C14	6	Wood	Greater than 43,500 cal BP	-25.5 o/oo	N/A	Sediments are transitioning from very dark gray clay with traces of fine sand and mica to gray poorly graded sand with gravel.
GMOP20-G-017	BH-21SB-A-G1	P03-B3-C14	5	Wood	(78.0%) 12,192-11,932 cal BP	-26.4 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P02-B3-C14	3	Plant Material	(93.0%) 12,005-11,818 cal BP	-26.2 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P03-B1-C14	4	Plant Material	(94.3%) 12,471-12,041 cal BP	-24.8 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P03-B3-C14 Plant	4	Plant Material	(44.6 %) 10,259-10,051 cal BP	-15.8 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P05-B2-C14 Plant	6	Plant Material	(95.4%) 12,725-12,618 cal BP	-21.2 o/oo	N/A	
GMOP20-G-017	BH-21SB-B-G1	PU07-B2-C14 Plant	9	Plant Material	(95.4 %) 13,112-12,918 cal BP	-24.8 o/oo	N/A	
GMOP20-G-011	BH-20SB-12-01	PU12-B2-C14 Plant	15	Plant Material	(84.9 %) 13,011-12,831 cal BP	-28.3 o/oo	N/A	Sediments consist of soft to firm dark greenish gray clay with some thin laminations of fine sand
GMOP20-G-011	BH-20SB-12-09	PU05-B2-C14 Plant	4	Plant Material	(95.4%) 12,834-12,743 cal BP	-13.6 o/oo	N/A	
GMOP21-G-002	BH-21CB_04-10	PU22-B2-C1-14	20	Wood	Greater than 43,500 cal BP	-25.6 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P03-B3-C14 Organic Sediment	4	Organic Sediment	(95.4 %) 13,599-13,450 cal BP	-24.6 o/oo	N/A	
GMOP20-G-017	BH-21SB-A-NG1	P05-B2-C14 Organic Sediment	6	Organic Sediment	(95.4%) 13,801-13,601 cal BP	-23.2 o/oo	N/A	
GMOP20-G-017	BH-21SB-B-G1	PU07-B2-C14 Organic Sediment	9	Organic Sediment	(90.9%) 14,229-14,054 cal BP	-22.6 o/oo	N/A	
GMOP20-G-011	BH-20SB-12-01	PU12-B2-C14 Organic Sediment	15	Organic Sediment	(95.4 %) 13,089-12,909 cal BP	-28.6 o/oo	N/A	Sediments consist of soft to firm dark greenish gray clay with some thin laminations of fine sand
GMOP20-G-017	BH-21SB_05-10	P04-B1-C14	3.5	Wood	(95.4%) 31,292 – 31,036 cal BP	-25.8 o/oo	N/A	

Seismic stratigraphy, sedimentology, and radioisotope and stable isotope results all indicated that paleolandscapes capable of supporting human populations were present and may have been preserved within the Project Area. Much earlier in the geological sequence, and prior to ~45,000 cal BP, Units C-F were deposited during early-late Pleistocene sea-level fluctuations associated with glacial episodes. Units D and C likely were deposited during an interstadial climate period when the coastline was not located at the modern high stand shoreline, nor was it as far seaward as the LGM low stand. Ecological conditions inferred from stable isotope data indicate that both nearshore and terrestrial environments formerly were present in the Project Area. Terrestrial floral assemblages likely were composed of a mesic or temperate forest. Fluctuations in marine water temperatures were detected in oxygen isotope records of shallow marine/brackish water shells. Units D or C likely were deposited during MIS 3. Therefore, it is unlikely that humans occupied this region at such an early period.

Following the LGM, Oldest Dryas materials (18,300 – 17,800 cal BP), as well as Bølling-Allerød materials (13,200 – 12,600 cal BP), were recovered from Unit B. Those remains attest to a landscape dominated by C3 plants, likely boreal or mesic forest cover, which then transitioned into a mix of C3/C4 plants, likely in an intertidal flat or marsh area. Sedimentological data are consistent with deposition in low energy environments such as a sluggish stream, pond and/or floodplain. Although the terrestrial surfaces of Oldest Dryas age are far less likely to have included humans, it is not impossible. However, the terrestrial surfaces dating to the Bølling-Allerød climate episode were more likely to have been visited by human groups of the middle Paleoindian Clovis culture.

4.3.1.3 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

The potential impact-producing factors resulting from the construction, O&M and decommissioning of the Project are based on the maximum design scenario from the Project Design Envelope in Chapter 3, Description of Proposed Activity. The maximum vertical depth of effect for marine archaeological and cultural resources is represented by maximum 12-legged piled jacket foundations, whereas the maximum horizontal area of effect is represented by 202 monopile foundations and three jacket foundations with maximum scour protection. Additionally, the maximum design scenario includes the maximum burial depth and width of the installation corridor for the Inter-Array and Offshore Export Cables.

Construction

During construction, the potential impacts to marine archaeological and cultural resources may include

- disturbance to submerged marine archaeological and cultural resources.

Such disturbances may occur as a result of disturbance to the seabed during installation of the Offshore Project Components. Offshore Project Components, which have the potential to disturb submerged resources during installation activities, include the WTG and Offshore Substation Jacket Foundations and associated scour protection, as well as installation of the Inter-Array and Offshore Export Cables. Additionally, there is potential for disturbance to submerged marine archaeological and cultural resources from Project equipment, such as the anchoring of installation vessels or the legs of jack-up vessels. Sediment suspension and deposition as a result of cable installation may temporarily settle on the seafloor and further impact submerged marine archaeological and cultural resources. However, suspended

sediments would settle close to the Inter-Array and Offshore Export Cable trenches following cable installation; modeled deposition thicknesses were less than 4 centimeters within 25 m of the trench centerline and less than 0.004 in (0.01 cm) at all stations within 8,202 ft (2,500 m) of the trench centerline (Appendix J, Sediment Transport Analysis). Disturbance to submerged marine archaeological and cultural resources will be avoided to the extent practicable through the analysis of the APE conducted by the QMA and adherence to the resulting recommended avoidance buffers. Disturbance to known resources that cannot practicably be avoided would only occur with appropriate consultations and approvals. Additional archaeological investigation of resources that cannot be avoided may be needed to determine whether they are historic properties and to fully assess Project effects on them. Furthermore, Dominion Energy has developed an Unanticipated Discoveries Plan (UDP) as part of the mitigation plan, which will be implemented to avoid and mitigate impacts to unknown resources and ancient submerged landform features. As part of the UDP, Dominion Energy's designated on-vessel representatives have the responsibility to monitor construction sites for potential cultural resources throughout construction. The approved QMA will inspect the discovery and provide a verbal or written notification within 24 hours of suspected discovery. The UDP includes a stop-work order and requires coordination with the Project, the QMA, BOEM, Tribes, and relevant stakeholders on the manner to proceed.

Dominion Energy will establish and comply with requirements for all protective buffers recommended by the QMA for each marine cultural resource (i.e., archaeological resource and ancient submerged landform feature) based on the size and dimension of the resource. Protective buffers extend outward from the maximum discernable limit of each resource and are intended to minimize the risk of disturbance during construction. A draft mitigation plan outlining the proposed avoidance buffers associated with marine archaeological resources has been submitted to BOEM and is included as an attachment to Appendix F of the COP.

Operations and Maintenance

During operations, the potential impacts to marine archaeological and cultural resources may include disturbance to submerged marine archaeological and cultural resources.

Such disturbances may occur as a result of seabed disruption during O&M activities within the APE (i.e., activities involving repair vessels anchoring and submarine cable repairs). However, repairs and other future activities will only occur within previously disturbed portions of the APE which have been previously assessed by the QMA, such as the Offshore Export Cable Route Corridor and existing WTG and Offshore Substation locations. Therefore, adherence to the QMA recommended avoidance buffers will still be in effect, and no submerged resources are anticipated to be disturbed by Project O&M.

Decommissioning

Impacts from decommissioning the Project are expected to be similar to or less than those experienced during construction. Therefore, avoidance, minimization, mitigation, and monitoring measures proposed to be implemented during decommissioning are expected to be similar to those experienced during construction, as described above. Decommissioning techniques are expected to advance during the lifetime of the Project. A full decommissioning plan will be provided to the appropriate regulatory agencies for approval prior to decommissioning activities.

4.3.1.4 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy proposes to implement the following measures to avoid, minimize, and mitigate the potential impact-producing factors described above (Table 4.3-7). Dominion Energy would continue discussions and engagement with the appropriate regulatory agencies and stakeholders (Native American Tribes) throughout the life of the Project to develop an adaptive mitigation approach that provides the most flexible and protective mitigation measures.

As noted previously, Dominion Energy submitted to BOEM a draft mitigation plan describing the measures developed to avoid, minimize and mitigate, potential adverse effects to the range of historic properties identified in the MARA. Dominion Energy will implement the avoidance, minimization, and mitigation measures included in the final, approved mitigation plan.

Table 4.3-7. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization, and Mitigation
Construction; Decommissioning	Offshore Project Area	Disturbance to submerged marine archaeological and cultural resources	• Dominion Energy will develop an operations plan prior to construction, to ensure that construction activities adhere to the recommended avoidance buffers. • Design and construction methods, including micro-siting opportunities, will continue to be evaluated in order to avoid or minimize the extent of seabed disturbance and adverse effects to historic properties. • Disturbance to known resources that cannot practicably be avoided would only occur with appropriate consultations (i.e., BOEM, State Historic Preservation Offices, Tribal Historic Preservation Officers) and approvals. • Additional archaeological investigation of resources that cannot be avoided may be needed to determine whether they are historic properties and to fully assess Project effects on them. • Dominion Energy has developed and will implement an Unanticipated Discoveries Plan (UDP) to avoid and mitigate impacts to unknown resources and ancient submerged landform features. As part of the UDP, Dominion Energy's designated on-vessel representatives have the responsibility to monitor construction sites for potential cultural resources throughout construction. The approved qualified marine archaeologist (QMA) will inspect the discovery and provide a verbal or written notification within 24 hours of suspected discovery. The UDP includes a stop-work order and requires coordination with the Project, the QMA, BOEM, Tribes, and relevant stakeholders on the manner to proceed. • Dominion Energy will establish and comply with requirements for all protective buffers recommended by the QMA for each marine cultural resource (i.e., archaeological resource and ancient submerged landform feature) based on the size and dimension of the resource. Protective buffers extend outward from the maximum discernable limit of each resource and are intended to minimize the risk of disturbance during construction. A Mitigation Plan outlining the proposed avoidance buffers associated with marine cultural resources has been included as an attachment to Appendix F of the COP.
Operations and Maintenance	Offshore Project Area	Disturbance to submerged marine archaeological and cultural resources	• Repairs and other future activities will only occur within previously disturbed portions of the APE which have been previously assessed by the QMA. • Adherence to the QMA recommended avoidance buffers would remain in effect during Operations.

4.3.2 Terrestrial Archaeological Resources

This section describes the terrestrial archaeological resources currently known to be present in the Onshore Project Area. Dominion Energy first conducted a desktop review of available cultural resources data to identify terrestrial archaeological resources within the Onshore Project Area. The subsequent TARA consisted of a Phase I survey consisting of two discrete parts, which for the purposes of reporting are referred to as Phase IA and Phase IB. Tetra Tech undertook a literature review, site reconnaissance, and archaeological sensitivity assessment for the initial Phase IA. Between May 17 and May 21, 2021, Tetra Tech performed a field reconnaissance to assess the archaeological sensitivity of the Project's Proposed Area of Potential Effect (PAPE; Figure 4.3-7). The results of the initial Phase IA portion of the survey informed the strategy for the subsequent Phase IB portion. The Phase IB portion of the survey was carried out between July 2021 and August 2022. The TARA report presented in Appendix G of this COP details terrestrial archaeological resources identified by the survey, recommendations for National Register of Historic Places (NRHP) of identified resources, potential impacts to those resources resulting from construction, operations and maintenance (O&M), and decommissioning stages of the Project, as well as proposed measures to avoid, minimize, and/or mitigate potential impacts to terrestrial archaeological resources as necessary.

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

- Terrestrial Archaeological Resource Assessment (Appendix G), and
- Section 106 Phased Identification Plan (Appendix DD).

The Terrestrial Archaeological PAPE includes the Onshore Project Area and any associated construction ROWs or work areas (as described in Section 3.4.2, Onshore Construction and Installation). The PAPE was designed to include onshore portions of the Project where terrestrial archaeological resources may be subject to direct effects from construction, O&M, and decommissioning of the Project. The PAPE initially included multiple route options and associated facilities currently under consideration. Since October 2021, in consultation with BOEM, the Virginia Department of Historic Resources (VDHR), and the State Corporation Commission (SCC), the TARA Phase IB portion of the survey was focused on a single onshore route option as the Preferred Route Option (Interconnection Cable Route 1). The archaeological survey first encompassed all proposed routes and then shifted focus to the Preferred Route Option after the route was approved by the SCC in August 2022. All portions of the Preferred Route Option were surveyed, including portions of other route options that are collocated with the Preferred Route Option.

This section draws information from publicly available data, Virginia Department of Historic Resources (VDHR) archives data, and the results of the Phase IB portion of the survey. This section was prepared in accordance with BOEM's site characterization requirements in 30 CFR § 585.626(3), BOEM's 2020 *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585*, Section 106 (36 CFR Part 800) of the National Historic Preservation Act, the Virginia Antiquities Act, and VDHR's 2011 *Guidelines for Conducting Historic Resources Survey in Virginia*.

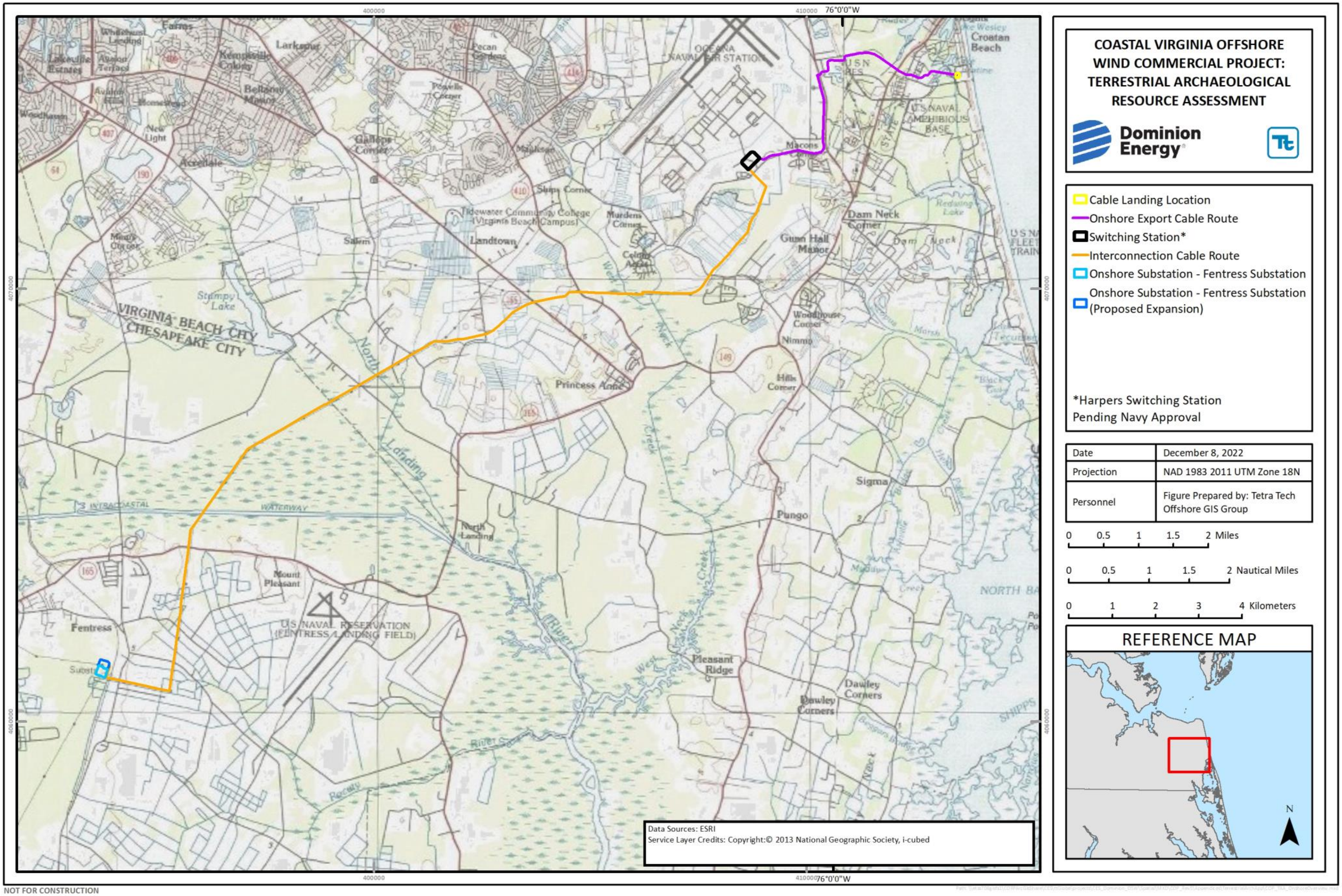

Figure 4.3-7. Terrestrial Archaeological Resources Area of Potential Effects

4.3.2.1 Research Design

Dominion Energy initiated consultation with the VDHR through the submittal of the Project into the VDHR ePIX system on November 16, 2020 (VDHR File No. 2020-4849). Parties consulted include local stakeholders, various Indian tribes, the State Military Reservation (SMR), and the Virginia Department of Military Affairs (VDMA). Meetings and communications to date relative to the TARA are detailed in Table 4.3-8.

Table 4.3-8. TARA Consultation Meetings and Communications to Date

Date	Topic	Attendees
Meetings		
December 3, 2020	Cultural Resources Planning Call	BOEM, VDHR, other stakeholders and consultants
January 29, 2021	Terrestrial Archaeology Planning Call	VDHR and consultants
April 15, 2021	Tribal Engagement Groups Meeting	Tribes and consultants
July 16, 2021	Terrestrial Archaeology Planning Call	VDHR and consultants
August 6, 2021	NEPA/SCC Alignment Discussion	BOEM, VDHR and consultants
September 2, 2021	Terrestrial Archaeology Planning Call	BOEM and consultants
September 23, 2021	Terrestrial Archaeology Planning Call	SMR, VDHR and consultants
September 28, 2021	Cultural Resources Planning Call	SMR and consultants
October 6, 2021	Phased Identification Process Document Planning Call	BOEM and consultants
March 30. 2022	Section 106 Consultation Discussion	BOEM and consultants
April 19, 2022	Phased Identification Document Discussion	BOEM and consultants
June 22,2022	Terrestrial Archaeology Planning Call	VDHR and consultants
June 22,2022	Terrestrial Archaeology Planning Call	BOEM and consultants
July 14, 2022	Nansemond Indian Nation (Nation) Cultural Resources Meeting	Nation and consultants
July 27, 2022	Cultural Resources Workshop	BOEM and consultants
July 28, 2022	Tribal Nations Cultural Resources Meeting	Tribes and consultants
August 2, 2022	Tribal Nations Cultural Resources Meeting	Tribes and consultants
August 9, 2022	Cultural Resources Planning Call	BOEM and consultants
September 9, 2022	Section 106 Consultation Discussion	BOEM, stakeholders and consultants
December 15, 2022	Section 106 Consultation Discussion	BOEM, stakeholders and consultants
Communications		
November 16, 2020	Project Introduction and Preliminary Project Information	Dominion Energy; NC SHPO
April 18, 2021	Data Needs for Section 106 Comments	BOEM; Dominion Energy and Consultants
April 20, 2021	Environmental and Cultural Resources Field Surveys	Dominion Energy; Landowners
April 21, 2021	Applicability of Previous Archaeological Investigations	VDHR; Tetra Tech
June 24, 2021	Route Selection in SMR Camp Pendleton	VDMA; Dominion
June 25, 2021	NOI Readiness Analysis	BOEM; Dominion Energy and Consultants
August 2, 2021	Initial Scoping Comments	Nation; BOEM
August 24, 2021	Subsurface Shovel Testing Intervals in Moderate and Low Archaeological Sensitivity Areas	VDHR; Tetra Tech

Date	Topic	Attendees
August 26, 2021	Identification of Historic Cultural Properties	Dominion Energy; VDMA
September 30, 2021	NOI Readiness Analysis	BOEM; Dominion Energy and Consultants
March 24, 2022	Nation Notice of Participation	Nation; Dominion Energy
June 13, 2022	Draft EIS Request for Information	BOEM; Dominion Energy and Consultants
July 8, 2022	Section 106 Comments	BOEM; Dominion Energy and Consultants
July 29, 2022	Phased Identification Plan Comments	BOEM; Dominion Energy and Consultants
September 9, 2022	Phased Identification Plan Comments	BOEM; Dominion Energy and Consultants
October 7, 2022	Approval of Site Forms	VDHR; Consultants
January 18, 2023	TARA and MARA UDP Comments	Kenah Consulting; Dominion Energy and Consultants
February 17, 2023	TARA Comments	BOEM; Dominion Energy and Consultants
February 24, 2023	TARA Comments	BOEM; Dominion Energy and Consultants

These discussions aided in the development of the TARA Survey Plan (Survey Plan) and methodology for the assessment as well as the Section 106 Phased Identification Plan.

A Survey Plan, which serves as the required VDHR Research Design, was developed for the Project. The Survey Plan was developed in accordance with VDHR guidelines and feedback received during engagement meetings with BOEM, VDHR, and tribes. The Survey Plan was submitted to BOEM and VDHR for review on April 1, 2021. BOEM and VDHR both provided comments on the Survey Plan which were incorporated as appropriate along with additional information based on Project developments and design changes since the original submittal. The revised Survey Plan was submitted to BOEM and VDHR on September 27, 2021. The Survey Plan details the methodology for the TARA including the Phase I and Phase II investigations.

4.3.2.2 Affected Environment

Terrestrial archaeological resources within the PAPE may include archaeological sites that date to as early as 15,000 B.C., or pre-contact time periods (also known as prehistoric time periods), and as recently as from around A.D. 1600 to 1970, or contact and post-contact periods (also known as historic time periods, VDHR 2013). Sites may potentially represent a wide range of types, such as small lithic scatters, village sites, Euro-American farmsteads and agricultural sites, nineteenth century tourism-related sites, twentieth century industrial sites, and military coastal defense sites.

Based on regional patterns of pre-contact settlement and land use within southern Virginia, onshore portions of the Project have the potential to contain sites related to the three major pre-contact cultural periods: Paleo-Indian, 15,000 to 8000 B.C.; Archaic, 8000 to 1200 B.C.; and Woodland, 1200 B.C to A.D. 1600 (VDHR 2013). The environmental setting of the Onshore Project Area, on fairly level terrain near coastal resources and navigable waterways, is ideal for pre-contact resource procurement and settlement. Given their abundance and size, Woodland period sites are considered most likely to be identified within the

PAPE. The PAPE is also considered sensitive for the potential presence of Archaic and Paleo-Indian period sites; however, Pleistocene glacial melting, which resulted in sea levels rising throughout the Paleo-Indian and Archaic periods, submerged many coastal sites. As such, the potential for Paleo-Indian and Archaic period sites to be located within coastal portions of the PAPE is considered lower than that of Woodland period sites.

Through much of the post-contact period (which in this region began in the early 1600s), human use of the Onshore Project Area was largely limited to small-scale agricultural pursuits. Northern portions of historical Princess Anne County supported large-scale plantation agriculture that began to develop in the seventeenth century. The southern part of the county, which includes the PAPE, remained relatively unsettled because of its poorly drained soils that exhibited low fertility. In addition, the area was inaccessible because it lay beyond navigable portions of the Lynnhaven and Elizabeth rivers.

Coastal resort and urban development in Virginia Beach, to the north of the PAPE, began in the 1880s. In 1912, major landscape modifications were undertaken in and near the PAPE during the construction of the State Rifle Range, now the SMR. The SMR is listed on the VLR and the NRHP (National Park Service [NPS] Reference Number: 04000852, VLR File No. 134-0413). The VLR and NRHP listed Albemarle and Chesapeake Canal Historic District and the Centreville–Fentress Historic District are also located within or in close proximity to the PAPE (NPS Reference Number: 04000035, VLR File No. 131-5333; NPS Reference Number: 03000562, VLR File No. 131-5071).

Previous Cultural Resource Studies

A review of previous archaeological surveys within the PAPE identified 34 previous Phase I and Phase II archaeological surveys which intersect the PAPE conducted between 1980 - 2020 (Table 4.3-9).

Table 4.3-9. Previous Archaeological Surveys Within the PAPE

VDHR Survey #	Title	Author	Date
VB-017	A Phase I Archaeological Reconnaissance Survey of the Proposed Improvements to the Entrance to Oceana Naval Air Station, Virginia Beach, Virginia	Wittkofski, J. Mark	1980
VB-025	Review and Compliance Phase I Reconnaissance Summary: North Landing River Bridge Replacement	Virginia Research Center for Archaeology	1980
CS-019	Phase I Cultural Resource Survey of the Proposed Build Alternatives for the Southeastern Expressway in the Cities of Chesapeake and Virginia Beach, Virginia	Traver, Jerome D., and Maryanna Ralph	1989
VB-015	An Archaeological Survey of the Virginia National Guard Camp Pendleton Training Camp Site, City of Virginia Beach, Virginia	Robison, Neil, and Ernie Seckinger	1987
VB-035	An Archeological Survey of the Naval Amphibious Base Annex, Camp Pendleton, Virginia Beach, Virginia	Robison, Neil, and Ernie Seckinger	1987
VB-037	Phase I Cultural Resource Survey Along Proposed Improvements to Oceana Boulevard in Virginia Beach, Virginia	Egghart, Christopher, and Luke Boyd	1991
VB-038	Phase I Archaeological Survey of a Proposed U. S. Navy Construction Project at Owl Creek in Virginia Beach, Virginia	Bussey, Stanley B., and Jerome D. Traver	1992
VB-047	Phase I Cultural Resource Survey, Birdneck Road, City of Virginia Beach, Virginia	Busby, Virginia, and Leslie Bashman	1993

VDHR Survey #	Title	Author	Date
CS-034	Phase I Archaeological Survey of Approximately 2,000 acres at Naval Air Station Oceana, Virginia Beach, Virginia, and Naval Auxiliary Landing Fentress, Chesapeake City, Virginia	Hornum, Michael B, Patrick Giglio, and William T. Dod	1994
CS-044	Additional Phase I Cultural Resource Survey of Revised Alignments for Proposed Southeastern Expressway, Cities of Chesapeake and Virginia Beach, Virginia	Higgins III, Thomas F., Anne S. Beckett, and Veronica Deitrick	1994
CS-070	Centerville Turnpike Interceptor Force Main Phase I Intensive Cultural Resources Survey, City of Chesapeake	Browning, Lyle E.	1994
VB-064	Phase I Archaeological Identification Survey in Support of 1995 Base Realignment and Closure, Naval Air Station Oceana, Virginia Beach, Virginia	Shmookler, Leonid I.	1996
VB-087	Phase I Archeological Survey of Approximately 583 Acres at Naval Air Station Oceana, Virginia Beach, Virginia	Madsen, Andrew D., Michael B. Hornum, Steven A. Mallory, and W. Patrick Giglio	1996
VB-091	Phase I Archaeological Identification Survey in Support of 1995 Base Closure and Realignment, Naval Air Station Oceana, Virginia Beach, Virginia	Shmookler, Leonid I.	1996
VB-066	An Addendum to Phase I Cultural Resource Study of Proposed Improvements to Oceana Boulevard and First Colonial Road in Virginia Beach, Virginia	Hodges, Mary Ellen N., and Margaret Long Stephenson	1997
VB-069	Phase I Archaeological Survey of Proposed Landstown-West Landing, 230 KV Transmission Line, Virginia Beach, Virginia	Stuck, Kenneth E., and Thomas F. Higgins III	1997
VB-079	Archaeological Survey along a Portion of Holland Road (Route 410), the City of Virginia Beach, Virginia	Clarke, Robert, and Bradley Bowden	2000
VB-082	Archaeological Identification Survey, Princess Anne Road and Ferrell Parkway, City of Virginia Beach, Virginia	Brady, Ellen M., and Loretta Lautzenheiser	2000
VB-088	Archaeological Survey of Route 165 (Princess Anne Road) Between Dam Neck Road and Judicial Boulevard, Virginia Beach, Virginia: Management Summary	Tippett, Lee	2002
VB-095	Archaeological Identification Survey and Archaeological Evaluations of Nine Sites Along the Proposed Landstown-West Landing 230 KV Transmission Line, City of Virginia Beach, Virginia	McDonald, Bradley, and Maureen Meyers	2002
VB-097	Supplemental Archaeological Survey of Two Canals within the Proposed Realignment of Elbow Road, City of Virginia Beach, Virginia	Penner, Bruce R.	2003
VB-099	Phase I Archaeological Identification Survey of the Proposed Security Improvements (P-445/P-509), NAS Oceana, Virginia Beach, Virginia	Jensen, Todd L.	2003
CS-078	Archaeological Survey, Proposed Southeastern Parkway and Greenbelt, Cities of Chesapeake and Virginia Beach, Virginia	Baicy, Daniel, Loretta Lautzenheiser, and Michael Scholl	2005
VB-145	Survey of the Architectural and Archaeological Cultural Resources at the Virginia Air National Guard Installations at the Richmond International Airport, Henrico County and the State Military Reservation, Camp Pendleton, City of Virginia Beach, Virginia	Markell, Ann, Katherine Kuranda, Katherine Grandine, and Nathan Workman	2007
VB-125	Phase I Archaeological Survey of the State Military Reservation, 83.81 ha (207 Acres) at Camp Pendleton, Virginia Beach, Virginia	Wayne C.J. Boyko, Beverly Boyko	2008
VB-143	Phase I Archaeological Investigation of Approximately 170 Acres at Naval Air Station Oceana, Virginia Beach, Virginia	Clement, Christopher	2011

VDHR Survey #	Title	Author	Date
NA	Terrestrial Archaeology Survey Report, Virginia Offshore Wind Technology Advancement Project (VOWTAP), Virginia Beach, Virginia, DHR File No. 2013-0452	Jacoby, Robert and Sarah Haugh	2013
VB-157	Phase I Archaeological Survey of the 5 Mile Stretch Project Area and Phase II Archaeological Evaluation of Site 44VB0166, Virginia Beach, Virginia	Dutton, David H. and Cara H. Metz	2014
VB-173	Phase I Cultural Resource Survey of Landstown Road Improvements	Tyrer, Carol D., and Dawn M. Muir-Frost	2017
VB-174	Completion and Synthesis of Archaeological Survey, State Military Reservation Camp Pendleton, City of Virginia Beach, Virginia	Monroe, Elizabeth J., David W. Lewes, and Ellen L. Chapman	2017
VB-183	Addendum to Phase I Cultural Resources Survey of Landstown Road Improvements, City of Virginia Beach, Virginia	Tyrer, Carol D. and Dawn M. Muir-Frost	2017
CS-137	Phase I Cultural Resource Survey of the ±233-Hectare (±576-Acre) Bedford Solar Project Area, City of Chesapeake, Virginia	Dutton & Associates	2018
VB-205	Archaeological Assessment of the Southern Portion of the City of Virginia Beach, Virginia	Blondino, Joseph R. and Curtis McCoy	2020
VB-207	Phase I Cultural Resource Survey for the Project Door Project Area in Virginia Beach, Virginia	Johnson, Patrick L. and Jonathan Valalik	2021

A VDHR archives search for previously identified archaeological sites was undertaken and as Dominion Energy refined the Onshore Project Components, the original archives search was supplemented by the Virginia Cultural Resources Information System (VCRIS) searches to account for updates to the PAPE and reassessment of the previously identified sites that fall within the PAPE, or within 1 mi (1.6 km) of the PAPE.

The assessment of previously identified archaeological sites identified a total of 134 sites located within 1 mi (1.6 km) of the PAPE, 12 of which are located within the PAPE. Of the 12 sites located within the PAPE, two sites are potentially eligible for listing on the NRHP, nine sites are ineligible for listing, and one site has no eligibility status. Table 4.3-10 presents a summary of the previously identified archaeological sites and the NRHP eligibility status of sites within the PAPE.

The 12 sites within the PAPE consist of two pre-contact sites, seven post-contact sites, and three sites with both pre-contact and post-contact materials. Two sites within the PAPE have been determined potentially eligible to the NRHP: site 44VB0162 is a multicomponent pre-contact site that contains early post-contact material and site 44VB0412 is a World War II-era airstrip.

Table 4.3-10. Previously Identified Archaeological Sites within the PAPE

Virginia DHR ID	Site Type	Time Period	NRHP Eligibility Status
44CS0250	Camp	Middle Archaic (6500–3001 B.C.), Late Archaic (3000–1201 B.C.)	—
44VB0162	Camp, temporary, Cemetery	Early Archaic Period (8500–6501 B.C.), Middle Archaic Period (6500–3001 B.C.), Late Archaic Period (3000–1201 B.C.), Early Woodland (1200 B.C.– A.D. 299), Middle Woodland (A.D. 300–999), Late Woodland (A.D. 1000–1606), Early National Period (1790–1829)	Potentially Eligible

Virginia DHR ID	Site Type	Time Period	NRHP Eligibility Status
44VB0175	Artifact scatter	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0204	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0274	Artifact scatter, Farmstead	Paleo-Indian (15000–8501 B.C.), Early Archaic Period (8500–6501 B.C.), Middle Archaic Period (6500–3001 B.C.), Late Archaic Period (3000–1201 B.C.), Early Woodland (1200 B.C.E– A.D. 299), Middle Woodland (A.D. 300–999), Late Woodland (A.D. 1000–1606)	Not Eligible
44VB0306	Canal	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44VB0314	Dwelling, single	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0361	Farmstead	Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0389	Lithic scatter, Military base/facility	Pre-Contact, World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0395	Lithic scatter, Military base/facility	Pre-Contact, Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0396	Military base/facility	World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0412	Military base/facility	World War I to World War II (1914–1945), The New Dominion (1946–1991)	Potentially Eligible

Source: VDHR 2022
Notes: A.D. – Anno Domini, B.C. – before Christ

4.3.2.3 Phase IA Portion of the Survey

The Phase IA portion of the TARA involved a literature review, site reconnaissance, and archaeological sensitivity assessment. Archaeological site files maintained by the VDHR were reviewed noting the locations and types of all documented sites within 1 mi (1.6 km) of proposed Onshore Project Components. Tetra Tech also reviewed reports from previous archaeological surveys, relevant reports from VDHR's report series, and pertinent scholarly literature. Additional background research included review of a summary of historic grave sites provided by the City of Virginia Beach Historic Preservation Commission, a review of literature, including sources recommended by the Nansemond Indian Nation, and documentary, photographic, and cartographic resources available through the Virginia Beach Public Library, VCRIS, Virginia Landmarks Register (VLR), NRHP, and other relevant sources.

Tetra Tech staff archaeologists conducted a pedestrian reconnaissance of the Project Area between May 17 and May 21, 2021. The reconnaissance consisted of observations of current conditions of accessible parcels that assisted in the assessment of archaeological sensitivity within the PAPE. Archaeological sensitivity is described as the relative potential for specific geographic locations to contain cultural deposits. Reliable estimates of archaeological potential, or sensitivity, are necessary for the implementation of effective survey strategies. The basis of the sensitivity assessment for the Project Area survey was derived from a review of

environmental settings and recorded site locations, identification of zones of past disturbance through field reconnaissance, application of sensitivity modeling from other projects in similar environmental and historical settings, and review of historic maps.

Archaeological Sensitivity Modeling

Following the Phase IA portion of the survey, sensitivity modeling of the Project was undertaken. A GIS model of pre-contact archaeological sensitivity was developed using the Project's parameters for predictive modeling. Data sources for sensitivity modeling were the National Hydrology Dataset (NHD), National Wetlands Inventory (NWI), and the National Elevation Dataset (NED), and VCRIS. The NHD and NWI are comprised of line features and polygons with resolution generally on the order of 3.3 to 16 ft (1 to 5 m). The NED is raster based and has a 33-ft (10-m) resolution. The resulting sensitivity layer was overlain with the georeferenced alignment of Onshore Project Features and loaded to the ESRI ArcCollector program allowing for field teams to view and interact with the model during the Phase IB reconnaissance survey. Historic archaeological sensitivity was assessed based on the onshore alignment and location of previously identified post-contact archaeological sites or mapped historic structures identified through either VCRIS or historic maps.

4.3.2.4 Phase IB Portion of the Survey

The Phase IB portion of the survey was initiated on July 27, 2021 and completed on August 25, 2022. To facilitate the survey, the PAPE was divided into 61 discrete survey units (SUs). The SUs were delineated based on their relationship to parcel boundaries or clearly defined geographic features such as field boundaries, waterbodies, and existing roads. The SUs were numbered in the order in which they were surveyed, which means, due to various issues regarding property access, that they were not geographically sequential.

Survey Methods

The survey investigated the PAPE through either subsurface testing or pedestrian survey. The location and layout of shovel tests (STs) were based on the Phase IA assessment, ground truthing of the prehistoric GIS sensitivity model and desktop historic sensitivity assessment, the stratified sampling approach based on archaeological sensitivity, and ground conditions at the time of survey.

A typical ST layout in an area of high archaeological sensitivity consisted of three transects, either parallel or staggered, at 50-ft (15-m) intervals with STs placed at 50-ft (15-m) intervals along the transects. STs within moderate to low sensitivity areas were typically arranged in two parallel or staggered transects at 50-ft (15-m) intervals with STs placed at 100-ft (30-m) intervals along the transects. STs were approximately 16 inches (40 centimeters cm) in diameter and excavated either to a depth below which archaeological deposits were not likely to occur or until hand excavation was not possible.

Excavated soil was screened through 0.25-in (0.64-cm) mesh sieves to facilitate systematic artifact recovery. After excavation, each shovel test was documented using a digital form on an electronic tablet to record soil characteristics and any finds, and its location was recorded by a tablet-based GPS receiver capable of providing sub-meter accuracy.

If artifacts were recovered during ST excavations, additional radial STs were excavated at a 25-foot (7.5-m) interval in cardinal directions from the positive ST to obtain information on the character and extent of the archaeological deposit, aid in assessing if a site has been located, and, if so, attempt to delineate a site boundary. Site boundaries were established based on either two consecutive negative STs and/or the edge of the PAPE.

Pedestrian survey was carried out in locations with a minimum ground visibility of 50 percent, generally in recently plowed agricultural fields. In these locations, the PAPE was traversed along transects spaced 15 ft (5 m) apart, and the location of any cultural material was recorded before being collected.

Where conditions made subsurface testing unfeasible, pedestrian reconnaissance was conducted. These conditions included steep slopes (in nominal excess of 15 percent), saturated soils with water standing on the surface or immediately below the surface, extensive exposures of bedrock at the surface, marker signs indicating the presence of natural gas pipelines or other underground utilities, or the presence of small- to medium-scale artificial landforms (berms, ditches, etc.), push piles, patches of exposed subsoil, trash piles, and/or other evidence of recent, substantial ground disturbance.

Isolated artifact finds were given a field identifier based on SU and ST (e.g.., 01-01 [SU-ST]). Newly identified sites were initially given a field identifier based on SU number and an alphabetical designation (e.g.., 01-A [SU-Letter]). Subsequently, VDHR Archaeological Site Inventory Forms were completed for newly identified sites and submitted for review and approval via VCRIS. After the Site Inventory Forms were completed and accepted, VDHR assigned permanent site numbers. Site forms for previously recorded sites were updated with newly acquired survey information.

Phase IB Survey Results

The Phase IB survey results are presented from east to west and are divided into the constituent portions of the PAPE which include the Cable Landing Location, Onshore Export Cable Route, Switching Station, Interconnection Cable Route, Onshore Substation, and Laydown Yard. In addition, survey was started on Interconnection Cable Routes that were previously under consideration before the Preferred Route Option, Interconnection Cable Route 1, was chosen including by the SCC.

Cable Landing Location

The Cable Landing Location is situated within the SMR and has been subject to numerous previous archaeological investigations including a completion and synthesis of archaeological survey performed by the William and Mary Center for Archaeological Research in 2015-2016, which summarized the previous work within SMR (Monroe et al. 2017).

Consultation with SMR determined that a Phase I archaeological survey was not necessary for portions of the PAPE within SMR property which was confirmed in an email on November 13, 2022. This is due to the extensive previous surveys on the SMR, which have been submitted to VDHR and provide near full coverage of the property and the Project PAPE. Additionally, while site 44VB0388 is not currently within the PAPE, in consultation with SMR a buffer of at least 10 ft (3 m) will be established around the resource to avoid any possible impacts.

Onshore Export Cable Route

The Onshore Export Cable Route originates within SMR and extends to the Harpers Switching Station. A large portion of the cable route is situated within NAS Oceana property.

Five previously identified archaeological sites are located within the Onshore Export Cable Route PAPE, three of which are located in SMR: 44VB0396, 44VB0395, and 44VB0389 (Table 4.3-11). Site 44VB0398 consists of a precontact lithic scatter of unknown date and a military facility dating back to World War I. Site 44VB0395 is a multi-component site consisting of a precontact lithic scatter of unknown date and a military facility dating from the mid-nineteenth to the turn of the twentieth century. Site 44VB0396 is a military facility consisting of an artifact scatter dating from the twentieth century associated with extant structures, Buildings 113 and 114. For all three sites, VDHR concurred with the consultant's recommendations that the site is not eligible for the NRHP (Monroe et al. 2017).

The remaining two sites (44VB0204 and 44VB0361) are located within NAS Oceana and were subject to reassessment as part of the Phase IB survey (Table 4.3-11).

Table 4.3-11. Previously Identified Archaeological Sites, Onshore Export Cable Route East to West

Virginia DHR ID	Site Type	Time Period	NRHP Eligibility Status
44VB0396	Military base/facility	World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0395	Lithic scatter, Military base/facility	Pre-Contact, Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible
44VB0389	Lithic scatter, Military base/facility	Pre-Contact, World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
44VB0204	Trash scatter	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0361	Farmstead	Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991)	Not Eligible

The Phase IB excavations identified one new archaeological site (44VB0443, located in SU 0035) and three isolated finds (Table 4.3-12), all currently attributed to undetermined post-contact time periods.

Table 4.3-12. Newly Identified Archaeological Resources, Onshore Export Cable Route

ID#	Resource Type	Time Period	Recommendation
31-46	Isolate	Post-contact, undetermined	Not Eligible
33-08	Isolate	Post-contact, undetermined	Not Eligible
34-02	Isolate	Post-contact, undetermined	Not Eligible
44VB0443	Site, Artifact Scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible

Site 44VB0204

Site 44VB0204 is heavily disturbed by a gravel shoulder, drainage ditch, storm drain, and utility pole. Four STs were placed on its periphery which contained a single stratum of gray (10YR 6/1) silt indicative of previous subsurface disturbance. None of the four STs contained cultural material.

Based on the subsurface disturbance and lack of cultural material in the vicinity of the site, Tetra Tech concludes that site 44VB0204 does not contain sufficient research value to satisfy NRHP criteria of significance. Consequently, there is no reason to revise the VDHR concurrence that the site is not eligible to the NRHP.

Site 44VB0361

The location of 44VB0361 is comprised of a landscaped lawn with planted trees within NAS Oceana. The area is heavily disturbed by landscaping, asphalt roads and parking lots, an unused office complex, storage buildings, aboveground utility installations, and a variety of buried utility lines (gas, telecommunications, sewer, and water).

The Phase IB survey excavated five STs within the defined boundaries of site 44VB0361. The soils in the upper strata of the STs were a dark grayish brown (10YR 4/2) silty clay loam. The soils in the lower strata were a grayish brown (10YR 5/2) silty clay. No cultural material was recovered from any of these five STs.

Based on this Phase IB survey, Tetra Tech recommends that site 44VB0361 remain not eligible for listing on the NRHP.

Site 44VB0443

Newly identified site 44VB0443 is located on property belonging to NAS Oceana. One primary ST and two radial STs contained cultural material. The soils in the upper strata of the STs were a brown (10YR 4/3) silt loam and extended approximately 16 – 18 in (40 – 45 cm) below the surface. The soils in the lower strata were a very pale brown (10YR 7/3) silt loam. The three positive STs contained eight artifacts all from the upper stratum. The assemblage appears to be a low-density field scatter consisting of late nineteenth to twentieth century domestic refuse.

The location of 44VB0443 is heavily disturbed by drainage ditches and exhibits evidence of recent ground disturbing activities and there is a low probability of finding intact archaeological deposits or subsurface features. Further, the sparse nature of the material recovered has limited research potential. Tetra Tech concludes that the site does not contain sufficient research value to satisfy NRHP criteria of significance and recommends that 44VB0443 is not eligible for listing on the NRHP.

Isolated Finds

Three isolated finds recovered from the Onshore Export Cable Route are all attributed to post-contact time periods and were determined not to be culturally meaningful and/or associated with specific landscape features. Isolated finds consist of a single artifact, or a small grouping of artifacts that lack cultural meaning, context, stratigraphy, or likely reflects casual discard.

Switching Station

The Switching Station is situated within NAS Oceana property. No previously identified archaeological sites are located within the Switching Station PAPE. However, prior to initiating the survey, NAS Oceana personnel informed Dominion Energy and Tetra Tech that a grave or memorial is located within the Project PAPE. The Phase IB excavations did not recover any cultural materials or indications of features from the entirety of this portion of the PAPE. The majority of 468 STs excavated there exhibited disturbed or stripped conditions and blocks of STs within fairways and surrounding the maintenance building were not excavated due to observed ground disturbance.

The grave/memorial site consists of a concrete slab, approximately 4 ft (1.2 m) long, with an embedded metal plaque of the type supplied by funeral homes, often as temporary. The area is surrounded by a low fence which appears to be a recent addition. The metal plaque reads:

INFANT GIRL UNKN[O]WN

DERRY-TWIFORD FUNERAL HOME

There are no dates, but the grave/memorial appears to date generally to the mid-twentieth century based on similar dated examples, particularly the plaque supplied by the funeral home, observed in other cemeteries in Virginia. Tetra Tech staff contacted the Twiford Funeral Home (former Derry Twiford Funeral Home) to inquire if there were any records of the infant burial, but none were located.

A non-invasive ground penetrating radar (GPR) survey was conducted to identify potential subsurface anomalies within the fenced grave/memorial site and surrounding area prior to Phase IB subsurface testing. An approximate 50 ft (15 m) area surrounding and including the grave/memorial was subject to the GPR survey. The survey results were inconclusive. Although the GPR findings did not display typical responses of a buried vault, body, or casket type anomaly, other anomalies that could represent excavations, graves, or other disturbances in soil stratigraphy were documented. The locations of these anomalies appear random, and their orientations are inconsistent, which would be unusual for burials. Moreover, the use of this location as an agricultural field and then subsequent landscaping would have resulted in significant subsurface disturbance such as drainage/irrigation ditches, plow scars, and tree removal. These activities could have resulted in the type of anomalies identified by GPR. Within the fenced grave/memorial, site, GPR findings determined the concrete slab is approximately 5 inches (12.7 centimeters) thick and contains reinforced steel.

Six STs were placed in the immediate vicinity of the grave/memorial. None of these STs contained cultural material and there was no indication of grave shafts or voids. The soils in the STs were deflated with a single stratum of gray (10YR 6/1) to light brownish gray (10YR 6/2) silty clay which is consistent with the subsoil identified in other areas of this portion of the PAPE. The presence of a single stratum of subsoil is indicative of previous grading and is consistent with the area's use as an agricultural field and subsequent landscaping.

Interconnection Cable Route

The Interconnection Cable Route represents the majority of the PAPE and consists of an overhead transmission route. Six previously identified archaeological sites are located within the PAPE of Route 1 (Table 4.3-13) which were subject to reassessment as part of the Phase IB survey.

Table 4.3-13. Previously Identified Archaeological Resources, Onshore Export Cable Route East to West

VDHR ID	Site Type	Time Period	NRHP Eligibility Status
44VB0175	Artifact scatter	Contact Period (1607–1750), Colony to Nation (1751–1789), Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0314	Dwelling, single	Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916)	Not Eligible
44VB0274	Artifact scatter, Farmstead	Paleo-Indian (15000–8501 B.C.E), Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606)	Not Eligible
44VB0162	Camp, temporary, Cemetery	Early Archaic Period (8500–6501 B.C.E), Middle Archaic Period (6500–3001 B.C.E), Late Archaic Period (3000–1201 B.C.E), Early Woodland (1200 B.C.E–299 C.E), Middle Woodland (300–999 C.E), Late Woodland (1000–1606), Early National Period (1790–1829)	Potentially Eligible
44VB0306	Canal	Early National Period (1790–1829), Antebellum Period (1830–1860), Civil War (1861–1865), Reconstruction and Growth (1866–1916), World War I to World War II (1914–1945), The New Dominion (1946–1991), Post-Cold War (1992–Present)	Not Eligible
44CS0250	Camp	Middle Archaic (6500–3001 B.C.), Late Archaic (3000–1201 B.C.)	—

Subsurface testing consisted of 1,511 STs which identified one new archaeological site. Six isolated finds were also recovered. All cultural material from this portion of the PAPE belongs to post-contact time periods (Table 4.3-14).

Table 4.3-14. Newly Identified Archaeological Resources, Onshore Export Cable Route

Field ID	VDHR ID	Resource Type	Time Period, Material	Recommendation
26-A	44VB0444	Site, Artifact Scatter	Reconstruction and Growth (1866–1916), World War I to World War II (1917–1945), The New Dominion (1946–1991)	Not Eligible
26-234	N/A	Isolate	Post-contact, undetermined	Not Eligible
26-21	N/A	Isolate	Post-contact, undetermined	Not Eligible
11-56	N/A	Isolate	Post-contact, undetermined	Not Eligible
12-09	N/A	Isolate	Post-contact, undetermined	Not Eligible
28-08	N/A	Isolate	Post-contact, undetermined	Not Eligible
28-09	N/A	Isolate	Post-contact, undetermined	Not Eligible

Site 44VB0175

Previously recorded site 44VB0175 extends approximately 5 ft (1.5 m) into an existing gravel road that is part of the PAPE. The majority of the site to the west is in second growth forest adjacent to the recently constructed housing development. Because the small portion of the site within the PAPE is an existing roadbed, no subsurface testing was conducted there and the area was pedestrian surveyed. The pedestrian survey identified no cultural material.

Because of the small area of 44VB0175 surveyed, Tetra Tech cannot make a recommendation regarding the site's eligibility to the NRHP. However, nothing was observed to question the earlier recommendation of ineligibility. Tetra Tech also recommends that no avoidance, minimization, or mitigation measures are necessary.

Site 44VB0314

Previously recorded site 44VB0314 is bisected by the PAPE and is characterized by marshy soils surrounded by mowed hay fields. It is bisected by drainage ditches and an access road.

Four STs were dug. The soils in the upper stratum consisted of a brown (10YR 3/2) silty clay loam extending approximately 12 in (30 cm) below the surface. The lower stratum consisted of grayish brown (10YR 5/2) sandy clay mottled with pale brown (10YR 6/3) sandy clay. No cultural material was recovered from these four STs.

Because no cultural material was recovered from 44VB0314 during this Phase IB survey, Tetra Tech recommends maintaining the site's status as not eligible for listing on the NRHP.

Site 44VB0274

Previously recorded multi-component site 44VB0274 is heavily disturbed by a road berm, drainage ditches, two access roads, and the existing transmission line ROW.

Eight STs were dug within the boundary of site 44VB0274. Two STs were heavily disturbed with soils consisting primarily of road gravel. Otherwise, the soils in the upper stratum of the STs were a grayish brown (10YR 5/2) sandy loam. The soils in the lower stratum were a gray (10YR 6/1) mottled with a yellowish brown (10YR 5/8) sandy clay or sandy clay loam. One ST contained 15 historic period artifacts, largely bottle glass and building debris. These appear to date to the twentieth century and are likely associated with a house noted in a previous survey. This was the only one of the eight STs within the boundary of site 44VB0274 to contain any cultural material.

Based on the results of previous surveys as well as those conducted for this Project, site 44VB0274 has been subject to extensive subsurface disturbance. Consequently, there is a low probability of intact stratigraphy or subsurface features. The significant subsurface disturbance and lack of associated features indicate that this site has limited research potential for both pre-contact and contact material culture. Tetra Tech recommends that site 44VB0274 remain not eligible for listing on the NRHP.

Site 44VB0162

The eastern end of site 44VB0162 is heavily disturbed by drainage ditches, storm sewers, landscaping, soil berms, and an artificial pond associated with the early twenty-first century construction. The western end of the site contains delineated wetlands and is covered in planted pine, indicating previous clear cutting.

This Phase IB survey dug 85 STs within the boundary of site 44VB0162. Soils in the upper stratum of the STs were generally a pale brown (10YR 6/3) silty clay loam extending only approximately 6 in (15 cm) below the surface. Soils in the lower stratum were generally a yellow (10YR 7/6) silty loam mottled with a brownish yellow (10YR 6/8). Fifty post-contact period finds from ten positive STs were recovered. The assemblage appears to be a low-density trash or field scatter containing household and construction detritus dating to the late nineteenth or twentieth century.

Because only approximately 52 percent of site 44VB0162, which is within the PAPE, was tested during this Phase IB survey, a definitive assessment of eligibility to the NRHP cannot be made. However, the evidence of deflated soils and extensive subsurface disturbance within the PAPE suggests little possibility of intact subsurface deposits or cultural features. The artifacts that were recovered, both during this Phase IB survey and the 1988 survey, were all from either the surface or deflated soils and, consequently, are likely from tertiary contexts due to repeated cultivation and extensive logging. Because of this extensive disturbance, the investigated portion of site 44VB0162 within the PAPE appears to lack data potential and integrity of materials (relevant for Criterion D of the NRHP) and integrity to convey association with locally or regionally significant individuals or events (Criteria A and B of the NRHP). Further survey outside of the Project PAPE may alter this view, but results from within the PAPE indicate that site 44VB0162 has low research potential.

Site 44VB0306

The Salem Canal, a channelized segment of North Landing River, was designated by VDHR as site 44VB0306. Because site 44VB306 contains flowing water, the site itself was not part of this Phase IB survey. However, the areas immediately to the northeast and southwest of the site were surveyed and lack both intact stratigraphy and cultural material. Tetra Tech recommends that these areas do not contribute to site 44VB0306.

Site 44CS0250

The previously identified site 44CS0250 is located within a broad woodlot and is bisected by an existing aboveground transmission ROW. An access road runs along the northeast edge of the site from its northern boundary to the ROW. Numerous areas of disturbance were observed in the vicinity of site 44CS0250. The existing ROW contains transmission towers as well as a marker for a buried natural gas pipeline. Additionally, subsoil was observed on the surface in several locations. The surrounding area is also covered in planted pine indicating clear cutting in the past.

No systematic surveys of the site have been conducted previously; identification of the site was by a local collector who found a soapstone vessel and “many points,” including Middle Archaic period Morrow Mountain projectile points.

The Phase IB survey excavated 48 STs within the bounds of site 44VB0250. No cultural material was recovered during the survey. In most of the STs the soils were deflated with a single stratum of gray (10YR 6/1) silty clay mottled with yellowish brown (10YR 5/8) observed. When two strata were present, the soils of the upper level range from a dark grayish brown (10YR 4/2) to a gray (10YR 5/1) silty clay loam or clay loam. The soils of the second stratum are the aforementioned gray (10YR 6/1) silty clay mottled with yellowish brown (10YR 5/8).

Because only the approximately 30 percent of site 44CS0250 within the PAPE was tested during this Phase IB survey, a definitive assessment of eligibility to the NRHP cannot be made. The evidence of deflated soils and extensive subsurface disturbance suggests little possibility of intact subsurface deposits or features. This, coupled with the lack of any cultural material, either pre- or post-contact, recovered indicates limited research potential.

Site 44VB0444

Newly identified site 44VB0444 is located in a fallow agricultural field covered in tall, dense grasses and brush. Several ditches cross the area from north to south and it is bordered by a wide drainage ditch indicating significant subsurface disturbance.

Site 44VB0444 contained 29 primary and radial STs and produced 245 post-contact period finds, which were mostly very fragmentary and worn. Most STs within site 44VB0444 contained a single stratum of very compact grayish brown (10YR 5/2) silty clay subsoil. When topsoil was present, it was a dark gray (10YR 4/1) to a dark grayish brown (10YR 4/2) silty clay loam. The subsoil in STs with two strata was the same very compact grayish brown (10YR 5/2) silty clay. The assemblage represents a mix of domestic artifacts dating from the late nineteenth to the later twentieth century.

Site 44VB0444's deflated soils and numerous ditches indicate that the area has been heavily disturbed, making any stratigraphic integrity or the presence of intact subsurface features unlikely. The fact that the artifacts from site 44VB0444 are fragmentary, worn, and found on the edge of the field suggests that their distribution may be the result of plowing and, consequently, from a tertiary context. Further, the sparse nature of the material recovered has limited research potential. Because of this extensive disturbance, site 44VB0444 appears to lack data potential and integrity of materials (relevant for Criterion D of the NRHP), and integrity to convey association with locally or regionally significant individuals or events (Criteria A and B of the NRHP). Tetra Tech recommends that site 44VB0444 has little potential for future research and is not eligible for listing on the NRHP.

Isolates

Six isolated finds recovered from the Interconnection Cable Route PAPE are all attributed to post-contact time periods and were determined not to be culturally meaningful and/or associated with specific landscape features.

Onshore Substation

The Onshore Substation includes an existing substation and two adjacent access roads. The northwest portion is primarily delineated wetlands, and the northeast portion is a mix of wetlands, access roads, drainage ditches, existing telephone and transmission line ROWs, buried telephone lines, train tracks, and a cell tower.

Eighteen STs were placed within the existing substation. The soils in all the STs were deflated with a single stratum ranging from gray (10YR 5/1) to dark gray (10YR 4/1) to brown (10YR 5/3) silty clay immediately beneath leaf litter. None of the STs contained cultural material.

One of the access roads is gravel with a drainage ditch running along its south side and utility poles and markers for buried telecommunications cables. Three STs were placed here all of which contained a single stratum of grayish brown (10YR 5/2) gravel. None of the three STs contained cultural material.

The other access road crosses a grassy field containing significant disturbance, including transmission towers, a gravel access road, and concrete slabs. Thirteen STs were dug here. The STs in the western portion contained a single stratum of grayish brown (10YR 5/2) gravels immediately beneath the sod cap indicating prior subsurface disturbance. The soils in the upper stratum of the eastern STs were very thin, approximately

5 cm, and consisted of dark grayish brown (10YR 4/2) silty clay. The soils in the lower stratum were a grayish brown (10YR 5/2) silty clay mottled with a brownish yellow (10YR 6/8). None of the STs contained cultural material.

Tetra Tech recommends no further survey at the Onshore Substation.

Laydown Yard

Site 44VB0412

The Pungo Airfield, 44VB0412, has been proposed as a laydown yard and been previously included in a Phase IA archaeological survey in 2020 and recommended potentially eligible to the NRHP under Criterion A for its association with World War II and under Criterion D for its potential to contribute significant archaeological data about military life and facilities (Blondino and McCoy 2020), though no systematic pedestrian survey or shovel testing was conducted. The portions of the Pungo Airfield that will be used for the Project are all paved with asphalt, and therefore unsuitable for subsurface testing.

The use of the Pungo Airfield as a laydown yard will be restricted to existing paved surfaces and will not involve subsurface disturbance. Moreover, activities involved in the site's use as a laydown yard will not significantly differ from its current use as a storage facility. Tetra Tech recommends no further survey is required.

4.3.2.5 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

Construction

The use of heavy machinery and activities that create subsurface disturbances during construction have the potential to disturb archaeological deposits. During construction, these potential impact-producing factors to terrestrial archaeological resources may include:

- Construction of the onshore export and interconnection cable including horizontal direct drilling (HDD) and open trenching,
- Construction of new onshore switching station and upgrade of an existing substation.

The following impacts may occur as a consequence of factors identified above:

- Ground disturbance within the PAPE for the construction and installation of underground components (e.g., the cable landing location, onshore export cable, site grading), the switching station, and onshore substation.

These activities have the potential to uncover and impact buried terrestrial archaeological resources. Dominion proposes implementing the following measures to avoid, minimize, and mitigate impacts:

- Implementation of the Draft Mitigation Plan – Terrestrial Archaeological Resources and the Unanticipated Discoveries Plan (UDP), which is included as part of Appendix G, Terrestrial Archaeological Resource Assessment and was provided to BOEM in January 2023. All Project personnel involved in construction activities must be familiar with the UDP and the processes for notification of appropriate individuals if archaeological material is encountered (see Appendix G, Attachment G-1).

- Archaeological monitoring will be available during all construction activities including HDD operations and construction within existing roadways. If the archaeological monitor is not present when potential cultural material is encountered, they will be notified immediately and make an on-site assessment of the potential cultural material as soon as possible. Work at the location of the unanticipated discovery will be halted until after the archaeological evaluation has been completed.
- An archaeological monitor will be present at SMR Camp Pendleton during all construction activities that involve subsurface disturbance.
- Due to the possibility of extant archaeological deposits in the vicinity of site 44CS0250, an archaeological monitor will be present at this location during construction activities that involve subsurface disturbance.
- On NAS Oceana/Aeropines Golf Course a 10-ft (3-m) buffer will be established around the grave/memorial beginning at the existing fencing. This area will be surrounded by fencing during all construction activities. An archaeological monitor will also be present during construction activities at this site.

Operations and Maintenance

During operations, no impacts to terrestrial archaeological resources are anticipated, as additional ground disturbing activities are not proposed.

Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time.

4.3.2.6 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy is committed to minimizing impacts to cultural resources through the siting, routing, and design process of the Onshore Project Components to the extent practicable. To this end, Dominion Energy has developed a Draft Mitigation Plan – Terrestrial Archaeological Resources and an Unanticipated Discoveries Plan (Appendix G, Attachment G-1), both of which will be implemented throughout construction, O&M, and decommissioning of the Project. The primary features include protection of identified archaeological resources, the presence of a qualified archaeological monitor, and detailed plans in the event unanticipated archaeological material is encountered during construction.

4.3.3 Aboveground Historic Resources

This section describes the aboveground historic resources that are currently known to be present in the Onshore Project Area and within the area of potential onshore visibility to the Offshore Project Area. Dominion Energy conducted preliminary desktop aboveground historic resources reviews and aboveground historic resources surveys to identify National Register of Historic Places (NRHP)-listed and NRHP-eligible aboveground historic resources that have the potential to be impacted by the Project. Onshore and Offshore Historic Properties Assessments (Appendix H) were prepared at the conclusion of surveys and data analysis. These reports present all aboveground historic resources, recommendations for NRHP-eligibility of identified resources, potential impacts to resources resulting from construction, O&M, and decommissioning of the Project, and proposed measures and BMPs to avoid, minimize, or mitigate potential impacts to aboveground historic resources, as necessary. Other assessments and reports in this COP related to cultural resources include:

- Visual Resources (Section 4.3.4);
- Section 106 Phased Identification Plan (Appendix DD);
- Historic Properties Assessments (Appendix H);
- Terrestrial Archaeological Resources Assessment (Appendix G);
- Marine Archaeological Resources Assessment (Appendix F); and
- Visual Impact Assessment (Appendix I).

For the purposes of this section, the Aboveground Historic Resources Area of Potential Effect (APE) is divided into two components: the Onshore APE (Figure 4.3-8) and the Offshore Viewshed Study Area and APE (Figure 4.3-9 and Figure 4.3-10). It should be noted that the Onshore APE for the Aboveground Historic Resources as shown in the figures below in some instances does not align with the maximum PDE listed in Section 3, Description of Proposed Activity. The Historic Resources Assessments were prepared based on a more conservative design scenario; see Appendix H, Historic Properties Assessments for more information. The maximum Onshore APE includes resources within a 1.5 mi (2.4 km) buffer of the Onshore Project Area. The Offshore Viewshed APE includes resources within the current maximum GIS based viewshed envelope that has potential visibility of the Offshore Project Components. The APE was designed to capture the maximum number of resources that may experience impacts from the Project. This section draws information from several sources of data, reports, and studies in the assessment of aboveground historic resources. These sources include publicly available data and previous cultural resources studies.

The purpose of the aboveground historic resources investigations proposed for the Project are to support BOEM in its review of the effects of the Project on historic properties. Historic properties are defined as historic resources listed in, or eligible for listing in, the NRHP (36 CFR § 60.4). This assessment will be completed by BOEM in consultation with the Advisory Council on Historic Preservation, VDHR and the North Carolina State Historic Preservation Office (NCHPO) in their roles as State Historic Preservation Offices (SHPOs), as well as federally recognized Indian Tribes and other interested and consulting parties pursuant to NEPA and the NHPA of 1966, as amended.

Consideration of the effects of both Onshore and Offshore Project Components to historic properties is required under NEPA and NHPA. BOEM under its obligations defined in 30 CFR Part 585, Subpart F, requires an aboveground historic resources investigation to identify and locate historic properties whose integrity may be affected by the Project.

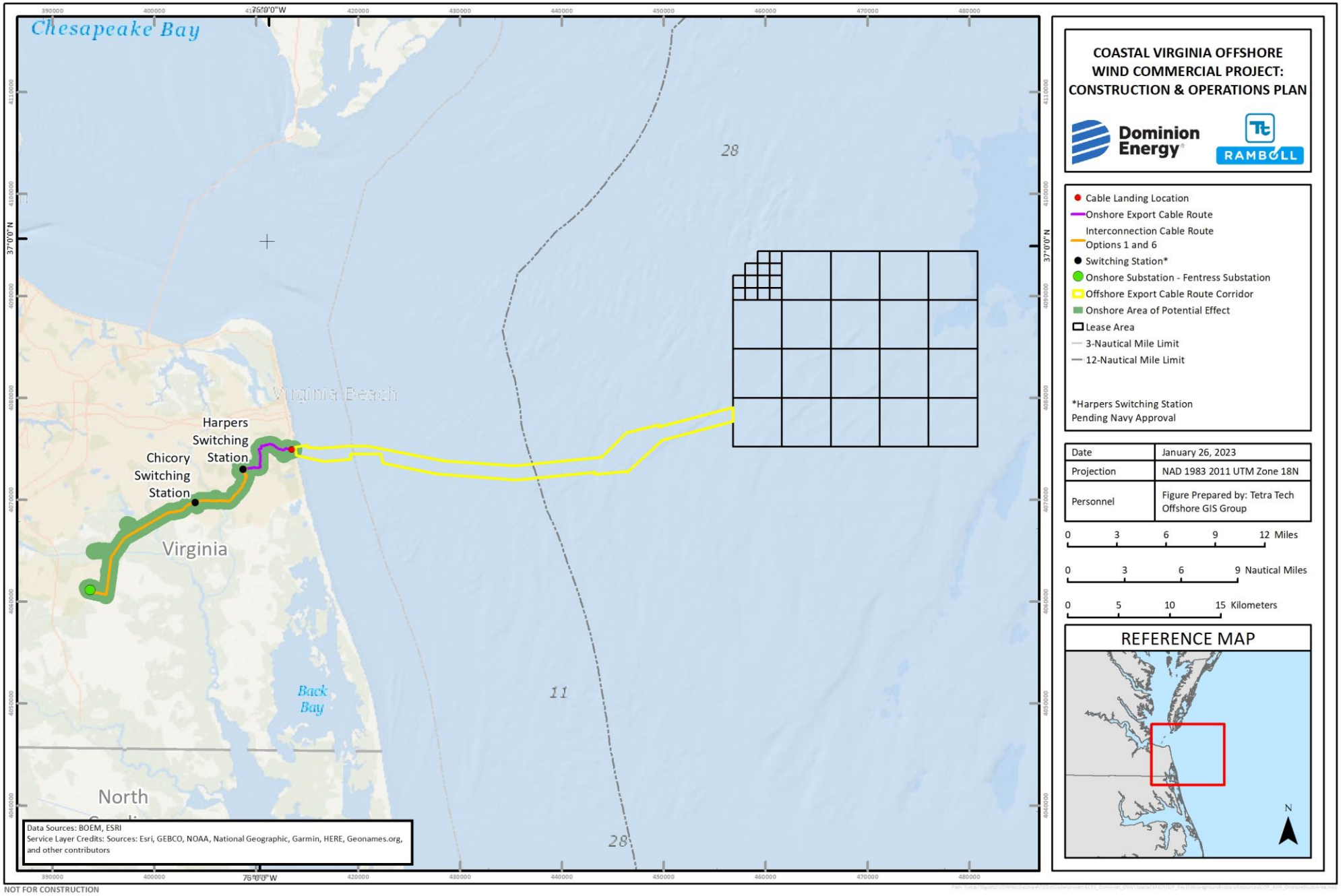

Figure 4.3-8. Aboveground Historic Resources Onshore Area of Potential Effects

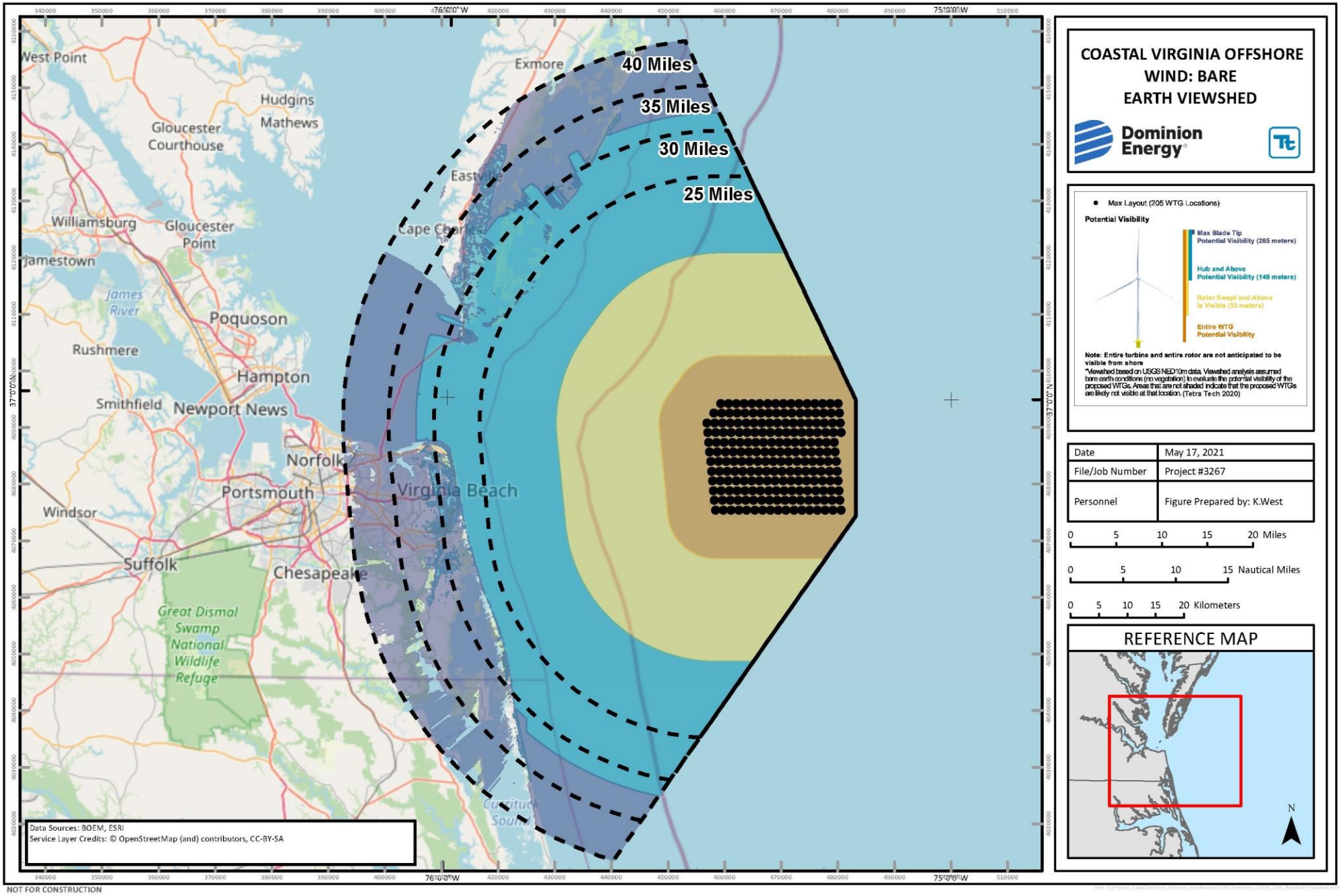

Figure 4.3-9. Aboveground Historic Resources Offshore Study Area

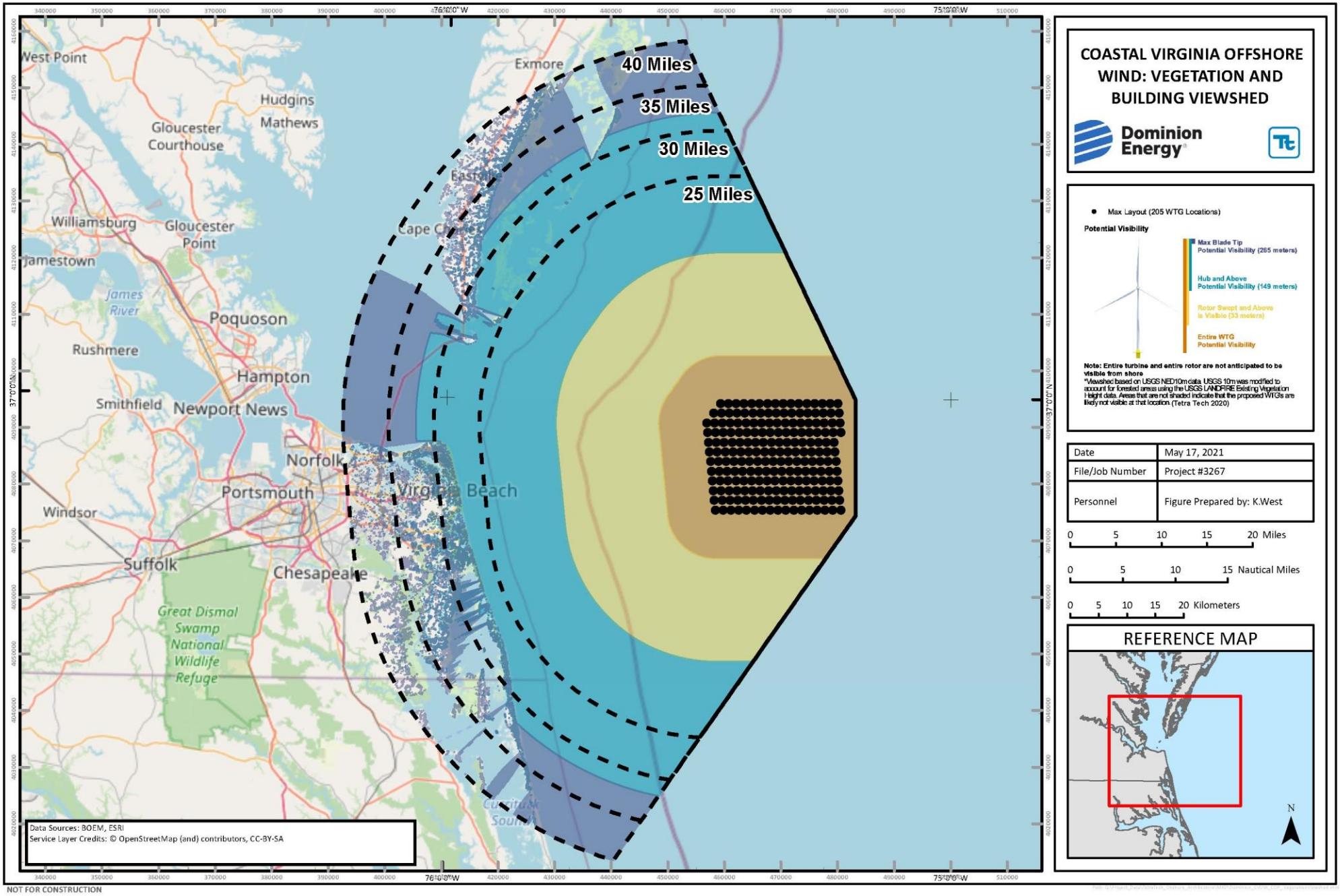

Figure 4.3-10. Aboveground Historic Resources Offshore Viewshed Area of Potential Effects

The aboveground historic resources investigations were completed following the appropriate SHPO standards and guidelines. The VDHR guidance includes *Guidelines for Conducting Historic Resources Surveys in Virginia* (VDHR 2017), *Assessing Visual Effects on Historic Properties* (VDHR 2010), and *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008). The investigation was also informed by BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (BOEM 2020), the North Carolina HPO's *Architectural Survey Manual: Practical Advice for Recording Historic Resources* (NCHPO 2008), the NPS's *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* (NPS 1997), and the NPS's *National Register Bulletin 24: Guidelines for Local Surveys: A Basis for Preservation Planning* (NPS 1985). All work was completed by architectural historians and historians whose professional qualifications meet or exceed those standards established by the Secretary of the Interior for their respective fields (36 CFR Part 61).

4.3.3.1 Affected Environment

Communities within Virginia and North Carolina that are within the areas of potential effects (APEs) for the offshore and onshore assessments include the cities of Virginia Beach, Norfolk, and Chesapeake, Virginia; Virginia's Eastern Shore; and Currituck County, North Carolina. Historic properties within the APEs have the potential to be impacted by construction of Offshore or Onshore Project Components.

Offshore Project Components are not anticipated to physically alter historic properties. However, certain components have the potential to introduce new visual and auditory elements that may affect the integrity of setting of historic properties. Integrity is defined as a property's qualities of location, design, setting, materials, workmanship, feeling, and association. Historic properties possess both the qualities of significance and integrity defined in the NRHP Criteria for Evaluation (36 CFR § 60 [a-d]). The integrity of historic and potentially historic properties, those listed in or eligible for listing in the NRHP, can be affected by the introduction of new elements within the landscape that may diminish their significant historic features through loss of integrity. Onshore Project Components are anticipated to physically alter historic properties. Adverse effects to these properties may include the physical destruction or alteration of a property and the alteration of the important aspects of integrity that qualify it for NRHP consideration.

4.3.3.2 Research Design

The aboveground historic resources investigations were undertaken through a series of steps, beginning with the establishment of the APE, followed by archival research, field investigation, and reporting.

Establishment of the Area of Potential Effects for the Onshore and Offshore Project Components

The Onshore APE was developed in accordance with the VDHR's *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008) and utilizes buffers established by the VDHR. The Offshore Viewshed APE was developed using a GIS based viewshed analysis. Both APEs have been presented to BOEM and the VDHR in meetings and/or survey plans.

Offshore Viewshed APE

Federal agencies determine and document the APE appropriate to an undertaking in consultation with State Historic Preservation Officers and/or Tribal Historic Preservation Officers [36 CFR 800.4 (a)]. The APE is defined as the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties.

The current investigation, applying direction from BOEM, established a preliminary area of potential effect (PAPE) extending 40 mi from the Offshore Project Components for consistency with the bare earth visibility method applied to determine the digital surface model (DSM) viewshed model for the Offshore Project Components Visual Impact Assessment (VIA).

The VIA defined distance zones from the Project by the quality of visibility. These four distance zones are foreground, middle-ground, background, and extended background. Foreground extends zero to 10 mi (zero to 16 km) from the Project and is the area from which the Offshore Project Components are visually clear. Middle-ground extends 10 to 20 mi (16 to 32 km) from the Project and is the area where views of individual forms are distinguishable, but texture and color are muted. Background extends 20 to 30 mi (32 to 48 km) from the Project; texture is indistinguishable at this distance and color is further flattened; however, objects in motion or highly contrasting forms are distinguished. This zone captures the most common viewing distance from seashore locations. Finally, the extended background zone extends from 30 to 40 mi (48 to 64 km) from the Project; views of the Project are considered "indistinguishable except under exceptionally favorable viewing conditions, without limiting atmospheric conditions such as haze and cloud cover." While the VIA posits general visibility to the Project area as opposed to visibility that may diminish the integrity of a historic property's significant historic features, the characterization of the quality of the view within the four distance zones was a factor considered in the assessment of adverse effects to historic properties from the Project.

Onshore APE

Dominion Energy prepared an Onshore Aboveground Historic Properties Survey Plan (Onshore Survey Plan) that details the proposed methodology for the identification and assessment of historic properties that may be subject to impacts from the Onshore Project Components. The methodology presented in the Onshore Survey Plan is consistent with the VDHR *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008). These guidelines define a two-step process for evaluating impacts on aboveground historic resources for electric transmission line projects subject to the jurisdiction of the SCC. The first step, referred to as a Stage 1 pre-application analysis, consists of desktop review, limited field reconnaissance, and preparation of photosimulations of transmission infrastructure in the viewsheds of select historic properties (Appendix H-2). The second step, referred to as a Stage 2 survey, consists of a full field survey and evaluation of historic resource impacts typically done after a route is approved by the SCC (Appendix H-3).

As discussed in the Onshore Survey Plan, Dominion Energy proposed to modify its approach for the Stage 2 study for the Project to include a full field survey of all Interconnection Cable Routes still under consideration at the time Dominion Energy filed its application with the SCC in November 2021. This

modified approach will ensure that the BOEM has sufficient information on all routes under consideration by the SCC to support its review of the Project under the NEPA Substitution for NHPA Section 106 process.

For the Stage 1 pre-application analysis, the VDHR guidelines specify an analysis of the following:

- National Historic Landmark (NHL) properties within a 1.5-mile radius of route centerlines;
- National Register of Historic Places (NRHP)-listed properties, NHLs, battlefields, and historic landscapes within a 1.0-mile radius of the route centerlines;
- NRHP-eligible and -listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of the route centerlines; and
- All of the above qualifying architectural resources located within the proposed right-of-way for each alternative route.

This is a tool used by the VDHR and SCC to assess impacts on aboveground historic resources in the evaluation of route alternatives.

Under VDHR's guidelines, the Stage 2 survey is designed to provide the information needed to assess effects on historic properties as required under Section 106 of the NHPA. For this analysis, the VDHR's guidelines define the APE for the undertaking as follows:

> The APE for the route options still under consideration will consist of a 0.5-mile buffer on either side of new overhead segments as well as areas immediately adjacent to route segments in which underground line is proposed or where overhead lines will occupy existing right-of-way and will not require removal of vegetation or construction of transmission line structures more than 20 feet or 10 percent taller than those of the existing line (VDHR 2008).

The guidelines specify a full survey of the APE for aboveground historic resources, including architectural sites, cemeteries, engineering structures, districts, and landscapes. Dominion Energy's Onshore Survey Plan incorporated all relevant aspects of the VDHR guidelines, including the definition of the APE, and expanded it beyond the single SCC-approved route to apply to all route alternatives under consideration as part of BOEM's NEPA Substitution process.

Dominion Energy submitted the Onshore Survey Plan to BOEM on April 5, 2021. BOEM provided comments on the plan to Dominion Energy by email on April 13, 2021. Dominion Energy submitted comment responses and an updated plan to BOEM by email on April 23, 2021. BOEM responded to Dominion Energy by email on May 4, 2021, approving the revised document and Dominion Energy's comment responses. BOEM's May 4, 2021 email noted that "this concludes our review" of the plan. Dominion Energy submitted the plan to the VDHR on April 5, 2021. The VDHR concurred with the plan in a letter to Dominion Energy dated May 12, 2021. Dominion Energy submitted the Stage 1 analysis and the VDHR concurred with the findings on January 5, 2022.

Archival Research

Archival research was undertaken to identify and to develop a comprehensive inventory of previously identified historic properties and previously identified unevaluated properties within the Study Area. Research was conducted using the State Historic Preservation Office (SHPO) databases, the VDHR

Virginia Cultural Resource Information System (VCRIS), NCHPO HPOWEB, and BOEM's *Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straights Volumes I and II* (Klein et al. 2012a, 2012b). Additionally, the NRHP and NHL registers were consulted. These resources were utilized to identify historic properties eligible or listed through state and federal historic property registers, or designated or considered for designation as NHL, or inventoried on V-CRIS or HPOWEB. The Virginia state register also is known as the VLR. The NCHPO maintains the North Carolina State Register.

The data used in this investigation reflects information available as of April 1, 2022. Forms corresponding to resources were downloaded for reference and logged in Excel databases. The locations of previously identified built resources were incorporated into the Project GIS model, created to manage data for the investigation by geographic location and classification.

Previously Identified Aboveground Historic Resources

Data regarding previously recorded aboveground historic resources within the Offshore Viewshed APE was compiled utilizing multiple sources including:

- VDHR's Virginia Cultural Resource Information System (V-CRIS);
- NCHPO's HPOWEB system;
- BOEM's *Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straights Volumes I and II* (Klein et al. 2012a, 2012b);
- NRHP and NHL databases; and
- Properties considered historic by the City of Virginia Beach.

Analysis was completed in order to determine how many historic resources are located in each distance zone defined by the VIA: foreground, middle-ground, background, and extended background. This analysis was undertaken to characterize the quality of views from the four zones, as projected in the VIA.

Foreground

Foreground is defined as zero to 10 mi (zero to 16 km) from the Project and is the area from which the Offshore Project Components are visually clear. No properties are located in this range that falls on open ocean.

Middle-ground

Middle-ground is defined as 10 to 20 mi (16 to 32 km) from the Project and is the area where viewers have the potential to distinguish individual forms, and texture and color and identifiable but muted. One property is located in this range, in the middle of the ocean: the Chesapeake Light Tower (DHR ID: 134-5301). The Chesapeake Light Tower is eligible for listing in the NRHP.

Background

Background is defined as 20 to 30 mi (32 to 48 km) from the Project and "texture has disappeared, and color has flattened making objects appear 'washed out'; however, objects in motion or highly contrasting forms may still be distinguished. This is the most common viewing distance range for seascape locations

evaluated." There are 209 historic properties located within the Background radius as it makes landfall in Virginia.

Extended Background

Extended background, locations beyond 30 mi (48 km) from the Project are considered "indistinguishable except under exceptionally favorable viewing conditions, without limiting atmospheric conditions such as haze and cloud cover." There are 502 properties located within the Extended Background radius in North Carolina and Virginia.

4.3.3.3 Field Investigations

Systematic reconnaissance surveys for both the Onshore and Offshore APEs were undertaken. Due to the differing guidelines and methodologies for the two surveys, the field methods vary between the two assessments.

Offshore Viewshed APE

Field investigation was undertaken in May and July 2021 to verify and document the maritime setting and views to the ocean of previously identified historic properties within the APE. Documentation of property setting frequently was not included in previous documentation and field verification generated information to address this data gap. Data was preloaded into Fulcrum, a digital survey platform, to record the locations of all historic properties within the APE and to document and assess the maritime setting and views to the ocean. Surveyors noted the importance of a maritime setting through proximity and views to the ocean from the property and the importance of proximity and views to the property's historical significance and integrity. Surveyors then photographed the property for reference and the properties' view towards the ocean utilizing National Park Service Photographic Standards. All surveys were conducted from the public right-of-way. Photographs were not taken from private or inaccessible properties. Properties inaccessible due to their location included those within military installations or on isolated beaches. Historic districts were photographed from the eastern edge of the historic property to depict the closest views to the ocean within the district.

An assessment of adverse effects was completed by analyzing the significance and aspects of integrity of all properties identified within the 40-mi (64-km) refined APE. Properties with both a significant maritime setting and current views to the ocean were identified for further analysis. This analysis assessed the potential impact of visibility on the qualities of significance and aspects of historical integrity that qualify the property for National Register consideration related to each resource. Consideration of effects during construction, operations and maintenance, night-time lighting, and decommissioning were made in this analysis. Tables then were developed summarizing the results of this analysis for each property within the APE.

As noted above, BOEM's 2012 study *Evaluation of Visual Impact on Cultural Resources/Historic Properties: North Atlantic, Mid-Atlantic, South Atlantic, and Florida Straits* defines a significant maritime setting as:

> Resources within this category derived their importance, in whole or in part, from their proximity to the sea. They include TCPs, coastal fortifications, parks and seashores,

> residential estates, lighthouses, life-saving stations, breakwaters, marinas, fishing and resort communities, and shore lodgings of all kinds, including hotels, motels, inns, seasonal cottages, and permanent residences (Klein et al. 2012a).

While it is unlikely that resources beyond 30 mi (48 km) will derive significance from maritime setting and proximity to the ocean, all historic or potentially historic properties within 40 mi (64 km) of the APE were analyzed. Data analysis was undertaken to analyze all previously identified properties within the APE.

Analysis for maritime views and character-defining views to the ocean were completed on the 712 recorded properties within the APE overlay. Analysis found that 25 properties would have an adverse effect from the Project due to their proximity and views to the ocean.

Onshore APE

The Onshore APE field survey was divided in two stages, correlating with the stages detailed in the VDHR *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008). The Stage 1 pre-application analysis consists of limited field reconnaissance. The Stage 2 survey consists of a full field survey and evaluation of historic resource impacts of the Onshore Project Components still under consideration at the time Dominion Energy files its application with the SCC.

Stage 1

The Stage 1 survey identified previously recorded NHL properties located within a 1.5-mi radius of the centerline of each alternative under consideration; NRHP-listed properties, locally significant resources, NHLs, battlefields, and historic landscapes within a 1.0-mi radius of each centerline; NRHP-eligible and -listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mi radius of the centerline; and all of the above qualifying architectural resources located within the ROW for each alternative route. Information on the considered resources in each study tier was collected from the V-CRIS. Information was also collected from the City of Virginia Beach City Council's Historic and Cultural Overlay Districts (City of Virginia Beach 2017), the Virginia Beach Historical Register (City of Virginia Beach 2018), and the City of Chesapeake's Historic Preservation Commission (City of Chesapeake 2018) to find locally significant resources within a 1.0-mi (1.6-km) radius of each centerline. In addition, information was collected on battlefields surveyed and assessed by the National Park Service's American Battlefield Protection Program.

Many of the previously recorded cultural resources in the vicinity of the Project have not been assessed for NRHP eligibility, and therefore are not included in the pre-application analysis, per VDHR's guidelines. Such resources are addressed as part of the full historic resource survey (Stage 2), discussed in more detail below.

Along with the records review carried out for the four study tiers as defined by VDHR, field assessments of the considered aboveground resources for each Project alternative route were performed in accordance with the VDHR guidelines. Digital photographs of each architectural resource and views to the alternative transmission line were taken. Photosimulations were prepared to assess visual impacts on the considered resources within the VDHR-defined tiered study areas for considered resources.

Nine aboveground resources fall within the VDHR tiers for Routes 1 and 6.

Stage 2

VDHR's 2008 *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008) prescribe that a full architectural survey be conducted once an alternative is approved by the SCC. While the Stage 2 survey normally covers only the SCC-approved alternative, because seven routes were still under consideration, the historic architectural study for the Project (Appendix H-3) considered all resources in the defined APE for each route, and summarized those findings for Routes 1 and 6 only. The purpose of the Stage 2 study was to record all architectural resources 50 years or older, evaluate them for eligibility to the NRHP, determine project impacts to resources that are eligible for listing on the NRHP, and develop a plan(s) to avoid, minimize, or mitigate adverse effects. If comments are received from the public or other stakeholders regarding impacts to specific resources, these comments will be taken into consideration when developing any necessary treatment plans.

Per VDHR guidance, the Stage 2 analysis identified historic properties that could be affected by the Project and described the nature of expected impacts, focusing on historic setting and viewshed of significant resources. Per the VDHR guidance document, the APE was defined in accordance with the nature of the proposed construction for specific segments of the routes, as summarized below:

- For portions of the proposed routes to be constructed within existing ROW, where no new vegetation will be cleared outside of the maintained ROW and there will be no substantial increase in tower height, the APE consists of resources adjacent to the ROW.
- For portions of the proposed routes to be constructed within existing ROW, and where there will be areas of new vegetation clearance, the APE consists of 0.5 mi on either side of the existing ROW.
- For portions of the routes to be constructed in proposed new ROW, where there is no adjacent existing ROW, the APE consists of 0.5 mi on either side of the proposed new ROW.

Survey was also conducted in accordance with a number of guidelines per below:

- *Guidelines for Assessing Impacts of Proposed Electrical Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia*;
- The approved Coastal Virginia Offshore Wind Commercial Project Onshore Aboveground Historic Properties Survey Plan prepared for the Project;
- OCS Study BOEM 2021-032, Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States (BOEM 2021);
- National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (NPS 1995);
- NHPA Section 106; and
- NHPA Section 110(f).

For Routes 1 and 6, a total of 140 resources were surveyed. Of these, 7 are listed or considered eligible for inclusion on the NRHP, and could be potentially affected by the Project depending on the selected route.

4.3.3.4 Impacts for Construction, Operations and Maintenance, and Decommissioning

The impacts of construction, O&M, and decommissioning of the Project, as described above, are based on the worst-case scenario, as detailed in Section 3, Description of Proposed Activity. The maximum design scenario represents the greatest amount of impacts the Project may have on Historic Properties. Project impacts to onshore historic properties and to recorded but unevaluated properties are anticipated to include visual impacts to maritime settings that are significant to the historical integrity of the resources. The affected resources include three lighthouses, and the State Military Reservation Historic District.

Mitigation to address adverse effects to historic properties generally is memorialized in binding agreement documents negotiated with the consulting parties in the Section 106 process. Under 36 CFR § 800.6(b)(1)(i), "The agency official shall consult with the SHPO/THPO and other consulting parties to seek ways to avoid, minimize, or mitigate adverse effects." Total avoidance or minimization of the adverse effects to historic properties identified in the current investigation is anticipated to be impracticable owing to the nature, scale, and complexity of the proposed Project WTGs.

Mitigation measures to address residual adverse effects to historic properties are designed to be commensurate with the scope and nature of the adverse effect. Examples of such mitigation may include support for cultural resource survey efforts, NRHP nominations, specialized historic preservation planning initiatives, or historic building rehabilitation.

4.3.3.5 Summary of Avoidance, Minimization, and Mitigation Measures

Mitigation options for consideration in the development of agreement documents to avoid, limit, or mitigate adverse effects to historic properties are summarized in Table 4.3-15. Dominion Energy has provided detailed mitigation plans inclusive of proposed avoidance, minimization, and mitigation as appropriate.

Table 4.3-15. Historic Properties Mitigation Options

Mitigation Measure	Resource Name	Description
Support for preparation of NRHP nominations for Chesapeake Beach, Doyletown, and/or Queen City, Virginia Beach.	Chesapeake Beach, Doyletown, and/or Queen City, Virginia Beach	This mitigation option would financially support the development of a NHRP nomination. Virginia Beach has developed a study list of potential NRHP historic districts that warrant further investigation and NRHP nomination.

Mitigation Measure	Resource Name	Description
Support for planning and design studies for the rehabilitation of the St. Teresa's Chapel and/or the 1902 Railroad Station.	St. Teresa's Chapel and/or the 1902 Railroad Station	Both buildings are candidates for rehabilitation to enable active use. Studies to advance rehabilitation would ensure appropriate treatment of the resources.
Support for the recognition and preservation of historic properties associated with African-American history, including Seatack Elementary School and the Mount Olive Baptist Church.	Seatack Elementary School and the Mount Olive Baptist Church	Preservation and interpretation of historic resources associated with African American communities is a goal of the City of Virginia Beach. Support of the preservation of the buildings associated with the City's African American history would advance this goal.
Support for updating the publication, 50 Most Significant Houses and Structures in Virginia Beach.	50 Most Significant Houses and Structures in Virginia Beach	The City of Virginia Beach previously issued a publication on historic properties within the City. Supporting an update to the publication would advance historic preservation in the city through increased public awareness.
Support the development of interpretive signs in the Historic Kempsville mini park in the City of Virginia Beach.	Kempsville mini park	Interpretative signage would advance public awareness and appreciation of the historic site.
Preservation planning support for 302 22nd Street—the C & P Telephone Building.	302 22nd Street—the C & P Telephone Building	Support of a reuse and rehabilitation study for the building would aid in planning for future preservation and use.
Support for the survey and designation of resources associated with underrepresented communities.		The history of previously under- represented groups along with the identification of associated properties will further local historic preservation initiatives.
Support for a public lecture series on preservation topics to support regional historic preservation planning objectives.		A lecture series would support public engagement in local preservation and history. Potential lecture topics include technical lectures on historic preservation topics, the early history of Virginia Beach, and historic resources from the recent past to publicize work undertaken to recognize Virginia Beach Oceanfront Resort Motel and Hotels (1955-1970).

Mitigation Measure	Resource Name	Description
Support documentation and public outreach on the history of the State Military Reservation ([SMR], formerly Camp Pendleton).	State Military Reservation (SMR)	Documentation with a public outreach component of historic resources associated with the SMR. This would enhance the public's knowledge of the resource and ensure its protection.

4.3.4 Visual Resources

This section describes the visual resources located within and surrounding the Onshore and Offshore Project Areas and potential effects to those visual resources that may result from construction, O&M, and decommissioning of the Project. Measures to avoid, minimize, or mitigate effects to visual resources are also described. Other resources and assessments detailed within this COP related to visual resources include:

- Aboveground Historic Resources (Section 4.3.3);
- Recreation and Tourism (Section 4.4.5);
- Marine Transportation and Navigation (Section 4.4.7);
- Aviation and Radar (Section 4.4.10);
- Historic Properties Assessment (Appendix H); and
- Visual Impact Assessment (Appendix I).

For the purposes of this section, the Project Area described in Section 3, Description of Proposed Activity, and the surrounding areas that have the potential to be impacted by construction, O&M, and decommissioning of the Project, were evaluated as described further below. Visual Study Areas were identified based on locations from which Project Components are likely to be visible and noticeable to the casual observer. The "casual observer" is a viewer who is not actively looking or searching for Project facilities but is otherwise engaged in activities in locations that may have views of the Project. Examples of such activities include fishing from a pier or spending time on the beach.

4.3.4.1 Data Relied Upon and Studies Completed

This section was prepared in accordance with BOEM's *Information Guidelines for a Renewable Energy Construction and Operations Plan* (BOEM 2020), which was in place at the initiation of the analysis. The visual assessment is also consistent with BOEM's *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments On the Outer Continental Shelf of the United States* (*SLIVA* methodology), which was published in April 2021 (BOEM 2021). The Visual Impact Assessment follows a standard inventory and assessment approach that applies elements of the new BOEM guidance, along with elements of the U.S. Bureau of Land Management (BLM) Visual Resource Management (VRM) system. The Project does not occur on or impact land under the jurisdiction of the BLM, but the BLM VRM system is widely used to systematically assess potential visual impacts. The methodology that was implemented for assessment in the Visual Impact Assessment has been modified from the BLM VRM system to address the specifics of offshore wind project development and is described in the Visual Impact Assessment (Appendix I). BLM visual inventory and contrast rating forms were not prepared for the onshore visual analysis; rather, BLM concepts such as user types, distance zones, form, line, color, texture, and contrast were incorporated into descriptions of existing onshore visual conditions and onshore visual impacts.

Elements of the new BOEM guidance (BOEM 2021) were incorporated and include identification of seascape and landscape zones. These zones are described and quantified in acres; scale of change has been

incorporated; as well as conclusions on degree of impact that considers contrast, scale of change, variations in impact, impacts on user experiences, and other considerations.

The Visual Impact Assessment was coordinated with Aboveground Historic Properties data and the Historic Properties Assessment (see Section 4.3.3, Aboveground Historic Properties; and Appendix H, Historic Properties Assessment). The viewshed analysis informed the selection of the aboveground historic resources recommended for evaluation, and some of those resources were evaluated in the Visual Impact Assessment if publicly accessible as representative of that viewer group (see Appendix I, Visual Impact Assessment).

4.3.4.2 Affected Environment

The affected environment is defined as the coastal, inland, and offshore areas where viewers might experience visual effects of the Onshore and Offshore Project Components. The types of viewers present within the Project Area include local residents and workers, travelers, tourists, and recreational users. The types of viewers and associated user groups may experience landscape changes differently based on activity types and viewing characteristics and are further described in the Visual Impact Assessment (Appendix I), including more detail regarding the seascape, landscape, and ocean character.

Offshore Visual Study Area

The Offshore Visual Study Area for the Offshore Project Components consists of a 40 mi (64 km) buffer around the WTGs. The Offshore Visual Study Area was determined based on a visibility analysis that evaluated the location of WTGs, curvature of the earth, and topography to identify where, and at what distance, the WTGs would be visible (see Appendix I, Visual Impact Assessment, for additional information). The Offshore Visual Study Area was used to assess the potential visibility of the Offshore Project Components and evaluate potential effects to visual resources.

Located within the 40 mi (64 km) buffer of the WTGs are the Atlantic Ocean, coastal Virginia and North Carolina, the mouth of Chesapeake Bay, and a portion of the Delmarva Peninsula. Figure I-1-9 of the Visual Impact Assessment shows the Visual Study Area used for the offshore visual analysis.

The ocean area is characterized by large expanses of open water for approximately 25 mi (40 km) or more surrounding the WTGs. The surface of the water varies from smooth and relatively level during calmer weather to undulating and choppy during more turbulent weather conditions. Also varying with weather conditions is the apparent color of the surface of the water, which ranges from blue to silver to dark grey. Existing visual intrusions offshore include buoys, channel markers, marine vessel traffic, the Chesapeake Light Tower, and the two existing WTGs of the CVOW Pilot Project. These features are visible during daytime hours, and safety and warning lights are visible during nighttime hours from certain viewing locations. Air traffic (including nighttime safety lighting on aircraft) arriving and departing from military and civilian airports is also commonly seen in the Offshore Study Area (see Section 4.4.10, Aviation and Radar).

The landward portion of the Offshore Visual Study Area is located along the eastern coastline of Virginia Beach, Virginia, and the Currituck Sound area in North Carolina in the Middle Atlantic Coastal Plain Level III Ecoregion. This ecoregion consists of low-elevation flat plains, with many swamps, marshes, and estuaries. Forest cover in the region is mostly loblolly and some shortleaf pine, with patches of oak, gum,

and cypress near major streams (EPA 2013). Agricultural fields are present in the more rural areas south of Virginia Beach and inland.

Cultural modifications that have locally altered the landscape setting include urban development associated with Virginia Beach, Chesapeake, and Portsmouth; coastal tourist and residential areas that include a boardwalk, hotels, restaurants, and shops along the Virginia Beach shoreline; and military developments including Fort Story, Naval Air Station Oceana, and Dam Neck Annex. Local infrastructure modifications include roadways, office and residential buildings and above-ground electric infrastructure.

Onshore Visual Study Area

The Onshore Visual Study Area includes areas within which the aboveground Onshore Project Components could potentially be visible when not blocked by vegetation and structures, depending on weather and atmospheric conditions. To identify locations where viewers could potentially see the aboveground Onshore Project Components, a geographic information system viewshed model was prepared for all areas within 5 mi (8 km) of those components. The viewshed model was constructed using a digital elevation model from the National Elevation Dataset (USGS 2019), enhanced to add 30 ft (9 m) of elevation for all building footprints and 50 ft (15 m) of elevation for all forested areas, as identified through the National Land Cover Database (MRLC 2021).

In some cases, the Onshore Visual Study Area could extend beyond the area within 5 mi (8 km) of Onshore Project Components; however, the description of onshore visual conditions in the Affected Environment and the analysis of onshore visual impacts (Section 4.3.4.3) is generally limited to the subset of the Onshore Visual Study Area within 5 mi (8 km) of onshore visual resources. The 5-mi (8 km) distance is consistent with the start of the "background" distance zone, as defined in the federal methodologies cited in Section 4.3.4.1, specifically the BLM VRM. At this distance, individual landscape features become simplified with only large geometric landforms discernible from one another. Large patterns of vegetation and surface conditions are discernible, but textures have smoothed and disappeared and color has flattened. At background distances, individual Onshore Project Components (e.g., Switching Station, Interconnection Cable Route towers, or Onshore Substation) would be indiscernible in most lighting, weather, and atmospheric conditions. The BLM VRM specifically advises exclusion of background areas where "the only thing discernible is the form or outline" (BLM 1986). As a result, areas more than 5 mi (8 km) from Onshore Project Components are not evaluated.

Key Observation Points for Offshore and Onshore Project Components

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

Table 4.3-16 lists the KOPs within the Offshore Visual Study Area (located in Virginia and North Carolina).

Table 4.3-16. Key Observation Points (KOPs), Offshore Visual Study Area

Field ID No.	Name	Location (County)	Character Area	Resource Type	Distance to Nearest Project Component (mi [km]) 14-MW and 16-MW WTG b/
Virginia					
5	Oyster Village Horse Island Trail	Northampton	Lower Coastal Plain/Tidewater	Public Recreation	32.5 (52.5)
8	Eastern Shore of Virginia National Wildlife Refuge	Northampton	Lower Coastal Plain/Tidewater	Public Recreation, Tourist Destination	28.2 (45.4)
13	Cape Henry Lighthouse/Fort Story Military Base	Virginia Beach	Industry/Military	Tourist Destination, Public Recreation	29.1 (46.8)
22	King Neptune Statue/Boardwalk	Virginia Beach	Virginia Beach	Tourist Destination, Public Recreation	27.9 (45.0)
23	Naval Aviation Monument Park	Virginia Beach	Virginia Beach	Tourist Destination, Public Recreation	27.9 (45.0)
26	Marriott Virginia Beach Oceanfront Hotel	Virginia Beach	Virginia Beach	Tourist Destination	28.0 (45.0)
29	Grommet Island Park/Boardwalk	Virginia Beach	Virginia Beach	Tourist Destination, Public Recreation	27.7 (44.6)
31	Picnic Views on Beach at State Military Reservation (SMR)	Virginia Beach	Industry/Military	Tourist Destination, Public Recreation	27.7 (44.6)
44	Little Island Park	Virginia Beach	Recreation	Recreation, Wildlife Viewing	26.8 (43.1)
15a	North End Beach – Residential View 1	Virginia Beach	Beach, Beachfront Residential	Beachfront Residential, Public Recreation	28.1 (45.2)
15b	North End Beach – Residential View 1 (Nighttime)	Virginia Beach	Beach, Beachfront Residential	Tourist Destination, Public Recreation	28.1 (45.2)
24a	Virginia Beach Boardwalk – 17th Street Park	Virginia Beach	Virginia Beach	Tourist Destination, Public Recreation	27.8 (44.7)
24b	Virginia Beach Boardwalk – 16th Street – Entrance (Nighttime)	Virginia Beach	Virginia Beach	Tourist Destination, Public Recreation	27.8 (44.7)
24d	Virginia Beach Boardwalk – Fishing Pier	Virginia Beach	Virginia Beach	Tourist Destination, Public Recreation	27.6 (44.4)
30a	Croatan Beach A	Virginia Beach	Beach, Beachfront Residential	Beachfront Residential, Public Recreation	27.7 (44.6)
30c	Croatan Beach C	Virginia Beach	Beach, Beachfront Residential	Beachfront Residential, Public Recreation	27.7 (44.6)
North Carolina					
47	Currituck Beach Lighthouse	Currituck	Recreation	Tourist Destination, Public Recreation	36.8 (59.2)
48	Currituck National Wildlife Refuge	Currituck	Recreation	Tourist Destination, Public Recreation	34.7 (55.8)

Field ID No.	Name	Location (County)	Character Area	Resource Type	Distance to Nearest Project Component (mi [km]) 14-MW and 16-MW WTG b/
49a	Whale Head Bay Residential View 4	Currituck	Beachfront Residential	Residential, Public Recreation	36.6 (58.9)
49g	Whale Head Bay Albacore Street Entrance – Elevated	Currituck	Beachfront Residential	Residential, Public Recreation	39.1 (62.9)

Note:
a/ Non-sequential Field ID numbers reflect that not all inventoried sensitive locations were carried forward for development of visual simulations.
b/ WTG placement for 14 MW and 16 MW is the same.

Table 4.3-17 lists the KOPs within the Onshore Visual Study Area (all in Virginia).

Table 4.3-17. Key Observation Points, Onshore Visual Study Area

KOP Number	Onshore Project Components	Location	Landscape Similarity Zones
KOP 03	Switching Station	Intersection of Dewey Road and Harpers Road	Transportation Corridor, Agriculture/Open Land, Developed—industrial
KOP 05	Interconnection Cable (Option 1)	Median of Kingsland Lane between the existing towers and the new tower locations	Developed—suburban residential
KOP 10	Fentress Substation, Fentress Substation Upgrades	Median of Fentress Loop Road at substation entrance north of intersection of Meredith Drive	Agriculture/Open Land, Developed—suburban residential
KOP 11	Interconnection Cable (Option 1, and Overhead Portion of Option 6)	East of parking lot on north side of baseball and soccer fields in Princess Anne Sports Complex	Developed Recreation Area
KOP 12	Interconnection Cable (Option 1 and Overhead Portion of Option 6)	Salem Road Development, corner of Salem Road and Highland Drive	Agriculture/Open Land, Developed—rural residential
KOP 13	Interconnection Cable (Option 1 and Overhead Portion of Option 6)	Highland Parish Development. End of Boarder Way Road (cul-de-sac)	Developed—suburban residential
KOP 14	Interconnection Cable (Option 1 and Overhead Portion of Option 6)	Indian River Road, crossing of Route 8 near Dewberry Farm residential subdivision	Suburban Residential
KOP 18	Chicory Switching Station (Option 6)	Princess Anne Road, near the Chicory Switching Station site	Developed-suburban residential

Note:
a/ Non-sequential Field ID numbers reflect that not all inventoried sensitive locations were carried forward for development of visual simulations.

4.3.4.3 Impacts Analysis for Construction, Operations and Maintenance, and Decommissioning

The potential impacts resulting from the construction, O&M, and decommissioning of the Project, as described below, are based on the worst-case scenario as detailed in Section 3, Description of Proposed

Activity. The maximum design scenario represents the greatest amount of visual impacts the Project may have on the Preliminary Onshore and Offshore Visual Study Areas.

Construction

During construction, the potential impact-producing factors to visual resources may include construction of the Offshore Project Components, staging activities and assembly of Onshore and Offshore Project Components at applicable facilities or areas, and construction of Onshore Project Components. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction. The following impacts may occur as a consequence of the factors identified above:

- Short-term visual impacts during offshore construction activities; and
- Short-term visual impacts during onshore construction activities.

Short-term visual impacts during offshore construction activities. Short-term visual effects would occur during construction of the Offshore Project Components resulting from construction activities and the presence of vessels used to transport components from fabrication and manufacturing facilities to the Project Area. Vessel traffic is common along the Atlantic Coast, and vessels being used for construction of the Project would be similar to the existing vessel traffic in the area (see Section 4.4.7, Marine Transportation and Navigation, for more information). The duration of this increased vessel traffic is also minimal, and therefore, long-term visual impacts are not anticipated.

Nighttime construction activities are also proposed to occur within the Offshore Project Area. Navigation lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform construction activities within the Lease Area and along the Offshore Export Cable Route Corridor may be visible from coastal vantage points. The vessel and construction lighting would appear similar to that associated with existing marine vessel traffic. The longest duration of nighttime construction activity would occur at a distance of 24 nm (44 km) or more from shore. Additionally, visual effects would be temporary as large vessels and lights associated with construction activities would not be present overnight once construction is complete.

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

Short-term visual impacts during onshore construction activities. Short-term visual effects would occur during construction of the Onshore Project Components resulting from construction activities and the presence of construction equipment and work crews. Construction activities associated with the Onshore Project Components would include surveying; clearing construction areas (of pavement, existing buildings, and/or vegetation, depending on the location); stockpiling topsoil; grading; forming and construction of

foundations for outdoor electrical equipment and buildings; placement and erection of buildings, electrical equipment enclosures, cranes, and electrical equipment; placement of security fencing; restoration; and landscaping installation (if required). It is anticipated that impacts would exist primarily for viewers within the Onshore Visual Study Area that have unobscured views toward the Onshore Project Area (see Section 4.3.4.2) where the presence of construction equipment, materials, and crews would be noticeable.

Construction-related visual impacts would be temporary (lasting for the duration of construction activities for a specific Onshore Project Component) and would be similar to the impacts associated with O&M of each Onshore Project Component, as discussed below. To mitigate onshore visual impacts from the construction stage of the Project, Dominion Energy would implement a Fugitive Dust Plan to minimize dust and visual pollution. The Onshore Project Area would be maintained free of debris, trash, and waste to the extent possible during construction, and areas temporarily disturbed during construction would be restored to the conditions required by state and/or local permits.

Operations and Maintenance

During O&M, the potential impact-producing factors to visual resources may include the presence of aboveground Project Components. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction. The following impacts may occur as a consequence of the factors identified above:

- Long-term visual effects from the presence of Offshore Project Components; and
- Long-term visual effects from the presence of Onshore Project Components.

Long-term visual effects from the presence of Offshore Project Components. Long-term visual effects are expected during the O&M stages of the Project as a result of introducing vertical objects (i.e., WTGs) and Offshore Substations into a landscape setting dominated by open expanses of water and defined by the horizon line. The new WTGs and Offshore Substations would be viewed in context with two existing offshore WTGs, the Chesapeake Light Tower, and marine vessel traffic in the area.

The visual simulations prepared for the Offshore Project Component Visual Impact Assessment analysis depict visibility of the Project from a variety of distances, elevations, atmospheric conditions, times of day, times of year, and site contexts. On a long-term basis during operation of the Project, views of the WTGs would be limited primarily to shoreline areas of the Delmarva Peninsula, Virginia Beach, and the Carova and Corolla Beach areas of North Carolina. The most apparent views of WTGs were found to be within 27 to 28 mi (43.5 to 45.1 km) from the Lease Area, where views are oriented toward the ocean and horizon. Within these areas, beach/shoreline and elevated viewpoints, such as multi-story buildings and/or lighthouses with ocean views, will have the most conspicuous views of the WTGs. As represented by the visual simulations, the foundations and deck of the WTGs would be below the visual horizon and would not be visible for most WTGs from most KOPs. The visible elements (tower, nacelle, and rotors) would be minimally discernable during hazy or overcast skies to distinct during the best visibility conditions (a clear, low-humidity day). Atmospheric haze or cloud cover greatly reduces visibility, as these conditions reduce visual contrast at the horizon. Refer to the Visual Impact Assessment Attachment I-1-5 for visual simulations depicting the offshore components of the Project.

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

The Offshore Substations would likely be less noticeable as they are shorter and less abundant than the WTGs. The Offshore Substations would appear as small grey blocks near the horizon and would appear similar to large marine vessels. It is anticipated that the Offshore Substations would be imperceptible from coastal viewing locations and likely not visible from most inland locations.

Viewers along the immediate coastline from Delmarva Peninsula to Corolla Beach, North Carolina, will perceive some change to ocean views during perfect viewing conditions, where the visual simulations showing contrast created by the change will vary from negligible to moderate (Appendix I-1, Table I-1-9). Concluding results are given below for Delmarva Peninsula, Virginia Beach, and North Carolina.

Delmarva Peninsula

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

Virginia Beach

In Virginia Beach, viewers on the beach with focused views toward the ocean would experience weak to moderate contrast as they view the WTGs for an extended duration. Beachgoers (e.g., sunbathers, swimmers), drawn to the beach during clear, sunny weather, may experience relatively greater impacts to their experience because their activity would predominantly place them within view of the Project under optimal viewing conditions. However, weather data compiled by BOEM for the area shows 90 percent visibility reaching 20 nm (37 km) is limited to just 7.3 percent of summer days (i.e., 6 to 7 days of the season). Viewers enjoying the Virginia Beach Boardwalk would primarily be focused on views to the north or south as they move along the promenade, but could notice the WTGs when they turn to face the ocean directly. Inland elevated views, such as from rooftop restaurants and bars and/or upper story residential units, would experience relatively more conspicuous views of the Project, because the superior position offsets some of the earth curvature screening; therefore, more of the WTGs could be seen. Refer to KOP from a rooftop restaurant on the 23rd floor of the Marriott Virginia Beach Oceanfront Hotel (Attachment I-1-5). Overall, visual impacts to KOPs in Virginia Beach would be minor to moderate.

North Carolina

In North Carolina, the nearest publicly accessible viewing location would be over 30 mi (48 km) from the nearest WTG, so even under perfect viewing conditions, visibility would be faint. Viewers in the lens room of Currituck Lighthouse may notice the WTGs as faintly contrasting white objects at the horizon, but the degree of change from this distance (38.6 mi [62.1 km]), even from an elevated position, would be slight. Other simulations at Whale Head Bay show the WTGs are imperceptible. Overall, impacts to visual resources in North Carolina would be negligible to minor.

Visual Effects from Nighttime Lighting

Dominion Energy included the effects of nighttime lighting in its visual analyses, in accordance with BOEM guidance. FAA lights will be mounted on the top of each WTG structure and will include two red lights, one on either side of the nacelle, so they are visible to pilots approaching from any direction. The FAA lights will be applicable to both the representative WTGs. The representative WTGs may also require mid-tower lighting, which will consist of three to four red lights, mounted midway between the top of the nacelle, that will flash in unison with the nacelle lights. The need and number of mid-tower lights will be dependent upon FAA requirements as well as the diameter of the tower. The proposed lighting for the Offshore Substations will include lights around the perimeter of each deck level for safety and will be mounted to lightning protection rods. Where visible, the proposed Offshore Substation lighting will be seen in the context of the FAA lights and therefore is not discussed separately.

FAA lights would be visible from locations where the nacelle is visible above the horizon line. A 2013 study prepared for the BLM (Sullivan et al. 2013) found that FAA lights were noted as being visible at a distance of 36.2 miles (58 km). It is anticipated that FAA lights would be more visible along the coastline and that most inland views would be screened by vegetation, topography, and/or development. Exceptions include elevated viewing locations, in which case FAA lights would most likely be seen in the context of other light sources such as offshore marine vessels and markers, architectural lighting and urban development, and street and traffic lights.

The introduction of nighttime flashing lights into the relatively dark setting of the Atlantic Ocean will be most noticeable from beaches and beachfront residential settings in and near Virginia Beach and Corolla Beach, North Carolina. Areas around Virginia Beach, Chesapeake Bay, and Delmarva Peninsula have more continuous vessel traffic and therefore lighting of WTGs with hub up views may not be as noticeable as areas with darker skies. It is anticipated that more contrast will be introduced in areas that are relatively void of human-made light sources, such as undeveloped beaches and natural areas along barrier islands (i.e., Back Bay NWR, False Cape State Park). However, given that these areas are primarily used during daytime hours and most of the local, state, and federal parks and beaches close at sunset, the number of affected viewers will be limited. Even viewed from highly developed beachfront areas like Virginia Beach, the flashing red FAA lights would introduce moderate to strong contrast to oceanward views during clear nighttime conditions. However, the highly developed beachfront areas are brightly illuminated after dark: the Virginia Beach Boardwalk includes bright, unhooded pedestrian lighting; streetlights; and illuminated hotels and restaurants, which would provide ambient lighting behind an east-facing viewer. For beachfront residential viewers along the coasts of Virginia Beach and potentially Corolla, North Carolina, the additional lights will introduce more contrast and may make the WTGs stand out more against the dark sky.

Ultimately, the potentially strong contrast introduced by the aviation deterrent lights may be perceived as the greatest visual impact to viewers. Contrast is anticipated to be reduced elsewhere along the coastline as the distance between the mainland and Offshore Project Area increases. At greater distances, WTGs in portions of the Offshore Project Area will not be visible because the nacelle of some WTGs will fall below the horizon. Visibility at these distances may be reduced or completely obscured by wave action and/or atmospheric conditions like cloud cover or haze.

Dominion Energy would implement an Aircraft Detection Lighting System (ADLS) (or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, pending commercial availability, technical feasibility, and agency review and approval. Dominion Energy has conducted an analysis of historical air traffic operations to determine how often the ADLS would activate the obstruction lights for the Project. The ADLS analysis report is included as Appendix T, Obstruction Evaluation and Additional Analysis.

Additionally, Dominion Energy is developing a lighting, marking, and signal plan for review and concurrence by BOEM and the USCG. The plan is based on consultations with the Fifth Coast Guard District and will conform to applicable federal laws and regulations. Dominion Energy would present the plan at least 120 days before installation. Preliminary details of the plan, as currently anticipated, are included in Section 3.5.3 of the COP. Dominion Energy would use NPS sustainable lighting best practices where practicable.

The nearest onshore vantage point is approximately 27 mi (43.5 km) from the Project Area. It is anticipated that USCG navigation lights would not be visible from most viewpoints on land because the lights would fall below the horizon line. Elevated viewpoints such as from hotel balconies may have views of the USCG navigation lights, because more of the WTG structures would be visible above the horizon. The two lighthouses evaluated in the VIA are closed at night, typically by 3:00 to 5:00 pm seasonally, so nighttime effects from the elevated lighthouse would not be seen. In addition, since USCG navigation lights are designed to be visible up to 5 nm (9 km), it is anticipated that these lights would be inconspicuous to onshore viewers (BOEM 2007). On a clear night from undeveloped beachfronts, it is anticipated that the WTG lights would create moderate to strong contrast with the dark skies, which means the lights could be a dominant element when present.

Long-term visual effects from the presence of Onshore Project Components. During O&M, the potential impact-producing factors to visual resources may include the presence of aboveground Onshore Project Components. Dominion Energy proposes to implement measures, as appropriate, to avoid, minimize, and mitigate impacts during Project construction.

Long-term visual effects during O&M of the aboveground Onshore Project Components would result from the visibility of the aboveground components associated with the Onshore Substation, Switching Station, and Interconnection Cable Route, including outside electrical equipment, static masts, perimeter security fence, and aboveground interconnection cables and transmission towers.

Appendix I, Visual Impact Assessment, provides a detailed discussion of the visual impacts of the aboveground Onshore Project Components. Overall, the Onshore Project Components would introduce new, visible transmission infrastructure in predominantly undeveloped rural forested or agricultural areas, as well as through some suburban residential areas from (and including) the Harpers Switching Station to

the Onshore Substation. The human-made transmission structures would be visually contrasting modern elements with strong vertical and horizontal linear elements, smooth surfaces, and brown (weathering steel) or black (conductors) colors.

These structures would contrast with the predominantly rough, green, irregular pattern of agricultural and forest areas, as well as the flat, rectangular light-colored character of residential areas. Due to this contrast and the height and mass of the transmission towers, the Project's structures would be noticeable if not dominant features in most views, especially close views (i.e., KOPs 12 and 17).

Most viewers would be local residents or commuters traveling on public roads. These viewers—especially local residents—would likely be sensitive to visual changes such as those observed at the KOPs associated with Option 1. Viewers would likely be more sensitive to change along segments of Option 1 that are not collocated with existing transmission lines (i.e., KOPs 3 and 12 through 14). Viewers in more developed commercial or non-residential locations (i.e., KOP 11) would likely be less sensitive to visual changes.

The Onshore Project Components incorporate the following embedded controls to mitigate onshore impacts from the O&M of the Project:

- Installation of the Onshore Export Cable underground between the Cable Landing Location and Harpers Switching Station;
- Use of the routing process, in particular collocation with existing transmission or road rights-of-way, as a mitigation technique for minimizing visual impacts;
- Siting of the Harpers Switching Station within NAS Oceana in an area with existing industrial and commercial development; and
- Use of weathering steel materials for transmission structures, which can appear similar in character to wooden transmission and distribution poles commonly viewed in the landscape.

In addition, Dominion Energy would implement a Fugitive Dust Plan to minimize dust and visual pollution, evaluate vegetative buffers to help screen views of the Onshore Substation and Switching Stations and would design the lighting of the Onshore Substation and Switching Station to reduce light pollution where feasible (e.g., downward lighting, motion-detecting sensors).

Because the Harpers Switching Station is on U.S. Navy property at NAS Oceana, any mitigations for visual impacts, such as color treatments or landscaping, will be determined by the U.S. Navy through the site acquisition process. Only one switching station will be constructed; the Chicory Switching Station would only be constructed if Interconnection Cable Route Option 6 is selected. No specific mitigations for visual impacts at the Chicory Switching Station or Onshore Substation have been identified. Mitigation (e.g., color treatments or landscaping) would be determined for the Chicory Switching Station by the City of Virginia Beach through the conditional use permitting process if the Chicory Switching Station is selected for the Project. Similarly, mitigation for the Onshore Substation would be determined by the City of Chesapeake through the permitting process.

Decommissioning

Decommissioning activities would be similar to construction activities, but in reverse, and would occur over a shorter period of time than initial construction. Once the Onshore and Offshore Project Components

are removed, the visual character of the Project area would return to baseline conditions. The Onshore Project Components, the regrowth of trees in previously forested areas used for the Project's aboveground facilities and Interconnection Cable Corridors would occur over a period of decades. A full decommissioning plan will be provided to the appropriate regulatory agencies for approval prior to any decommissioning activities, and potential impacts would be re-evaluated at that time.

4.3.4.4 Summary of Avoidance, Minimization, and Mitigation Measures

Dominion Energy proposes to implement the following measures to avoid, minimize, and/or mitigate the potential impact-producing factors described (Table 4.3-18). Dominion Energy would continue discussions and engagement with the appropriate regulatory agencies and environmental non-governmental organizations throughout the life of the Project to develop an adaptive mitigation approach that provides the most flexible and protective mitigation measures.

Table 4.3-18. Summary of Avoidance, Minimization, and Mitigation Measures

Project Stage	Location	Impact	Avoidance, Minimization and/or Mitigation
Construction; Decommissioning	Onshore Project Area	Short-term visual impacts during offshore construction activities Short-term visual impacts during onshore construction activities	• Dominion Energy would implement a Fugitive Dust Plan to minimize dust and visual pollution. The Onshore Project Area would be maintained free of debris, trash, and waste to the extent possible during construction, and areas temporarily disturbed during construction would be restored to the conditions required by state and/or local permits.
Operations and Maintenance	Onshore Project Area	Long-term visual effects from the presence of Onshore Project Components	• Dominion Energy would evaluate vegetative screening to help screen views of the Onshore Substation and Switching Station and design the lighting of the Onshore Substation and Switching Station to reduce light pollution where feasible (e.g., downward lighting, motion-detecting sensors). • Dominion Energy would consult with the U.S. Navy, City of Virginia Beach, and the City of Chesapeake to evaluate color treatment and other visual impact mitigations for Switching Station and the Onshore Substation. • Dominion Energy would implement an Aircraft Detection Lighting System (ADLS). • Dominion Energy would develop a lighting, marking, and signal plan for review and concurrence by BOEM and the USCG. The plan is based on consultations with the Fifth Coast Guard District and will conform to applicable federal laws and regulations. • Dominion Energy would use NPS sustainable lighting best practices where practicable.